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Perceived Challenges and Benefits of AI Implementation in Customer Relationship Management Systems

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Abstract

This study explores the multifaceted implications of Artificial Intelligence (AI) implementation in Customer Relationship Management (CRM) systems. The research is broken down into distinct variables, each representing a unique aspect of the study. These variables include Assistance, Automation, Personalization, Customer Service Improvement, and Decision-making. Assistance refers to how AI can aid human workers by providing suggestions, automating repetitive tasks, or helping to sift through large amounts of data. Automation discusses the use of AI to perform tasks with minimal human intervention, thereby increasing efficiency. Personalization examines how AI can use data to tailor services or products to the individual needs and preferences of each customer. Customer Service Improvement refers to the use of AI to enhance customer service, for example, by improving response times, accuracy, or personalization. Lastly, Decision-making explores how AI can assist in decision-making by analyzing large amounts of data and providing insights or recommendations. The research employs a systematic and iterative coding process, identifying 'meaning units' from interview transcriptions and grouping these into 'sub-dimensions' based on shared meaning or context. This process has resulted in 33 distinct sub-dimensions that encapsulate the key themes or concepts emerging from the data. In essence, this paper serves as a comprehensive guide to understanding the key elements that have been explored in this study, providing a clear and concise summary of the findings related to each particular area. It is instrumental in providing a holistic view of the research, allowing readers to quickly grasp the breadth and depth of the study.

Keywords
Challenges, Benefits, AI Implementation, Customer Relationship Management

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1. Introduction

Artificial intelligence (AI) is a fascinating field that merges multiple disciplines such as computer science, mathematics, and psychology, among others. It aims to create systems capable of performing tasks that would normally require human intelligence Bessen and Righi (2019); (Dennehy et al., 2023). These tasks include understanding natural language, recognizing patterns, solving complex problems, and learning from experiments (Davenport et al., 2020). AI can be divided into two categories: narrow AI, which is tailored to a specific task such as speech recognition, and general AI, which, in theory, can perform any cognitive task a human can (Bughin et al., 2017; Chatterjee et al., 2022).” Machine learning, a subset of AI that involves building algorithms capable of learning from data and making decisions or predictions, has contributed greatly to recent advances in AI (De Mauro et al., 2022). Machine learning models can be trained in a supervised manner, where known outcomes label learning data, unsupervised, where they discern patterns in unlabeled data, or reinforced, where they learn based on reward and punishment mechanisms (Mehralian & Khazaee, 2022).

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AI's ability to automate complex processes, provide accurate predictions and offer personalized services has led to its adoption in a variety of sectors. In healthcare, for example, AI makes it easier to diagnose diseases, predict patient outcomes and personalize treatment plans (Bughin et al., 2022). In the retail sector, AI improves supply chain efficiency, predicts consumer behavior, and personalizes the customer experience (Kumar & Reinartz, 2018). However, in addition to its vast potential, AI integration poses challenges. One of the main obstacles is the ethical use of AI, which encompasses issues of fairness, accountability, and transparency (Dennehy et al., 2023; Fu et al., 2020). Other issues like data privacy, job displacement, and potential misuse of AI technologies are topics of ongoing debate (Bryson & Winfield, 2017; Kindzeka, 2023).

Customer Relationship Management (CRM) systems are at the heart of modern business, as they aim to manage and improve a company's interactions with its customers. CRM systems encompass the methodologies, technologies, and strategies that companies employ to manage and analyze customer interactions throughout their lifecycle. The aim is to improve customer relationships, build loyalty and stimulate sales growth (Ledro et al., 2022; Mackey et al., 2021). CRM systems are built around the collection of data from a variety of communication channels, including the company's website, telephone, email, live chat, marketing materials, and social media (Hermosa & Castro, 2023; Huang & Rust, 2018). They offer a 360-degree view of customers, which can help companies understand and anticipate their customers' needs. CRMs have evolved from simple contact management systems to sophisticated systems offering a wide range of functionalities. Today, CRM systems integrate sales force automation, marketing automation, contact and opportunity management, as well as customer service and support (Davenport et al., 2020; Davenport & Ronanki, 2018; Ledro et al., 2022). They are also increasingly incorporating AI technologies to improve their effectiveness and efficiency (Zada, 2022; Zhiwei, 2023). While CRM systems can provide many benefits, successful implementation can be challenging. It requires a well-planned strategy, top management commitment, adequate resources, and training of users (Linthicum et al., 2019). The success of a CRM system is not just about having the right technology, but also about creating a customer-focused culture within the organization (Kaondera et al., 2023).

As the business world becomes increasingly competitive, companies are looking for ways to improve customer service and satisfaction. The integration of artificial intelligence (AI) into customer relationship management (CRM) is a potential remedy to this problem. According to a survey by Accenture, 63% of consumers are willing to disclose their data in exchange for personalized suggestions, and 76% of customers want companies to understand their requirements and expectations (Syam & Sharma, 2018). Telecommunications companies have also chosen to integrate AI into customer relationship management to improve their customer service, after seeing the potential benefits of this technology. The novelty of implementing AI in CRM is that it offers the organization the ability to analyze large volumes of customer data in real-time, which can help predict customer behavior and deliver personalized, proactive solutions. In addition, AI can automate routine tasks and provide valuable insights for the organization to identify new growth opportunities. These capabilities were previously not possible or required considerable human effort, making AI a game-changer for the organization's customer service and business operations (Seidenstricker & Krause, 2023).

The implementation of Artificial Intelligence (AI) into existing Customer Relationship Management (CRM) systems has become increasingly important in recent years. Telecom companies are recognizing the potential of AI in optimizing their CRM systems to improve customer experiences and drive business growth (Pashaie et al., 2022). By implementing AI, these organizations can improve customer engagement, automate processes, and gain valuable insights into customer behavior. However, the integration of AI into CRM systems presents both challenges and benefits. Challenges include the need for skilled personnel, the potential for data privacy breaches, and the risk of overreliance on AI. On the other hand, the benefits of AI integration include enhanced customer

satisfaction, increased operational efficiency, and improved decision-making capabilities. In the context of French telecom companies, the implementation of AI into its CRM system can provide significant benefits (Mehralian & Khazaee, 2022). The telecommunications company has a large customer base, and the effective management of customer interactions is critical to its success. AI can assist these companies in providing personalized customer experiences by analyzing customer data and providing targeted recommendations. Additionally, AI can improve the customer service by providing automated responses to frequently asked questions and issues, allowing for faster response times and improved customer satisfaction. Therefore, the need for this study is to identify the specific challenges and benefits related to AI integration into CRM systems and provide recommendations for successful implementation (Linthicum et al., 2019; Mackey et al., 2021). The findings of this study will help French telecommunication companies to leverage the benefits of AI while managing the challenges effectively, ultimately improving customer experiences and driving business growth.

Firstly, the goal is to identify the most effective AI technologies that can enhance the design and utilization of CRM systems. By examining the latest research and advancements in the field, this study will identify AI technologies such as machine learning, natural language processing, and computer vision that hold promise for improving CRM systems. Secondly, this research aims to develop a comprehensive framework for seamlessly integrating AI technologies into existing CRM systems. This framework will provide guidelines and best practices for incorporating AI capabilities into CRM processes, ensuring smooth integration and maximizing the benefits derived from AI (Zhiwei, 2023). Furthermore, the study will evaluate the potential benefits of leveraging AI technologies within CRM systems. These benefits include enhanced customer experience through personalized interactions, increased efficiency in managing customer data and processes, and the potential for cost reduction through automation and improved decision-making. Moreover, the research will delve into the challenges faced by telecom companies in implementing AI technologies within CRM systems (Martinek-Jaguszewska & Rogowski, 2023). These challenges encompass technical considerations such as data integration and system compatibility, organizational factors including change management and employee training, as well as cultural aspects that may influence the acceptance and adoption of AI technologies within the company (Ledro et al., 2022).

This study seeks to contribute to the body of knowledge regarding the integration of AI technologies into CRM systems, ultimately providing insights and recommendations for French telecom companies and other organizations aiming to leverage AI to enhance their customer relationship management practices. The study aims to explore the use of AI technologies in improving the design and use of CRM systems. The study provides a comprehensive understanding of the potential benefits and challenges of AI in CRM systems and offers practical recommendations for organizations looking to implement AI technologies in their CRM systems. Ultimately, the aim is to help organizations improve their customer service and gain a competitive advantage in the marketplace by leveraging the power of AI in their CRM systems. The current study objectives are; 1. Identify the most effective AI technologies for improving the CRM system's design and use. 2. Develop a framework for integrating AI technologies into existing CRM systems 3. Evaluate the benefits of using AI technologies in CRM systems, including improved customer experience. 4. Increase efficiency, and reduce costs. 5. Explore the challenges that French telecom companies face in implementing AI technologies in CRM systems, including technical, organizational, and cultural factors.

2. Literature

The integration of Artificial Intelligence (AI) in Customer Relationship Management (CRM) has paved the way for revolutionizing how businesses interact with their customers. AI's transformative capabilities lie in its ability to deliver personalization, automation, predictive analytics, and natural language processing. This literature review aims to explore these facets of AI in CRM in greater depth, drawing from several recent academic studies.

2.1. The Role of AI in Modern Business Practices

Artificial Intelligence (AI) is playing an increasingly central role in modern business practices. This is reflected in various areas, from decision-making processes to customer service and human resource management. AI is pivotal in supporting more informed decision-making within businesses. With machine learning algorithms and predictive modeling, AI is capable of analyzing extensive datasets to detect patterns and offer insights, which may not be readily discernible to human operators. This ability to harness the potential of big data significantly improves businesses' strategic planning and decision-making processes (Davenport & Ronanki, 2018; De Mauro et al., 2022). AI is essential for automating repetitive processes in addition to enhancing decision-making. Businesses can boost productivity and concentrate human resources on more important and innovative projects by having AI handle these duties. According to Bughin et al. (2017); Bughin et al. (2022), the automation capability of AI is essential for increasing productivity and operational effectiveness. Another area where AI is essential is in the customer experience. It offers a way to customize interactions between companies and their clients. Artificial intelligence (AI) enables the development of specialized services or goods by utilizing machine-learning models to anticipate consumer behavior. According to Huang and Rust (2018), this personalized strategy strengthens client relationships and improves customer satisfaction. Finally, AI has the potential to augment human capabilities, essentially serving as a force multiplier. It aids in interpreting complex data, assists in brainstorming sessions, and enhances problem-solving skills, thus enabling humans to perform their roles more effectively (Bryson & Winfield, 2017). AI's influence on modern business practices is profound and wide-reaching, with impacts ranging from decision-making and automation to customer experience and human capability enhancement.

2.2. IS in Organizations

The deployment of Information Systems (IS) in large-scale organizations, can lead to significant advantages. As highlighted by Mackey et al. (2021), IS can augment decision-making processes by supplying decision-makers with precise and timely information, thereby facilitating more informed decisions (Jayawardena et al., 2022). Moreover, IS can enhance organizational operations, leading to heightened efficiency, a point underscored by a study conducted by Bughin et al. (2017); Bughin et al. (2022); Chui (2017). IS is essential for improving the customer experience. Organizations may give individualized services, guarantee quick response times, and effectively handle client issues by utilizing the capabilities of IS, which will increase customer satisfaction and loyalty (Chui, 2017). Finally, IS helps businesses maintain compliance and security. IS can help firms adopt strong security measures to protect their data and achieve compliance criteria in light of the increasing importance of data protection and regulatory obligations (Martinek-Jaguszewska & Rogowski, 2023; Pashaie et al., 2022). In conclusion, Telecom firms can get a variety of advantages from the integration of information systems.

2.3. The Significance of AI for CRM Systems

The incorporation of Artificial Intelligence (AI) into existing Customer Relationship Management (CRM) systems, comes with its own set of challenges. One of these challenges is the availability of skilled personnel who can develop and maintain the system. This necessitates individuals with expertise in data science, machine learning, and software engineering. However, a study conducted by Bryson and Winfield (2017) revealed a significant skills gap in the AI talent pool, which could hinder the successful implementation of AI within organizations (Bughin et al., 2017; Bughin et al., 2022; Chui, 2017). Another challenge is the issue of data privacy. As the use of AI becomes more prevalent in organizations, there is an increased risk of data privacy breaches. Appropriate measures must be taken to ensure that customer data is securely handled and protected to safeguard customer privacy (Schatsky et al., 2017; Seidenstricker & Krause, 2023). Overreliance on AI poses yet another challenge. Relying too heavily on AI can lead to a lack of human interaction, potentially resulting in

negative customer experiences (Ledro et al., 2022; Mackey et al., 2021). Despite these challenges, implementing AI in CRM systems offers several significant benefits. One such benefit is the ability to provide personalized customer experiences. AI can offer personalized recommendations and tailored experiences to customers, thereby enhancing customer satisfaction and loyalty (Davenport et al., 2020; Davenport & Ronanki, 2018; Huang & Rust, 2018; Hutter et al., 2019).

Additionally, AI can contribute to improved customer service. Through automated responses to frequently asked questions and issues, AI can enable faster response times and enhance overall customer service (Salesforce, 2018) (Huang, M. H., & Rust, R. T., 2018). Operational efficiency is another benefit that AI can bring. By automating routine tasks, AI can free up employee time and improve operational efficiency (Bryson & Winfield, 2017; Chatterjee et al., 2022; Dennehy et al., 2023; Fu et al., 2020). Furthermore, AI can facilitate improved decision-making. By providing insights into customer behavior and trends, AI enables better-informed decision-making and strategic planning (Davenport & Ronanki, 2018; Dennehy et al., 2023). In conclusion, while implementing AI into an existing CRM system at French telecom companies may present challenges, it is crucial to carefully manage these challenges to effectively leverage the benefits of AI.

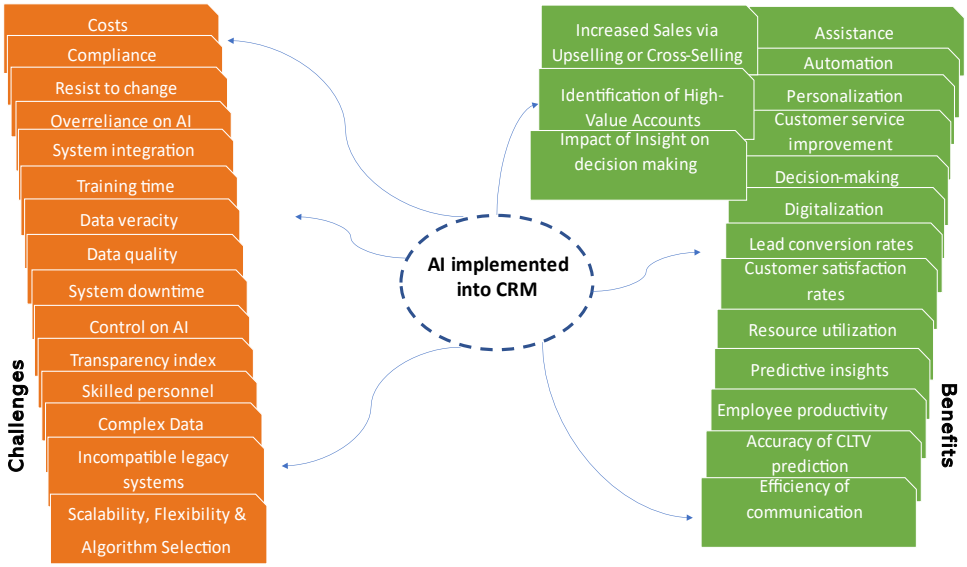

Figure 1: AI in CRM Model: Challenges & Benefits

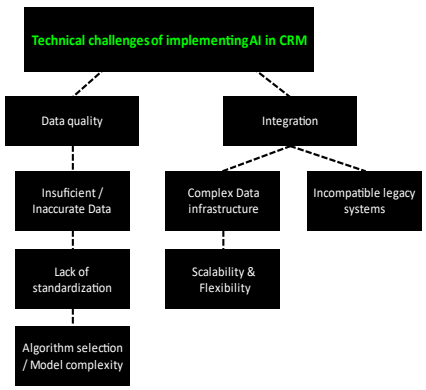

Figure 2: Technical challenges model

Figure 2 technical challenges explain AI implementation in CRM heavily relies on accurate and reliable data. However, there can be challenges with insufficient or inaccurate data, leading to skewed results and poor AI performance. Integrating AI into existing CRM systems can be complex. It requires seamless integration of AI capabilities, such as data processing, prediction, and recommendation, with the existing CRM infrastructure. CRM systems often deal with complex data structures, including unstructured data like emails, chats, and social media interactions. Processing and extracting meaningful insights from such data can pose technical challenges. Many organizations have legacy CRM systems that are built on outdated technologies. Integrating AI into these systems can be difficult due to compatibility issues. Standardizing data formats and structures across different CRM systems can be challenging. Inconsistent data formats can hinder AI implementation and interoperability between systems. AI implementations in CRM should be able to handle growing data volumes, user loads, and changing business requirements. Ensuring scalability and flexibility can be technically demanding. Choosing the right algorithms and models for AI implementation in CRM is crucial. Selecting appropriate models and managing their complexity can be challenging, as different algorithms perform differently on various CRM tasks.

2.4 AI deployment in CRM

AI can help sales teams better understand their customers' needs and preferences, identify promising leads, and personalize their interactions with customers to improve the likelihood of closing deals. AI can help marketing teams identify target audiences, personalize marketing messages, and optimize marketing campaigns for better results.AI can help customer service teams provide more efficient and effective support by automating routine tasks, providing personalized recommendations, and analyzing customer feedback to identify areas for improvement. According to Salesforce, organizations that use Einstein AI have seen an average 26% increase in lead conversion rates and a 35% increase in customer satisfaction. Another example is Zendesk's Answer Bot, which uses natural language processing (NLP) to understand customer inquiries and provide personalized responses. According to Zendesk, Answer Bot has reduced response times by up to 90% and increased customer satisfaction by up to 25%.

3. Methodology

3.1. Case Study Methodology

The case study methodology is an appropriate research design for investigating the study question because it enables the researcher to gain an in-depth understanding of the topic by examining it in its real-life context. By using a case study of Telecom Company, this study can provide insights into how AI is transforming CRM systems' use and design in a specific organizational setting. The case study approach also allows to triangulate data from multiple sources, including interviews, observations, and articles, to provide a comprehensive analysis of the research question.

3.2. Data collection

For my data collection methods, the researcher used a mixed approach, combining both qualitative and secondary data. To gather secondary data, the researcher conducted a literature review by exploring academic research articles related to my topic. This allowed me to gather information that was already published by other researchers. This literature review provided qualitative insights and knowledge on the subject, mostly about AI and CRM overall. In addition to the literature review, the researcher conducted interviews with users of the CRM system within a French telecom firm. These interviews involved collecting primary data directly from the participants. By speaking with the users, the researcher aimed to gather qualitative data that captured their opinions, experiences, and insights regarding the CRM system. Moving on to data analysis, since researcher collected both qualitative and

secondary data, my analysis approach will involve a combination of qualitative and quantitative techniques. For the qualitative data gathered from the interviews, researcher have transcribed the interviews and identified recurring themes, patterns, and key insights. This process involves techniques such as coding, thematic analysis, and content analysis. The researcher will use statistical methods to analyze it. This might include generating descriptive statistics, conducting inferential analysis, or performing correlations to identify relationships between variables.

3.3. Systematic Literature Review

The researcher employed a systematic and iterative process for the literature review, which is often referred to as a systematic literature review. This process is designed to identify, analyze, and interpret key themes or patterns from a collection of academic articles related to my research topic. The first step in this process is the identification of relevant literature. The researcher has done this by searching through various databases using specific keywords related to my study, and by manually going through journals and conference proceedings. After identifying a pool of potential articles, Researcher screened these articles based on their title and abstract to determine their relevance to my research topic. The researcher has used four filters to keep the relevant articles classified in this order:

- Filter 1: Subject area; Engineer, Business.
- Filter 2: Language: English
- Filter 3: Document type: Academic articles, peer review.
- Filter 4: Removing duplicates.

Articles that did not meet my criteria were excluded. The remaining articles were then read in full to further assess their relevance and quality. Once the selection process was complete, the researcher extracted relevant information from each of the selected articles. This included the authors' names, year of publication, research methods used, key findings, and conclusions. The researcher organized this information in a structured format to facilitate analysis.

Next, the Researcher conducted a thematic analysis of the extracted data. This involved identifying 'meaning units', which are phrases or sentences that represent unique ideas, events, or aspects related to my research questions. These meaning units were then grouped into 'themes' based on their shared meaning or context. The final step involved synthesizing and interpreting the findings from the thematic analysis. This involved drawing connections between the themes, comparing and contrasting different findings, and interpreting these findings in the context of my research question. Throughout this process, the researcher found that it is iterative, meaning that the researcher had to revisit earlier steps as the researcher gained a deeper understanding of my research topic through the review process. For example, Researcher had to go back and extract additional data from the articles, or the researcher identified new themes during the analysis stage that required me to re-group my meaning units. This systematic literature review methodology has provided a rigorous and transparent approach to reviewing existing literature on my research topic. It has ensured that researcher captured a comprehensive view of the current state of research, and it has provided a solid foundation for my research.

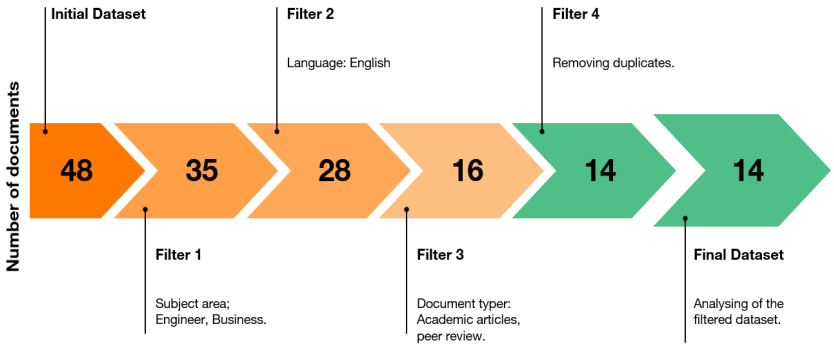

Figure 3: Search and selection of articles considered in this study

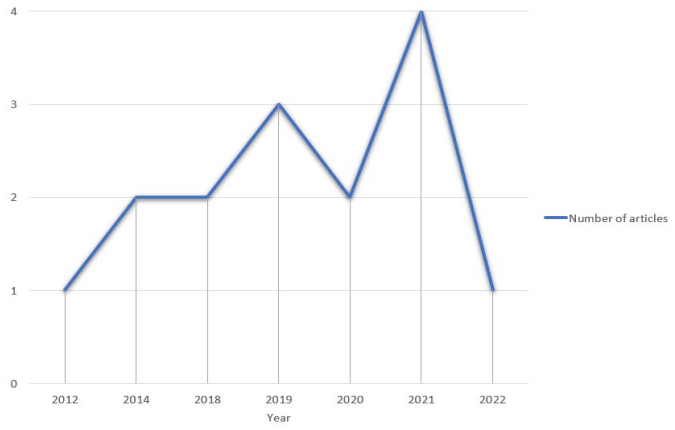

Figure 4: Temporal distribution of the filtered initial data set

3.4. Literature Review Table

Author	Objectives/Research Question	Methodology	Results
Unhelkar and Arntzen (2020)	The study explores how modern collaborative systems can benefit from intelligent decision-making and machine learning algorithms, emphasizing the role of big data in decision support across various domains.	Qualitative research approach	The paper proposes a framework using machine learning for enhanced decision-making in Collaborative Enterprise Systems, emphasizing the value of deep data insights and big data optimization.
McCarl (2022)	The paper explores the limits of artificial intelligence (AI) in the field of law, focusing on the challenges of making law computable and the potential applications of AI in legal research, information retrieval, and e-discovery.	Theoretical approach	Machine learning aids legal analytics, while traditional symbolic AI remains relevant. Modern information retrieval systems offer innovative search capabilities.
Davenport and Ronanki (2018)	The paper examines AI's role in predicting customer preferences and behaviors, exploring its potential impact on business models and marketing strategies, anticipating significant changes in both.		It emphasizes the importance of understanding AI development pathways and timelines for managers and researchers.
Huang and Rust (2018)	The aims is to explore the implications of artificial intelligence (AI) in the service industry. It investigates how AI can replace human labor, how firms should design AI service strategies, and what will happen to service jobs as AI develops.	Exploratory approach	It concludes that task nature and strategic emphasis shape the decision to replace employees with AI. It advises integrating human-machine services and upgrading intuitive and empathetic skills as AI assumes analytical roles.
Davenport et al. (2020)	The document discusses the following research questions: How does AI influence consumer behavior and decision-making? (Page	Theoretical approach	Exploration of social robots in healthcare, ethical concerns, and how AI impacts data-driven marketing and the privacy-personalization paradox.

	How does AI affect the perception of privacy and personalization? (Page 2) What are the implications of AI in the field of marketing? (Page How does AI facilitate data-driven, micro-targeting marketing offerings? .		
Bessen and Righi (2019)	Explored how technology affects job markets, showcasing the paradox of productivity-enhancing technology both increasing employment and causing job losses. Historical data from industries like textiles, steel, and auto is used.	The paper combines theoretical modeling with empirical analysis	Automation initially drives job growth, but as demand saturates, job losses occur. It highlights industry shifts and the need for workers to adapt skills and transition to new sectors.
Bryson and Winfield (2017)	Develops principles for ethical design of intelligent systems to shape technology's impact on society and explores the consequences of AI for our social order.	The paper uses a theoretical approach	Highlights the IEEE Computer Society's efforts to establish standards for responsible design in shaping our future. It also addresses AI's superhuman capabilities and examines the potential implications (Page 2).
Chatterjee et al. (2022)	The paper examines the impact of AI-integrated CRM systems on firm performance in B2B contexts, emphasizing the significance of relationships among involved firms.	Theoretical approach.	The study highlights how an AI-CRM system improves B2B relationship management, enabling quick decision-making, automation, accuracy, cost-effectiveness, and enhanced collaboration.
Addison (2021)	Examines the impact of technological advancement, competition, and user expectations on continuous digital disruption, mediated by perceived ease of use.	The paper uses a quantitative research approach.	The study contradicts the positive link between technology advancement and digital disruption, suggesting larger samples and diverse methodologies for future research.
Bello-Orgaz et al. (2016)	The paper provides an overview of social big data, covering its concept,	The paper employs a qualitative approach.	The paper highlights recent advancements in social big data, including

	characteristics, processing technologies, and applications in areas like crime analysis and epidemic intelligence.		methodologies, technologies, and applications. It also addresses challenges like privacy and efficient algorithms.
Ledro et al. (2022)	The objectives or research questions are not explicitly mentioned in the extracted sections.	The methodology of the research is not explicitly mentioned in the extracted sections.	The study identifies three AI-related CRM subfields and introduces a three-step strategy for AI in CRM. It provides academic insights and a practical guide for AI-CRM integration, suggesting areas for future research.
Hutter et al. (2019)	The paper appears to explore methods for automating machine learning pipelines	Theoretical approach	The use of GP primitives allows for the construction of flexible machine learning pipelines.
Goodfellow et al. (2016)	The book provides a comprehensive overview of deep learning for students and software engineers.		The book provides an overview of deep learning and discusses its application in various fields such as medical imaging. It explores different methods that make use of deep learning for object or landmark detection tasks in 2D and 3D medical imaging.
Bryson and Winfield (2017)	Discusses ethical considerations and standardization in AI and autonomous systems design.	Qualitative approach	The P7001 standard seeks to define transparency levels in autonomous systems, ensuring users understand their actions. With IEEE's involvement, the goal is to ensure AI and autonomous systems are beneficial and transparent for all.

3.5. Internal Quantitative Research

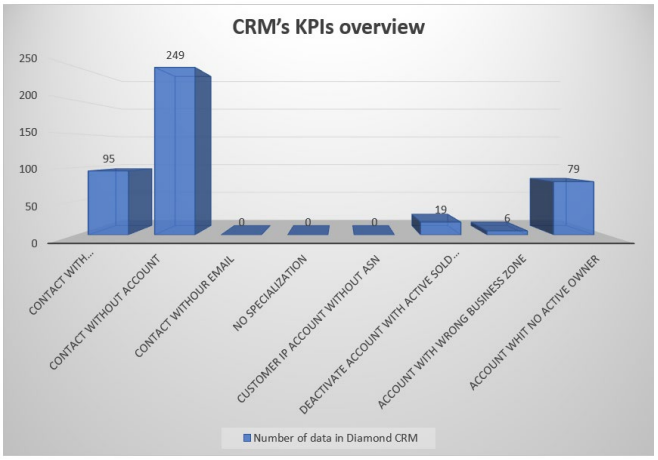

Figure 5 – CRM'S KPIs overview

In the overview of data quality in the CRM, the number of erroneous data varies greatly, but there are always important indicators for which data is missing or erroneous, such as for "Contact without an account", which represents a significant number of 249 erroneous data in the system.

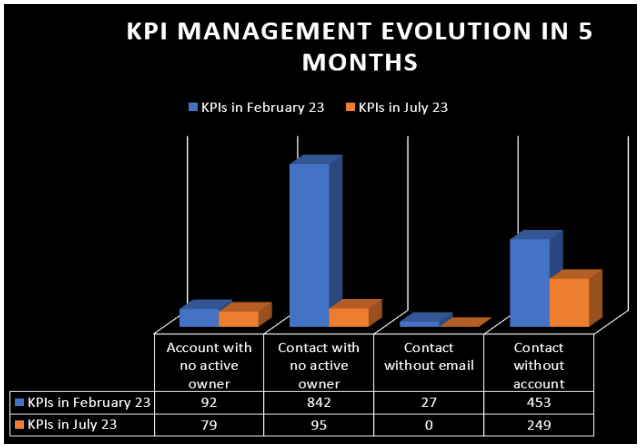

Figure 6 - Extract from the analysis of CRM KPIs on data quality

As a member of the IT team, we are constantly monitoring the erroneous CRM data, and cleaning it to keep only the relevant data. Based on the height of CRM's KPI, I chose to select four of them as an example and compare it to the previous records from five months before. In July, we can see that non-existent data or bad data represents a significant proportion of all CRM data. The numbers tend to decrease, but they do not disappear. It is difficult to keep CRM data up to date, complete, and error-free, as many data items are deemed non-priority, and few checks are made.

3.6. Interview Target and Goals

The population of interest for this study comprises individuals who are directly involved in

customer relationship management (CRM) practices within the organizations. To obtain a representative sample, a purposive sampling technique was employed, targeting CRM users that are more subject to using this system for their work. The target is segmented into two categories which correspond to two types of users, the IT/Support team and the general user's team. The sample size consisted of 10 participants, carefully selected to ensure diversity in terms of organizational status and business sector. The data for this study was collected from employees of a leader in French telecom firms, a prominent telecommunications company with a strong focus on customer-centric strategies and CRM. The participants were chosen from different departments within the organization, including IT, sales, marketing, and customer service, to provide a comprehensive understanding of CRM practices within the organization.

By conducting interviews with telecom professionals, this study aimed to gain valuable insights into the challenges and benefits d of implementing artificial intelligence in enterprise CRM by a leading organization in the telecommunications sector. The results of these interviews contribute to a better understanding of current CRM users' opinions and expectations regarding the potential implementation of AI in CRM and provide valuable recommendations for improving the existing CRM, and therefore the sales process, not only for French telecom firms but also for other organizations operating in similar sectors. The interviews sought to gather input from professionals at a French telecom firm regarding the integration of AI technologies into their existing CRM systems. By understanding their experiences, challenges, and best practices, the research aimed to develop a comprehensive framework that outlines the steps and considerations necessary for the successful integration of AI technologies into CRM systems. It also aimed to gather data on the perceived benefits resulting from the implementation of AI technologies in CRM systems. By examining the participants' insights, the study assessed the impact of AI technologies on various aspects, including customer experience, operational efficiency, and cost reduction. The interviews allowed for an exploration of the potential challenges encountered by this firm during the implementation of AI technologies in their CRM systems.

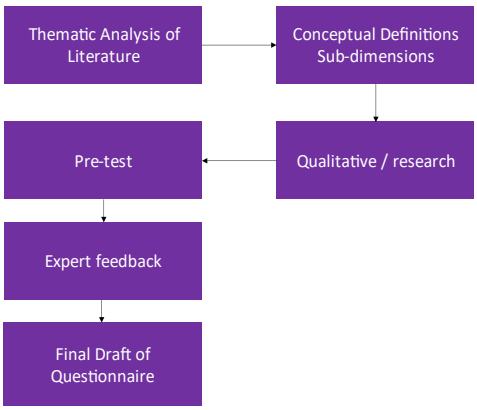

Figure 7: Research Design (Chatterjee et al., 2022)

3.8. Coding Sample

Respondents ID	Meaning unit	Sub-dimensions
Cred RES6	Unintuitive	CRM actual use
IT- SIR RES5.1	automatic data correction, e.g. email or account	automation
IT- SIR RES6	AI can improve employee's efficiency, but it needs user training: understanding the use	Skilled personnel
IT- SIR RES6.1	AI can help data definitions and data architecture.	Decision-making
Sale RES6	Data replication – data quality – lack of data on an opportunity for	Data quality – data veracity
IT- SIR RES7	Design thinking is not adapted to the expectations	Resist to change
Sale RES10	Auto generate order forms	Automation
Cred RES12	Interactive chat	Decision making – Employee productivity
Sale RES14	Specific conditions may need to added for certain clients.	Control on AI
CRMbus RES7	Appointments for the international meetings	Digitalization
CRMbus RsES10	For any user, it takes time to understand how the CRM works	Resist to change

3.9. Coding explanation

The coding process was systematic and iterative, necessitating continual revisiting of the data, the emerging codes, and the subsequent sub-dimensions. The aim of this process was not merely to simplify and reduce the data, but also to interpret and make sense of it. This provided a solid foundation for the subsequent analysis and discussion sections of my study. It is crucial to note that the references the researcher cited here are indicative and may not be the exact ones used in this paper. This explanation is grounded in standard practices in qualitative research and the specifics of the coding details provided earlier.

4. Result

4.1. Literature Sub-Dimensions Validation from Respondents

Following sub-dimensions were identified from literature and later the respondents also confirmed the same. The later section explains the extracts from respondents responses according to each subdimension.

Assistance: AI can provide ongoing support in various processes. *Citation: "We need to have constant help on the process, a chatbox may help us on the use" (Sale2 RES6).*

Automation: AI can carry out tasks without human intervention, improving efficiency. *Citation: "Automize some support task...the AI could directly provide help to the user by notifying us at the same time" (CRMman RES12).*

Personalization: AI can offer personalized interactions for a better user experience. *Citation: "Onboarding phase, AI helps the user on every stage by giving advices..." (CRMman RES7).*

Employee Productivity: AI can enhance employee productivity by providing insights and improving efficiency. *Citation: "AI can improve employees' efficiency on their everyday tasks" (IT-SIR RES6).*

Data Quality: Ensuring accurate and reliable data for AI systems is a challenge. *Citation: "The data on the current CRM need to be improved..." (IT-SIR RES5).*

System Integration: Successfully integrating AI systems into existing infrastructures can be difficult. *Citation: "The actual CRM is a Microsoft Dynamics 365 system...this can be too much for this kind of system" (IT- SIR RES7).*

Employee Acceptance: Resistance from employees towards adopting AI systems is an issue. *Citation: "Some users are reluctant to use AI, they have a preference to speak to a human instead of a machine" (CRMbus RES11).*

4.2. New Emerged Sub-Dimensions

***Benefits* Personalization:** Personalization here means tailoring interactions based on the unique needs, preferences, and contexts of users. The users experience and customer experience personalization is well known and eagerly awaited by different teams " Chat box that will remind you of things that are uncomplete" (Sale RES13), "Help with reporting: business monitoring, business anticipation, estimating the Wind ratio of different opportunities, visualizing the workflow or timeline of opportunities" (CRMman RES1), "Onboarding phase, AI helps the user on every stage by advising on what they should do on this section, what can be the impact, etc.", "from CRM data on performance statistics linked to its use, alert the user with advice. For example, AI noticed that 80% of the time, when a salesperson contacted a prospect every week, the deal progressed more quickly." (CRMman RES7). Academic studies confirm this benefit, stating that AI enables personalized interactions with customers (Kumar & Reinartz, 2018).

Automation: In the context of AI, automation refers to the capability of a system to execute tasks without human intervention. Several respondents pointed out automation as a benefit: "automatic data correction, e.g. email or account", "Automatically resolve the most recurrent bugs" (IT- SIR RES5.1), "Auto-generate order forms" (Sale RES10), "automize or modifying the process of filling in a form, for example, to check certain data. AI can help automate routine tasks such as data entry", "Automize some support tasks, if a user needs a support on a step that is recurring, based on the statistic, the AI could directly provide help to the user by notifying us at the same time" (CRMman RES12). This is in line with studies showing that automation of routine tasks increases efficiency (Bughin et al., 2017; Bughin et al., 2022).

Predictive Insights: Predictive insights refer to future-oriented, data-driven insights generated by AI. "AI can analyze historical transaction data to predict the lifetime value of a customer"(CRMman RES10), "As soon as a lead arrives, know the probability that this lead will generate business for me,

and what type of business it will be" (IT- SIR RES5), "As soon as a lead arrives or during filling the opportunity information, according to similar past data, predict if there is a risk, what it can be and how many time does it occur", " An AI that analyzes which salesperson makes the most orders, the most opportunities, the most appointments, knowing daily who does what, when and where who encounters the most difficulties? When and where?" (CRMman RES8). Similar points are discussed in academic literature (Kumar & Reinartz, 2018).

Assistance: in this context refers to the supportive role that AI can play in aiding employees with various tasks. AI is described as being of assistance for employees: " We need to have constant help on the process, a chat box may help us on the use" (Sale2 RES6), "for the IT team to have a workflow on the system bugs and notification when a bug is not solved since a time with advice on how we can fix it according to the previous similar bugs registered" (CRMman RES7). This aligns with previous research, which found AI can support human productivity (B. D. Mittelstadt et al., 2016; Pashaie et al., 2022).

Control on AI: This reflects concerns about maintaining human oversight and control over AI-driven processes and decisions. "Humans must keep control of decision making ", and "By implementing an AI, humans automatically lost a part of its control on the system" (CRMman RES4). This is a recurring concern in AI discussions(Chui, 2017) in this study, the authors discuss the ethical implications of algorithms, which underpin AI systems. One of their primary concerns is control over AI, indicating how important it is to understand and manage how these algorithms work, make decisions, and impact various aspects of society. The ability (or inability) to control AI systems has been a recurring theme in discussions about the ethics of AI.

Impact of Insights on Decision-Making: This phrase refers to the use of AI-generated insights in shaping decision-making processes. "Help with reporting: business monitoring, business anticipation - sales support - estimating the Wind ratio of different opportunities - integrating new fields ", "AI suggestion on previous data analytics" (CRMman RES4), "Having all the data, knowing that it is correct as soon as the AI verified it, to take a decision, AI help us during the process than we would be in a position to take decision thanks the predictions and the data collected" (Sale RES9). Davenport and Ronanki (2018) discuss how AI can shape decision-making processes.

Customer Service Improvement: This refers to the enhancements in customer service facilitated by AI technologies. Improving users' service through the use of AI is implied in statements like "Interactive chat" (Cred RES12) and "Automatic email while processing the opportunity" (Sale RES13). Such insights are echoed in academic literature (Huang & Rust, 2018).

Decision-making: AI's impact on decision-making refers to the ability of AI to analyze data and provide insights or recommendations, assisting human decision-making processes. Several statements reflect AI's impact on decision-making: "AI can help in predicting customer issues or dissatisfaction" (CRMman RES10), and "AI suggestion on previous data analytics" (CRMman RES4). Prior studies also highlight AI's role in enhancing decision-making processes (Davenport et al., 2020; Davenport & Ronanki, 2018).

Digitalization: Digitalization is the conversion of information into a digital (computer-readable) format. The respondent's quote " Digitization of contractual documents thanks a scan that recognizes fields and fills in directly in CRM", "Current negotiation, thanks the mail invitation information, AI should scan the mail (example: meeting minutes) and fill in the opportunity on the CRM" (IT-SIR RES10) can be connected to the idea of digitalization. Literature suggests digitalization is a crucial part of AI implementation (Schatsky et al., 2017).

Lead Conversion Rates: Lead conversion rates relate to the process of converting potential customers (leads) into actual buyers. The statement "AI can analyze numerous data points to prioritize the leads most likely to convert, saving time and effort for the sales team" (CRMman RES10) directly addresses this point. Academic research supports the idea that AI can enhance lead conversion rates (Zada, 2022; Zhiwei, 2023).

Customer Satisfaction Rates: This refers to the measurement of how products or services provided by a company meet or exceed customer expectations. The sales team is enthusiastic about the customer satisfaction aspect of implementing AI into the CRM "AI can help in predicting customer issues or dissatisfaction, allowing the company to proactively address concerns" (CRMman RES11) suggests an indirect link to customer satisfaction. Studies indicate that predictive insights provided by AI can increase customer satisfaction (Huang & Rust, 2018; Hutter et al., 2019).

Resource Utilization: Resource utilization refers to the optimal use of resources (including employees' time). "Freeing time up to complete other tasks as the manual input would be reduced" (Sale RES11) implies better resource utilization. This aligns with the findings by Bughin et al. (2017); Bughin et al. (2022).

Employee Productivity: Employee productivity refers to the efficiency of employees in performing their tasks. "AI can improve employees' efficiency on their everyday tasks and explain to them how the processes are going and the use of the CRM, but it needs user training" (IT- SIR RES6), "an AI that takes stock of efficiency, compares all the MD 365 CRMs within our group and proposes an analysis, for example, by evaluating contacts and e-mail addresses. Ours are 20% less efficient than other entities, so we lose 5% of e-mail opens on our campaigns, and each % of e-mail opens means 1/10 loss of orders." (CRMman RES6) points to the potential of AI to increase employee productivity. Research corroborates this benefit (Martinek-Jaguszewska & Rogowski, 2023).

Accuracy of CLTV Prediction: CLTV (Customer Lifetime Value) prediction accuracy refers to the ability of a system to predict the net profit attributed to the entire future relationship with a customer. "AI can analyze historical transaction data to predict the lifetime value of a customer" (CRMman RES10), speaks directly to this benefit. Kumar and Reinartz (2018) also note the potential of AI in improving CLTV prediction accuracy.

Increased Sales via Upselling or Cross-Selling: AI can analyze customer behavior to predict their needs, leading to effective upselling (offering a higher value product) or cross-selling (offering a related product), which in turn increases sales. "AI algorithms can predict customer needs and future behavior, which can lead to increased sales" (CRMman RES10), "As soon as a lead arrives or during filling the opportunity information, according to similar past data, predict if there is a risk, what it can be and how many time does it occur" (CRMman RES8). Literature confirms AI's role in driving sales (B. Mittelstadt et al., 2016; Zada, 2022).

Efficiency of Communication: This term indicates the role of AI in ensuring timely and consistent communication. "Visualizing the workflow or timeline of opportunities, prioritize and stay on top of their accounts, ensuring timely and consistent communication" (Sale RES16). This notion is explored in academic circles (Ledro et al., 2022; Mackey et al., 2021).

Identification of High-Value Accounts: This term refers to the ability of AI to identify accounts that require more attention based on their potential value or likelihood of churn. "AI can help identify which accounts require more attention based on their potential value or the likelihood of churn" (CRMman RES10). Prior studies substantiate this claim (Kindzeka, 2023; Kumar & Reinartz, 2018).

Challenges

Resist to change: This term refers to the level of acceptance or resistance from employees towards adopting AI systems. "Some users are reluctant to use AI, they have a preference to speak to a human instead a machine", “Most of International Carriers’ employees work here sing 25 years ago, they have their routine, we tend to implement new systems and processes but they seek to avoid these novelties and stay on their comfortable routine”, “Most of the employees have a low IT knowledge and because they reach a certain stage in their career they don’t want to spend time on acquiring new knowledge, they think that according to their current situation, it is not useful for them” (CRMbus RES11) points to resistance from employees. Resistance to AI adoption has been noted in research (Syam & Sharma, 2018).

Data Quality: This term refers to the challenge of ensuring that the data used in AI systems is accurate and reliable. "Data replication – data quality – lack of data on an opportunity e.g." (Sale RES4), “The data on the current CRM need to be improved, there is not enough data on the system and not all the data is verified so it can be difficult for the AI to provide good insight and make efficient predictions and provide advice with the current data” (IT-SIR RES5). Here we identify that IT team faces a huge problem with the CRM’s data quality, which is the first resource needed for an AI to be efficient. This issue has been widely discussed in the context of AI (Jayawardena et al., 2022; Kindzeka, 2023).

Transparency Index: Transparency in AI involves understanding how AI makes decisions. This is crucial for trust in AI systems. Not directly addressed in the interviews, according to the article Standardizing ethical design for artificial intelligence and autonomous systems. In this paper, the authors point out that one of the key challenges in implementing AI systems is ensuring transparency. Transparency, in this context, refers to how AI systems process information and make decisions. The authors argue that it is essential to create standards for ethical design and transparency to build public trust in AI and autonomous systems. (Brynjolfsson & McAfee, 2014; Bryson & Winfield, 2017).

System Downtime: System downtime refers to periods when a system is unavailable or offline, disrupting operations. “We are not sure of how much the system's capacity handle increasing data volume and complexity”, and “It can slowdown the system and make it more complex to fix if there is an error or a bug on an AI algorithm” (CRMman RES10) can be related to the challenge of system downtime. As the system expands, it may struggle to keep up and experience downtime. It is a known issue in IT systems (Jayawardena et al., 2022; Linthicum et al., 2019).

Data Veracity: This term refers to the truthfulness or reliability of data, which is a critical issue in AI systems. "If the AI cannot find out the veracity of a data, It can use assumptions, and if these assumptions are wrong, the sale and the prospect can be lost" (IT- SIR RES6.1), “set up a test that discerns with certainty that it is the AI that has led to the right result and not the concordance of a host of factors and data.”, “Establish a test plan which, for example, determines whether an employee is more often right than the AI about the actions that have been taken as a function of the outcome of these decisions.” (CRMman RES7). This point reflects the concern over data veracity in AI systems (Barocas et al., 2019; Dennehy et al., 2023).

Skilled Personnel: This term points to the importance of having personnel who are trained and proficient in using AI systems. "It needs user training to understand the use" (IT- SIR RES6) underlines the importance of skilled personnel. A known challenge in AI (Bessen & Righi, 2019; Bughin et al., 2017).

AI Implementation and Maintenance Cost: This term refers to the financial costs associated with implementing and maintaining AI systems. "At present, we have a budget in the form of a global

envelope, for each project we have to negotiate to increase the budget, this one is low, and integrating AI with different aspects and modules is very expensive since we will improve it more and more according to the activities", “Our CM is deployed on our server, implement new algorithms and features cost more than if it was on a cloud server” (IT- SIR RES8) directly refers to AI costs. Research underlines cost as a challenge in AI implementation (Davenport et al., 2020; Davenport & Ronanki, 2018)

Training Time: This term refers to the time required to train users to use AI systems effectively. "User may require some extra time and support to become comfortable", and “the support team must maintain a constant support to the teams to ensure the understanding of the CRM’s use with AI implemented” (CRMbus RES5) highlights the need for training. Academic literature confirms this issue (Bessen & Righi, 2019; Bughin et al., 2022)

Overreliance on AI: This term refers to the potential problem of relying too heavily on AI at the expense of human judgment and intervention. "Human must have control over decision making", “While AI facilitates tasks and processes, it can be obvious for users to be dependent on this AI and lose control over opportunities, leading to potential errors and failures”, “A sale need to know his client, for that he needs to follow the opportunity from the beginning to the end if it is not the case he can lose information about the deal” (CRMman RES4) hints at the potential overreliance on AI. The balance between AI and human intervention is an ongoing discussion (Brynjolfsson & McAfee, 2014; Bryson & Winfield, 2017)

System Integration: This term refers to the ability to incorporate the CRM system with other business applications seamlessly. However, this can lead to issues with manual data entry and an increased risk of errors. "The actual CRM is a Microsoft Dynamics 365 system; we can customize it as much as we want but the implementation of such advanced algorithms can be too much for this can of system this is why we use different systems to ensure different stages of the process", "Difficulty in seamlessly integrating the CRM system with other business applications, resulting in manual data entry and increased risk of errors." (IT-SIR RES7). Previous studies have noted the challenges of integration in the CRM context (Seidenstricker & Krause, 2023; Syam & Sharma, 2018)*(28)* **Complex Data:** This term signifies challenges in handling large amounts of data from diverse sources and structuring processes to integrate the CRM system. "We do not have sufficiently reliable data and sufficiently structured processes to be able to integrate R”, “Facing challenges in analyzing large volumes of data from various channels and touchpoints” (IT-SIR RES8). The difficulty of managing complex data in CRM systems has been widely documented in academic literature (Zhiwei, 2023).

Incompatible Legacy Systems: This term refers to the lack of compatibility between older CRM systems and newer marketing automation tools. "Lack of compatibility between the legacy CRM system and newer marketing automation tools, we tried before” (IT-SIR RES7). There is ample evidence in the literature of problems caused by legacy system incompatibility (Zada, 2022).

Lack of Standardization: This term pertains to the absence of uniform procedures, leading to discrepancies in data handling and analysis. This issue, although not directly cited in the given references, is a well-known challenge in CRM and data management literature (Fu et al., 2020).

Scalability and Flexibility: This term denotes the capacity of a system to handle increased load and adapt to changes efficiently. "Experienced system slowdowns or crashes during peak periods of high customer activity, impacting the ability to serve customers efficiently” (ITS-SIR RES8). Prior research has pointed out the importance of scalability and flexibility in CRM systems (Hermosa & Castro, 2023).

Algorithm Selection and Model Complexity: This term alludes to the intricacy of training and tuning machine learning models, which often demand considerable computational resources and specialized expertise. “Dealing with the complexity of training and fine-tuning deep learning models, requiring significant computational resources and specialized expertise” (IT-SIR RES7). The issue of model complexity and algorithm selection in AI and machine learning has been extensively discussed in the academic literature (Dennehy et al., 2023).

Compliance with Data Privacy Regulations: This term refers to the challenge of ensuring that AI systems comply with data privacy laws and regulations. "Because we are dealing with huge companies and sharing private information, the researchers need to secure the data and be sure that it can be used outside the context of a deal" (CRMbus RES13) touches on the broader theme of data privacy. Privacy issues have been extensively discussed in the context of AI (Barocas et al., 2019; Bello-Orgaz et al., 2016).

5. Discussion

Our interviews reveal that artificial intelligence (AI) in customer relationship management (CRM) systems has significant potential to positively impact various aspects of business operations, corroborating the findings of numerous academic studies. There is strong evidence that AI can assist employees in their daily tasks and improve their productivity, as noted by Hutter et al. (2019); Mackey et al. (2021). This assistance can take various forms, such as automated bug notifications or simple guidance throughout complex processes. Moreover, automation has emerged as a key advantage of AI, with the ability to handle routine tasks like data entry, form filling, or even resolving recurrent bugs, resulting in time savings for various teams, including sales, IT, and support. This efficiency boost has been documented in the works of Bughin et al. (2017)). AI is seen as a valuable tool for personalization and improving user service. For instance, the chatbot reminders and business monitoring tools cited by our respondents are similar to those mentioned by Bughin et al. (2022); Huang and Rust (2018). AI can offer personalized interactions and proactive customer service solutions, enhancing customer satisfaction and personalized customer interactions.

One area where AI seems particularly promising is in aiding decision-making. The predictive capabilities of AI can provide insights into customer behavior and anticipate issues, as suggested (Davenport & Ronanki, 2018). This predictive insight is a powerful tool for businesses, allowing them to anticipate customer needs and preferences and adapt their services accordingly. This could lead to improved customer satisfaction, loyalty, and potentially increased revenue. By analyzing large volumes of data, AI can provide valuable information and recommendations, guiding decision-making processes. This can be particularly beneficial in complex scenarios where human decision-making may be limited by the volume or complexity of the data. This finding aligns with the work of Davenport and Ronanki (2018), who highlighted the predictive capabilities of AI in decision-making. Excessive reliance on AI emerged as another potential issue. While AI can significantly improve efficiency and decision-making, there is a risk of becoming overly dependent on these systems at the expense of human judgment and intervention. While AI facilitates tasks and processes, it can lead users to become dependent and lose control of opportunities, which can result in errors and failures. This concern aligns with the ongoing debate in the literature regarding the balance between AI and human intervention (Bryson & Winfield, 2017). The ability of AI to identify high-value accounts was also a significant finding from our interviews. By analyzing customer data, AI can identify accounts that may be at risk of canceling their service or have a high potential value. This would allow companies to prioritize their resources and efforts towards these accounts, potentially improving customer retention and increasing revenue. Data quality was another important theme that emerged from our interviews. The accuracy, completeness, and reliability of the data used by an AI system to make decisions can have a significant impact on the effectiveness of the AI system. Based on internal documentation, the current CRM system lacks data and contains a large number of inaccurate data. Poor data quality could lead to inaccurate predictions or recommendations, which could have a negative impact on business operations

and decision-making. The availability of skilled personnel to manage and use AI systems was another concern raised by our respondents. This aligns with the findings of Bessen and Righi (2019), who highlighted that the lack of skilled personnel could hinder the successful implementation and use of AI systems. This highlights the need for companies to invest in training and development to equip their personnel with the necessary skills to effectively use AI systems. According to our respondents, training on the use of the CRM is not always sufficient; it is necessary to create incentives for users and emphasize the benefits for them, as they are currently hesitant about the implemented CRM changes.

Resistance to change is a significant challenge that emerged from our interviews. It refers to the level of acceptance or resistance from employees regarding the adoption of AI systems. Successful integration of AI into CRM systems requires not only technical solutions but also a cultural change within the organization. Employees need to be open to adopting new technologies and modifying their work processes accordingly. This emphasizes the importance of change management strategies in the successful implementation of AI in CRM systems. This finding aligns with the work of Syam and Sharma (2018), who highlighted resistance to AI adoption in their research. Furthermore, our interviews also highlighted several challenges related to the implementation of AI in CRM systems. Concerns such as control over AI, transparency, system downtime, data quality, and the need for skilled personnel were among the most frequently cited. The issue of maintaining control over AI is particularly critical due to its ethical implications, as emphasized by Kindzeka (2023). Another key aspect of AI integration into CRM systems is its role in digitizing customer data. AI can facilitate the conversion of various forms of information into a digital format, making it easier to store, access, and analyze. This can improve customer service and personalization efforts by providing a more comprehensive and accessible customer database, resulting in significant time savings that enhance efficiency in the sales process and for salespeople themselves, allowing them to focus on other tasks. AI implementation also presents potential challenges such as the success rate of system integration, compliance with data privacy regulations, and the costs associated with AI implementation and maintenance. Additionally, the training time for employees to become proficient in using AI-equipped systems and their acceptance rate are significant considerations. The danger of relying too heavily on AI is another important challenge raised by our respondents, echoing the concerns of Bryson and Winfield (2017). They stress the importance of maintaining a balance between AI and human intervention. The selection of appropriate algorithms and models for AI implementation in CRM systems is a crucial aspect of AI integration. Different algorithms perform differently on various CRM tasks and managing their complexity can be challenging. The selection of the right algorithm can significantly impact the effectiveness and efficiency of the AI system.

6. Recommendations

Based on our findings from the interviews and the existing literature, several recommendations can be made for French telecom firms and other organizations considering the implementation of AI in their CRM systems. Firstly, it is crucial to invest in employee training and development. Given the importance of skilled personnel in managing and using AI systems, organizations should provide comprehensive training on the use of the CRM system and create incentives for employees to learn and adapt to the new system. Moreover, implementing effective change management strategies is essential to overcome resistance to change, a significant challenge in the implementation of AI in CRM systems. This could involve communicating the benefits of the new system to employees, providing support and resources during the transition, and encouraging feedback and involvement from employees. While AI can significantly enhance efficiency and decision-making, there is a risk of overreliance on AI at the expense of human judgment and intervention. Therefore, organizations should strive to maintain a balance between AI and human intervention, setting clear guidelines on the role of AI and ensuring that human oversight is maintained in key decision-making processes. Maintaining high data quality is crucial for any AI implementation. A common issue is missing or inaccurate data, which can lead to misleading AI outcomes. De Mauro et al. (2022) suggest applying data imputation techniques to

handle such data gaps, filling in missing values based on available data, thereby preserving the data's overall quality and integrity. For a CRM system, if certain customer interaction data is missing, imputation techniques can fill these gaps using available interaction data from similar customers. Organizations should prioritize ensuring the accuracy, completeness, and reliability of their data, given that the quality of data used by an AI system can significantly impact its effectiveness. This could involve implementing robust data management practices, regularly reviewing and cleaning the data, and using reliable sources of data. In order to avoid missing data, such as empty fields that have not been filled in by the user, it is necessary to make these fields mandatory and to store proposals in case the user doesn't know or isn't sure of the value to enter. CRM systems hold a wealth of information but ensuring the accuracy and reliability of this data is paramount for the functioning and the value provided by these systems. One way of ensuring that the data entered is accurate is to integrate a data verification system. This system can leverage various Artificial Intelligence (AI) algorithms to judge the quality of the data, identify whether it's good or bad, and then make suggestions for correction if it's identified as bad. For example, consider a scenario where an erroneous email is entered into the CRM system. AI algorithms can be applied to validate the format and plausibility of the email address. If it's identified as incorrect, the system can alert the user by providing proposals for correction or confirming the accuracy of the input.

The selection of appropriate algorithms and models is crucial in AI implementation. Therefore, organizations should invest time and resources in selecting the most suitable algorithms and models for their specific CRM tasks. With the increasing importance of data privacy, organizations should ensure that their AI systems comply with all relevant data privacy regulations. This could involve regularly reviewing and updating their data privacy policies and practices and ensuring that the AI system is designed and used in a way that respects data privacy. Organizations should leverage the predictive capabilities of AI to provide valuable insights into customer behavior and identify high-value accounts. This can enhance their decision-making and allow them to prioritize their resources and efforts effectively.

Legacy CRM systems built on outdated technologies pose a challenge for AI integration due to compatibility issues. De Mauro et al. (2022) suggest creating an abstraction layer that translates the data and function calls between the old system and the new AI technologies. For example, a legacy CRM system might store data in a proprietary format, which the new AI systems can't handle directly. The abstraction layer can translate this proprietary format into a standardized one that the AI system can process. Lack of data standardization across different CRM systems can hinder AI implementation. According to Huang and Rust (2018) adhering to international data standards, such as ISO/IEC 11179, or developing internal data governance policies can promote standardization. For example, a company might enforce a policy where all CRM data must be structured in JSON format to ensure consistency and ease of processing by AI systems. AI implementations should be scalable and flexible to accommodate growing data volumes and changing business needs. Furthermore, model complexity can be managed using strategies like pruning, quantization, and knowledge distillation (Hinton et al., 2015). For example, a company might have a complex neural network model that performs well on its CRM data but is computationally intensive. Applying pruning or quantization techniques can simplify the model without significant loss in performance, making it more manageable and efficient for the company's CRM system.

7. Conclusion

AI technologies have demonstrated substantial potential in enhancing Customer Relationship Management (CRM) systems, particularly in the domains of automation, personalization, and decision-making. Automation through AI is instrumental in managing routine tasks such as data entry and form filling, thereby saving time for various teams including sales, IT, and support. Moreover, AI serves as an invaluable tool for personalization, offering tailored interactions and proactive customer service solutions. This not only enhances customer satisfaction but also streamlines personalized customer

interactions. Furthermore, AI's predictive capabilities are a boon for decision-making, as they offer insights into customer behavior and anticipate issues, allowing businesses to adapt their services accordingly. This is particularly beneficial in complex scenarios where human decision-making might be hindered by the sheer volume or intricacy of data. In the context of big data, AI technologies are pivotal in building unique customer databases and leveraging analytics capabilities. These technologies support organizations in identifying, attaining, and retaining profitable customers. They also facilitate the integration of information from new data sources into CRM decisions, while ensuring data access boundaries are clear and ethical issues are addressed. This includes managing the ethics of data and grasping ethical issues associated with AI and data usage. For the successful integration of AI into CRM systems, organizations should allocate time and resources to select the most appropriate algorithms and models tailored to their specific CRM tasks. This involves choosing the right algorithms based on the application purpose, which is a critical aspect of the technology investigation of AI and Machine Learning (ML) techniques applied to CRM activities. These technologies not only help in developing new human tasks and company capabilities but also assist in identifying the strategic, operational, and organizational changes needed.

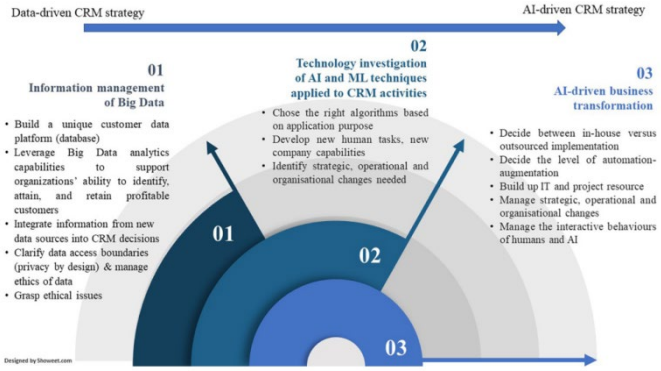

Figure 10 - Three-step strategy for AI implementation in CRM (Ledro et al., 2022)

AI-driven business transformation involves making key decisions such as choosing between in-house versus outsourced implementation, deciding the level of automation-augmentation, building up IT and project resources, and managing strategic, operational, and organizational changes. It is also important to manage the interactive behaviors of humans and AI to ensure a balance between AI and human intervention. In terms of enhancing performance and measuring impact, AI technologies can improve the overall performance of CRM systems through better decision-making, data digitalization, and handling of complex data. To gauge the impact of these improvements on business outcomes, organizations can employ AI algorithms to gain deep insights into customer behaviors and pinpoint high-value accounts. Employing classification, regression, clustering, deep learning, and recommendation algorithms, organizations can segment customers, forecast customer lifetime value, comprehend complex patterns, and suggest products or services based on past behavior. This empowers organizations to make informed decisions and effectively allocate their resources and efforts. The study's implications are significant, highlighting the transformative potential of AI technologies in enhancing CRM systems. However, it also underscores the need for a balanced approach, emphasizing the importance of human judgment and intervention alongside AI capabilities. The study suggests that AI can improve efficiency and decision-making, but an over-reliance on these systems could lead to a loss of control and potential errors. Therefore, maintaining a balance between AI and human intervention is crucial. The study also highlights the importance of data quality. The accuracy, completeness, and reliability of the data used by an AI system can significantly impact the effectiveness of the AI system. Poor data quality could lead to inaccurate predictions or recommendations, which could negatively impact business operations and decision-making. Therefore, robust data management practices are essential. The availability of skilled personnel to manage and use

AI systems is another significant implication of the study. The lack of skilled personnel could hinder the successful implementation and use of AI systems. This highlights the need for companies to invest in training and development to equip their personnel with the necessary skills to effectively use AI systems.

In terms of limitations, the study acknowledges that resistance to change is a significant challenge when implementing AI in CRM systems. Successful integration requires not only technical solutions but also a cultural change within the organization. Employees need to be open to adopting new technologies and modifying their work processes accordingly. This emphasizes the importance of change management strategies in the successful implementation of AI in CRM. Another limitation is the challenge of selecting appropriate algorithms and managing the complexity of models for AI implementation in CRM systems. Different algorithms perform differently on various CRM tasks and managing their complexity can be challenging. The selection of the right algorithm can significantly impact the effectiveness and efficiency of the AI system.

In conclusion, while AI offers significant benefits in CRM systems, such as improved decision-making, data digitalization, and handling of complex data, it also presents challenges. These challenges highlight the need for careful planning and the involvement of skilled personnel in the implementation of AI in CRM systems. Looking forward, future research should focus on exploring the ethical implications of AI in CRM systems, the impact of AI on customer satisfaction and loyalty, and the role of AI in enhancing the efficiency of CRM systems. Additionally, the research could also delve into the challenges and best practices of integrating AI into legacy CRM systems, the role of data privacy regulations in AI implementation, and the effectiveness of different AI algorithms in handling complex and unstructured CRM data. This will provide a comprehensive understanding of the potential of AI in CRM and guide future developments in this field.

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Interview Questions

1. How do you anticipate AI improving the overall efficiency and effectiveness of our CRM system's management processes?
2. What specific challenges or limitations do you encounter in managing our CRM system that you believe AI could help overcome?
3. What potential benefits do you see AI bringing to the user experience within our CRM system, and how might it enhance usability and adoption?
4. How do you envision AI supporting data management and analysis within our CRM system, and what opportunities does it present for data-driven decision-making?
5. Are there any concerns or risks associated with implementing AI in our CRM system, such as data privacy, system integration, or user acceptance? How do you plan to address them