A Systematic Literature Review on Artificial Intelligence in Customer Relationship Management

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Abstract: *Objective -This paper offers a systematic assessment of the area considering the recent advancements in Big Data and artificial intelligence (AI) technological solutions in customer relationship management (CRM), thereby exposing gaps and outlining possible avenues for future research.*

Research Methodology - The systematic review was conducted on the reporting checklist of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). A search of Scopus and other related literature returned 1269 articles; 45 papers were included following screening using the pre-determined criteria.

Findings – The outcomes of the systematic literature review allowed the authors to identify three main subfields of the AI literature within the CRM domain: Big Data and CRM as a database, AI and machine learning techniques applied to CRM activities, and strategic management of AI-CRM integrations. Additionally, each of these subfields was identified as having promising directions for future research and development. Also established in this work is a three-step conceptual model for AI deployment in CRM. Managers can use this model to create a successful strategy, while academics can use it to deepen their study of the topic.

Implications - Companies are recognizing the significance of data to gain an expanding amount of comprehensive information about their customers and the power of Big Data analytics to improve the decision-making process due to the growing interest in value creation from incorporating Big Data into CRM decisions. Researchers should delve deeper into this issue by looking into how to first measure the return on Big Data applied to CRM and SCRM investments, and then how to maximize it, as companies are increasingly investing resources in Big Data and social media without fully acknowledging the return on these investments. The change in perspective spanning strategy and technological advancement progress demonstrates the expanding desire in carrying out a fresh look at how technology interacts with society's CRM approach. Additionally, we pinpoint three key issues that can be covered later on: Chatbots, IoT, and the customer journey..

Keywords: Artificial Intelligence, Customer Relationship Management, Customer Experience, Big Data, Systematic Review

I. INTRODUCTION

Customer relationship management (CRM) entails data collection, management, and intelligent use assistance for technology solutions in order to build long-term customer connections and provide an amazing customer experience (Rababah 2011). If properly handled, the data collected from all client interaction points can assist businesses in developing personalized marketing replies, coming up with fresh ideas, customizing products and services, and ultimately offering high customer value and earning a competitive advantage (Kumar and Misra 2021). AI describes a system's capacity to accurately analyze a massive amount of data, learn from that data, and use that learning to complete specific tasks and goals (Kaplan and Haenlein, 2019).CRM users and developers both benefit from advancements in AI technology solutions, which are now necessary to live in the CRM environment. As a matter of fact, new CRM features like personality insight services, website morphing, chatbot services, programmatic advertising,

and emotional, image, and facial recognition technologies necessitate significant data to be crunched in real-time, which would be nearly impossible to implement without AI's advancements (Pearson, 2019).

Although AI is becoming more common in administrative settings, management researchers haven't offered many insights into AI during the previous 20 years (Raisch and Krakowski, 2020). The AI literature has mostly developed along the lines of two distinct disciplines: organization and management research and computer science and operations research, whose scholars have primarily examined administrative tasks that are only for humans (Raisch and Krakowski, 2020). Recently, there has been a significant increase in publications due to AI's growing importance and its possible effects on CRM. As a result, there is now a vast yet dispersed and fragmented body of knowledge on the subject (Schroder et al., 2021). This is also because CRM has multiple definitions.

Prior reviews in the field have concentrated on topics, such as the difficulties and applications of big data and artificial intelligence (AI) in customer journey modeling (Arco et al., 2019; Chatterjee et al., 2019), or the potential effects of big data and AI, respectively, on the critical success factors of CRM (Zerbino et al., 2018) and consumers' decision-making (Klaus and Zaichkowsky, 2020).

To the best of our knowledge, there has not yet been a thorough analysis of the literature on AI in the CRM field. Based on these underlying assumptions, this paper intends to trace the state-of-the-art of AI in CRM and, in doing so, identify emerging themes and intriguing lines of inquiry for further study. The authors perform a thorough, transparent, and replicable evaluation of AI in CRM for this reason using a systematic review (Zupic and Cater, 2015).

Our study addresses new significant directions for future research, expanding the field of AI in CRM (Donthu et al., 2021). Additionally, it provides practitioners with pertinent insights.

Regarding the application of artificial intelligence to customer relationship management, this research paper provides two key answers:

- How is customer relationship management using artificial intelligence?
- Why is customer relationship management using artificial intelligence?

The remainder of the essay is structured as follows. The technique, including the search plan and data collection, are described in Section 2. While Section 4 covers the key contributions and potential future study directions, Section 3 presents the results together with data analysis and visualization. The study's results, contributions, and limitations are presented in Section 5 to conclude.

II. REVIEW OF LITERATURE

A literature review is a common method of conducting research. The following search criteria are used to find the literature in the IEEE (Institute of Electronics and Electronics Engineers) Xplore digital library, Google Scholar, and Scopus.

2.1 Artificial Intelligence

A degree of intelligence known as artificial intelligence (AI) comprises robots that "think like a human" or otherwise act intelligently (Ertel, 2017). Artificial intelligence is currently one of the most hyped technologies as it has gained more and more interest from a wide range of professions. Machine learning and natural language processing are two of the numerous subfields of AI that are now considered to be essential to computer science research (Xue and Zhu, 2009). Due to its revolutionary data analytics capabilities, capacity to boost efficiency, and demonstrated capacity to provide an overall mostly favourable impact on solutions it has been introduced to, AI has found its way into an expanding volume of business infrastructures and solutions (Nayak & Dutta, 2017). Customer relationship management (CRM) system was developed to help users manage their relationships and keep a tight rein on their leads and sales. Customer relationship management aims to boost sales, customer loyalty, and total customer understanding through data gathering, analysis, and streamlined information output. Because AI can collect and analyze data, it is a relevant technology for CRM, which presents an intriguing opportunity that is explored in this thesis.

Since research on the use of AI in CRM has focused mainly on specific CRM or AI applications, a broader examination of the subject is necessary. To provide a more comprehensive view of this revolutionary phenomenon, this research paper tries to integrate some of these topics. The primary objectives of this paper are to review current AI applications in CRM and to provide a broad overview of the advantages of AI technology in CRM.

The first time the word "artificial intelligence" was used was in 1956, when John McCarthy, a young assistant professor of mathematics, and his colleagues investigated the topic. The study's premise was that any feature of learning or intelligence could be so precisely described and replicated by a machine (Buchanan,2005).

Although artificial intelligence (AI) is a very ancient technology, defining it has proven to challenge, leading to a variety of meanings for the term. One reason why artificial intelligence is hard to define is that the term "intelligence" is difficult to define. Since intelligence cannot be measured in numerical terms, many people think that we are unable to comprehend the workings of our own brains and so are unable to comprehend the concept of intelligence. It seems strange that a human would strive to imitate such a poorly understood ability given the lack of understanding. Due to its strong associations with science fiction and end-of-the-world scenarios, the term "artificial" is also under question. Together, these conflicts make it impossible to define the phrase clearly, yet many people have offered their own interpretations of what it means.

Although there is disagreement on the definition of artificial intelligence, John McCarthy's own definition is one of the most widely used: "The goal of AI is to develop robots that behave as though they are intelligent." (Ertel, 2017). AI is defined more generally by (Kiruthika & Khaddaj, 2017) as intelligent software and machines with the capacity to learn. This leads to the conclusion that artificial intelligence is superior to human intelligence. It is crucial to understand the fundamental idea of artificial intelligence (AI), which is that machines or computers are capable of some amount of intelligence or learning.

A. Application of artificial intelligence in education and business

The concept of AI is divided into two sub-parts that address pertinent applications of artificial intelligence because of the continuously expanding use of AI and the resulting vastness of the field of AI applications.

AI's role in education

Although the function of AI has altered significantly over the past few years, computers have been a significant component of education for many years. The first systems utilised to assist the student through computers included computer-based training (CBT) and computer-aided instructions (CAI). Although these systems were initially thought to be beneficial, it soon became apparent that they were not appropriate for everyone because they did not take into consideration a learner's talents.

As soon as methods for a more individualized approach to education through computers were studied, an intelligent tutoring system emerged as the first system that produced eminently favorable outcomes (ITS). Such a system was given substantial importance because research revealed that it had been an exceptional help to people like pupils. According to one study, students who used ITSs performed equally well as those who did not and needed to study for only half as long (Beck, Stern, and Haugsjaa (1996).

The use of AI as an assistant is one of its more popular applications, whether it be as a sales assistant, chatbot, tutoring system, or Scarlet - an intelligent teaching assistant (Ilhan et al.2017).

The next level of tailored learning is made possible by AI, increasing the effectiveness of the learning process. One can utilize AI to help them identify their areas of strength and weakness while also giving professors and other tutors vital information about the student and their study habits (Florea & Radu, 2019). According to a meta-analysis by de Boulay (2016), 11 artificial intelligences in education (AIED) systems outperformed one-on-one human tutoring only marginally.

AI offers numerous additional advantages in addition to those already mentioned, such as automating boring teaching tasks like grading, essay analysis, and response checking. This allows the teacher to focus on tasks that an AI cannot yet complete, such as providing more emotional support for students. Artificial intelligence (AI) is already able to recognize at-risk pupils and connect with them using their native language, which elevates their interactions above the level of surface-level communication (Florea & Radu,2019).

In conclusion, artificial intelligence is applied in a variety of educational settings, including kindergarten through high school. It is important not to undervalue or ignore the assistance AI offers as an assistant. Studies indicate that AI has had and will continue to have an impact on education. AI is expanding rapidly, and it has an impact on many aspects of our lives, including education. (Kandlhofer et al. 2017).

AI's role in businesses

Business models (BM) are evolving quickly as a result of the quick development of new technologies. A problem with the infrastructure could arise as a result of integrating several technologies, in addition to the time and money it takes. Except for its uniqueness, integrating an AI is similar to integrating other technologies. Due of AI integration's "freshness" in the market, research is limited. A rise in interest in AI is driving up investment in the field across a wide range of industries, forcing businesses to adapt to cutting-edge business models that frequently incorporate advanced technology like artificial intelligence (Soni et al. 2019).

Systems viewpoint is required for improved AI use in enterprises, claim Quan & Sanderson (2018). Business models have quickly transitioned from human interaction to human-machine communication. Businesses should think about being familiar with these technologies as the modern advanced BMI perspective shifts towards more sophisticated technologies like AI (Vartel, Lindgren, and Parasad,2017).

Every organization relies heavily on decision-making, which is frequently dependent on data obtained through information systems. Customer relationship management (CRM), supply chain management (SCM), and enterprise resource planning are examples of these systems (ERP). Artificial intelligence can be used to extract, analyse, and store data from various systems more efficiently. As a result, there is a chance that decision-making will become easier and more effective. Computational intelligence (CI) is a term used to describe a new information processing paradigm with an emphasis on intelligent system design. With CI approaches, a family of technologies that includes some AI technologies, intelligent BI systems can be developed, forging a vital link between AI and business decision-making. (Jui-Yu, 2010). People can apply their innate intelligence on a solid basis made possible by artificial intelligence (du Boulay,2016).

When viewed from a different perspective, the Gartner hype cycle provides a fair illustration of AI's rapid development. The hype cycle from Gartner is a graph that lists every new technology that year. One can see that AI-related issues frequently appear at the top of Gartner's hype cycle by looking at it. Topics like driverless vehicles and machine learning peaked the inflated expectations in 2015, and deep neural networks and a virtual assistant peaked the expectations in 2018. The hype surrounding AI is a persistent phenomenon that won't go away any time soon. (Steinert & Leifer,2010). One of the most popular methods for teaching businesses about emerging and current technologies is the Gartner cycle. According to Gartner Inc., AI technology will be included into most software products by 2020. (Kaplan, 2018).

In conclusion, from a business standpoint, using AI can have a wide range of beneficial benefits in numerous commercial domains. Since AI is still a highly nebulous technology, it is challenging to properly comprehend how it will affect organizations. In the domains of autonomous labor, data analysis, stock investment, and decision-making, relying significantly on AI may be helpful.

On the other hand, the unpredictability of AI may result in several problems, including more expenses and the need for more infrastructure. Overall, AI and machine learning are playing a bigger role in organizations, therefore it's important for companies to think about whether they want to integrate AI into their infrastructure (Muthusamy, Slominski, and Ishakian,2018). The significant potential of AI to evaluate data, manage more autonomous operations, provide outstanding calculating power, and aid various information systems in performing better are major benefits for businesses (Quan & Sanderson, 2018).
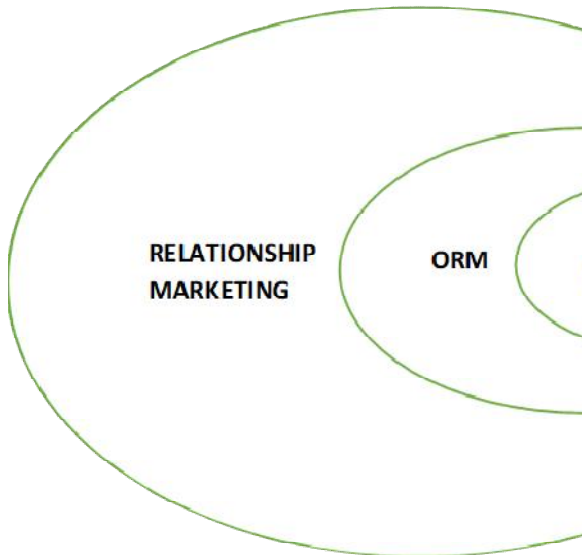
2.2 Customer Relationship Management

The definition of customer relationship management has changed recently as a result of new technologies having a significant impact on business infrastructure.

The most widely used definition of CRM is provided by Boulding, Staelin, Ehret, Johnson (2005), and Payne and Frow (2005) in the Journal of Marketing. They propose the following definition, which they have slightly condensed from their original lengthy definition: "CRM is a cross-functional strategic approach concerned with improving shareholder value through the development of appropriate relationships with key customers and customer segments."

In order to distinguish between customer relationship management and relationship marketing, integration across various functions should be emphasized when defining CRM. CRM is a sub-terms relationship marketing (RM), which

is a broader idea relating to relationship management. The graph below illustrates various relationship management theories as described by Ryals and Payne (2001) and Gummesson (2002).

Figure 1: Customer Management, CRM, and Relationship Marketing

Even though CRM is a growing trend, there is ongoing controversy regarding its efficacy. According to a Verhoef & Langerak (2002) study, only approximately 12 percent of large organizations in the EU and the US already use CRM programs, while about 28 percent are creating them. The fact that CRM project success rates are unconvincing may be one factor in the evaluations' low quality. Although this is due to misunderstandings about the usage or implications of CRM, businesses are not typically happy with the performance of their CRM systems. CRM is frequently thought of as a direct improvement in many business sectors, but in truth, deploying such systems requires much more than simply installing and using them (Richards and Jones,2008).

Although recent research indicates that this heterogeneity is not as significant as previously thought, CRM benefits vary by business because such solutions must be customized to suit a given industry. This brings us to the primary benefit that a CRM system offers in a variety of businesses and is frequently acknowledged. The three categories of equity that gain the most from CRM are relationship, value, and brand.

These three concepts can be condensed into one phrase, "customer equity," which deals with determining the worth of a client to a company. There are seven main advantages of adopting CRM, and they are as follows:

1. A better capacity to identify profitable customers
2. A cross-channel offering that is integrated
3. Increased productivity and efficiency of the sales force
4. Advertising messaging
5. Products and services with customization
6. Increased efficiency and efficacy of client service
7. More competitive pricing

The hidden customer base is important in addition to the current clientele.

CRM can aid in consumer targeting by improving the base's quality as well as its quantity. Control and targeting of a client base are crucial since customer value management is the most crucial component of CRM. Customer targeting is crucial since it is relevant to identify the three different sorts of customers: the model customer, the product consumer, and the underlying customer. Customer loyalty and happiness are attributes that are highly valued, and CRM aids

businesses in finding more valuable consumers by providing a quantifiable assessment of the customer value (Liu and Zhu,2009).

The modern consumer is more digital than ever. The vast increase in personal mobile devices, constant internet access, and the overall volume of digital footprints result in an expansion of the size and relevance of various channels. New technologies that are reshaping society and industry are causing a revolution in distribution channels. The advancement of technology has made it simpler to integrate a CRM with media platforms in the present world. CRM enables improved social channel comprehension and integration, improving customer understanding. (De Sutter et al.2011).

CRM is a useful tool for organizations given their sales staff since customer-centered marketing is rapidly expanding. CRM enables a deeper comprehension of the consumer base, enabling more customer-focused marketing. (Rust, Lemon, and Zeithaml,2004).

Communication between a company and a client is an essential action that offers a customer the chance to give the firm the feedback they want, and on the other side, it gives a company a great chance to learn about its customers and gain an advantage through effective and open communication.CRM is a useful tool for obtaining this data because it allows for the analysis and storage of customer feedback. The information gives a business the ability to continuously enhance client knowledge and services, which in turn improves customer satisfaction and loyalty (Guo & Niu,2007).

By having a deeper understanding of the consumer, the business can better meet their requirements and wishes, enabling more precisely tailored pricing. CRM's ability to improve customer knowledge is a huge benefit as pricing continues to shift away from cost-based pricing and toward customer-based pricing. (Jones & Richards, 2008). CRM integration has been successful across many departments of a business, but it's important to remember to balance key business competencies including implementation capability, marketing capability, and organization capability. Two key factors contributing to a CRM installation's success are maintaining the right balance and making a significant investment in thorough preparation. (Yang, 2010)

III. RESEARCH METHODOLOGY
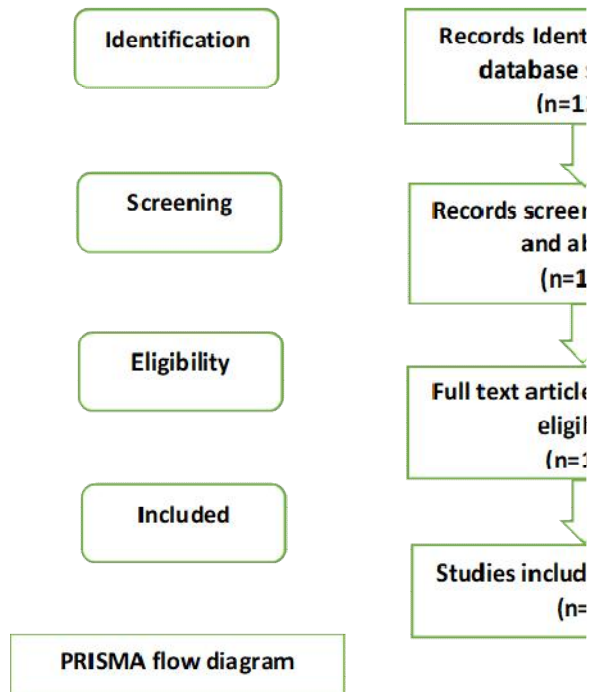
Figure 2: PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses)

Our research employed a systematic review, a type of literature review that concentrates on giving a precise summary of the body of work relevant to the various research questions by extracting multiple articles from the database. For this investigation, 45 papers were analyzed. The procedure of the article selection process is shown in Figure 2. As a result of the literature search using databases and search engines, 925 articles were eliminated after the inclusion criteria were

applied, leaving 1269 articles. The titles of the remaining 145 papers were thoroughly examined, and 100 were removed since they didn't meet the criteria for inclusion in the study. 45 articles were discovered after the abstracts of the papers that were selected were studied and the titles of the papers were checked. 7% of the items are older than 2009, while 90% date back to 2012.

A comprehensive evaluation of artificial intelligence and customer relationship management was conducted to determine the methods research academics in this subject used, and this led to numerous quantitative and qualitative literature studies. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses were used to guide the systematic review (PRISMA). We selected several gaps and issues that make up the research's keywords in order to satisfy the study's aim. In the beginning, we identified the two fundamental concepts—"artificial intelligence or big data," "and customer relationship management or customer experience,".

An extensive search of the literature was conducted for this study to locate different research papers from different journals (Mura and Pahlevan Sharif, 2017).

According to the observations, all articles published in social science, business & management, and computer science journals between January 2011 and December 2021 were searched for systematic reviews in accordance with the needs of the study.

We recorded the analysis procedure and inclusion standards in accordance with the protocol created (PRISMA) for a systematic review. We used Scopus to search for articles that had the terms"artificial intelligence or big data," "and customer relationship management or customer experience," in the titles, abstracts, or keywords of their publications in the chosen journals. We used TITLE-ABS-KEY and the phrases ((artificial intelligence OR big data) AND (customer relationship management OR customer experience)) in the advanced search option.

We then performed the following exclusion criteria after looking for numerous publications: articles published in 2022, articles not written in English, and articles not published in a peer-reviewed journal. The publications covering the fields of "social sciences," "computer science," and "business, management, and accounting," commencing in January 2011 and ending in December 2021, were included.

The article's title, main concepts, authors' names and affiliations, journal name, and year of publication were all exported to an MS Excel spreadsheet along with the article's abstract. The adjustment was made by including a few things for data management in the MS Excel spreadsheet. Two impartial reviewers looked over the titles and abstracts of the identified records. When reviewers disagreed throughout the screening step, they talked it out and came to an agreement. The two authors divided the job into two parts; one author extracted the data from the study's papers, while the other verified the extracted data. Disagreements between the authors were settled by conversation. All the papers were thoroughly evaluated after the authors had reached an arrangement.
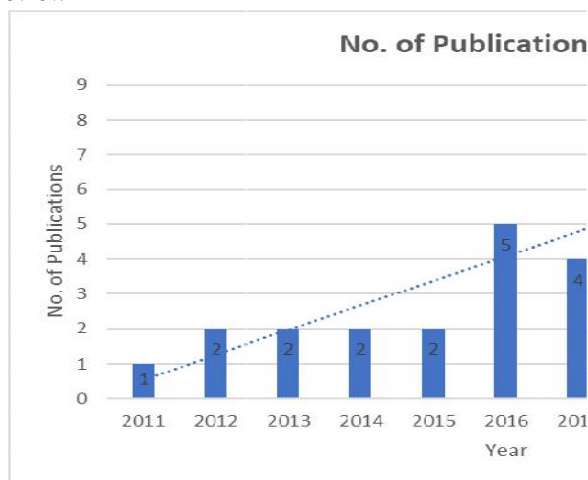
IV. DATA ANALYSIS AND FINDINGS

4.1 Academic Review

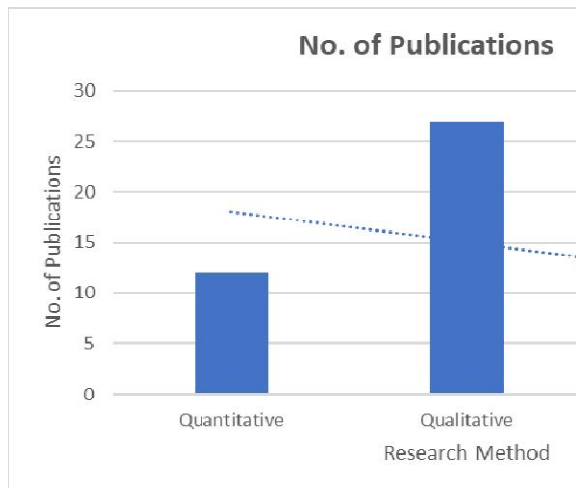**Figure 3: No. of publications by year**

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Academic research in journal publications about "artificial intelligence or big data," "and customer relationship management or customer experience," started emerging in the mid- 1920s. Six articles were published in 2018; the anticipated number of 2020 and 2021 publications, shown in Figure 3, appears to be 6 and 8, which shows the number of publications has increased over a period.

In terms of regional focus, metropolitan areas (40%) have more articles than rural areas (5%), according to Figure 4. 22 articles, or 55% of the total, dealt with both urban and rural regions.
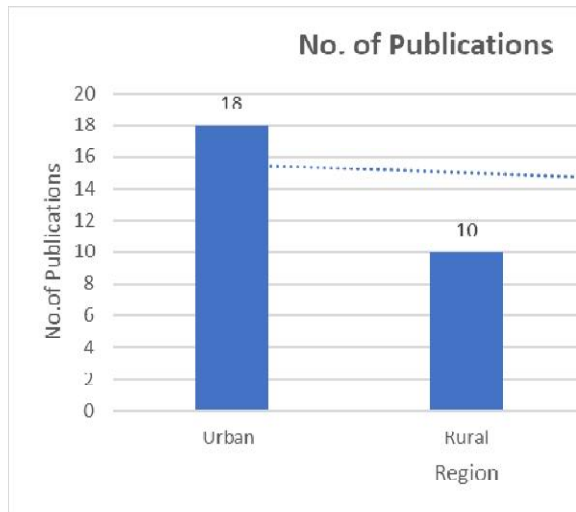
Figure 4: No. of publications by region

Regarding the research techniques depicted in Figure 5, 26.67% of the publications (12) used quantitative techniques, whereas 27 articles (60%), used qualitative techniques. 6 articles, or 13.33% of the total, combined quantitative and qualitative research.


Figure 5: No. of publications by research method

V. DISCUSSION AND CONCLUSIONS

The analytical component of CRM is addressed by information management (Buttle, 2009). It entails gathering, organizing, and using customer-related data in order to assist executives in understanding consumer preferences and behavior (Thakur and Chetty, 2019). Companies are recognizing the significance of data to gain an expanding amount of comprehensive information about their customers and the power of Big Data analytics to improve the decision-making process due to the growing interest in value creation from incorporating Big Data into CRM decisions (Bernardino and Neves, 2016).
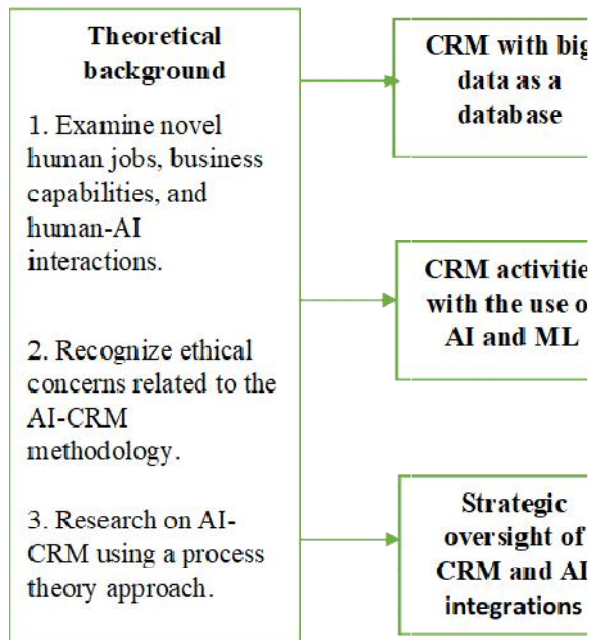
Figure 6: Future research areas for AI-CRM integrations

However, the emergence of Big Data has created even greater difficulties as businesses struggle to build analytical capabilities, which are skills used by organizations to extract useful information from data and can support organizations' ability to identify, attain, and maintain competitive advantages.

The findings also confirm a growing interest in social CRM (SCRM) and SCRM analysis (Anshari et al., 2015; Chang, 2018; El Fazziki et al., 2017). In order to gain valuable insights into their business opportunities in today's cutthroat business environment, companies are becoming more and more dependent on listening to and understanding customers' expectations, opinions, and conversations on social media networksby Del Vecchio et al. (2020), who showed how the combination of netnography and big data analytics is necessary for the creation of a successful CRM strategy. However, there is still limited research on the use of AI tools for social network analysis methods to convert the substantial amounts of data available on social media into useful insights for CRM.

Researchers should delve deeper into this issue by looking into how to first measure the return on Big Data applied to CRM and SCRM investments, and then how to maximize it, as companies are increasingly investing resources in Big Data and social media without fully acknowledging the return on these investments. To strengthen the evaluation of these investments, scholars may supplement the performance methodologies typically used in marketing with those frequently employed in information system research (Maklan et al., 2015). Findings have also shown that there is significant interest in doing sentiment analysis on Big Data that is derived from social media networks (El Fazziki et al., 2017; He et al., 2015). Utilizing CRM's skills for gathering and analyzing customer data, sentiment analysis may be a potent tool for expanding customers' vision both inside and outside of the firm. Throughout the customer experience, from negotiation to post-purchase, to request or after-sale help, organizations can use sentiment analysis to analyze spoken and textual contacts with customers. New research along all these aspects is encouraged. We also urge academics to apply AI to extract value from the text and other content produced by businesses and their clients, in line with Kietzmann and Pitt (2020).

According to Wang and Hajli (2017), the second topic of research focuses on the "AI and ML approach used to CRM operations," and we see that this ever-expanding body of research has largely focused on the development, analysis, and comparison of various AI and ML techniques. However, corporate organizations need to approach AI and ML approaches within CRM systems from a strategic position rather than from a purely technical viewpoint if they are to fully profit from them (Iansiti and Lakhani, 2020). To ensure that the new technical applications match the

organizational context and CRM strategy, it is crucial to examine CRM requirements, capabilities, and practices and understand their influence on people's behavior and performance (Catalan-Matamoros, 2012).

The third research area, referred to as "Strategic examines the administration of AI-CRM integrations rather than looking at integration from a narrow strategic perspective the examination of certain technological applications. This subdivision considers CRM as a tool that drives strategy through useful insights rather than a database and emphasizes the use of AI approach CRM with a focus on the customer. The change in perspective spanning strategy and technological advancement progress demonstrates the expanding desire in carrying out a fresh look at how technology interacts with society's CRM approach. Additionally, we pinpoint three key issues that can be covered later: Chatbots, IoT, and the customer journey

VI. CONCLUSION AND RECOMMENDATIONS

This study defines and describes three subfields that form and characterize this literature within the CRM domain, in response to Raisch and Krakowski's (2020) call for the development of comprehensive viewpoints on the AI debate in management. CRM as a big data platform, the application of AI and ML to CRM tasks, and the strategic management of AI-CRM connections.

The results indicate that CRM is transitioning from a data-driven to an AI-driven strategy (Colson, 2019). Recent research has also moved away from focusing solely on individual technology applications to maximize the operational efficiency or CX within a single CRM activity and toward a broader strategic strategy to harness the power of AI to improve CRM.

VII. LIMITATIONS

Despite these benefits, our study has certain drawbacks that may possibly present opportunities for future research. First, as bibliographic coupling does not capture the goals or driving forces that motivated the authors to cite earlier works, limitations are mostly connected to the flaws of citing behavior (Vogel and Güttel, 2013; Soranzo et al., 2016). Furthermore, as they potentially exhibit more intersections with the references of other articles, publications with more references are over-weighted (Agostini and Nosella, 2019). Second, in order to develop complete and full knowledge, future work can operationalize and evaluate the suggested conceptual model, finding potential moderators, mediators, and regulating factors. In conclusion, we hope that our research will serve as an example for future investigations to further our understanding of AI in CRM.

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