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**NEW TRENDS IN CRM SOFTWARE SYSTEMS:
THE IMPACT OF AI AND MACHINE
LEARNING INTEGRATIONS ON CUSTOMER
ANALYTICS**

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Master's Thesis

Supervisor

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ABSTRACT

NEW TRENDS IN CRM SOFTWARE SYSTEMS: THE IMPACT OF AI AND MACHINE LEARNING INTEGRATIONS ON CUSTOMER ANALYTICS

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In this era of paced digitalization significant changes have surfaced. Nowadays companies are not just gathering customer information. Also concentrating on analyzing this data in an efficient manner to improve the overall customer satisfaction. The incorporation of machine learning and artificial intelligence, in CRM systems has revolutionized the way customer analysis is conducted making it a sophisticated and multifaceted procedure. Traditional CRM systems were originally created to store customer information and conduct analyses; however., AI and machine learning powered CRM systems offer sophisticated analytical features, like forecasting customer actions and creating customized marketing plans. These advanced technologies, fundamentally utilizing big data and data mining methods to analyze customer data, offer businesses strategic advantages in competitive markets. The contributions of machine learning and AI to CRM software play a crucial role, especially in customer segmentation, customer lifecycle analysis, and the implementation of upselling and cross-selling strategies. Moreover, these technologies allow for faster and more efficient analysis of customer complaints and feedback, enabling businesses to develop proactive solutions aimed at increasing customer satisfaction. Within the framework of machine learning and AI, the data analysis capacity of CRM software has been enhanced, providing

deep insights into customer-business interactions and automating business processes (BPA), particularly in marketing. The primary objective of this study is to examine in detail the impact of AI and machine learning integrations on customer analysis in CRM software. Specifically, the study will explore the role of AI and machine learning in increasing customer loyalty, predicting customer behavior, and personalizing customer interactions. The contribution of these technologies to the development of customer-centric strategies by businesses will be assessed. By analyzing the effects of machine learning and AI on customer segmentation, customer lifecycle management, and data-driven marketing strategies, this study will investigate how these integrations have driven transformative changes in CRM software.

Keywords: CRM, AI, Software, Machine Learning, Analyzing

ÖZET

CRM YAZILIM SİSTEMLERİNDE YENİ TRENDLER: YAPAY ZEKA VE MAKİNE ÖĞRENİMİ ENTEGRASYONLARININ MÜŞTERİ ANALİTİĞİ ÜZERİNDEKİ ETKİSİ

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Bu hızlı dijitalleşme çağında önemli değişiklikler ortaya çıkıyor. Günümüzde şirketler sadece müşteri bilgilerini toplamıyor. Ek olarak, genel müşteri memnuniyetini artırmak için bu verileri verimli bir şekilde analiz etmeye odaklanıyor. Makine öğrenimi ve yapay zekanın CRM sistemlerine dahil edilmesi, müşteri analizinin yürütülme biçiminde devrim yaratarak onu karmaşık ve çok yönlü bir prosedür haline getirdi. Geleneksel CRM sistemleri başlangıçta müşteri bilgilerini depolamak ve analizler yapmak için oluşturuldu. Yapay zeka ve makine öğrenimi destekli CRM sistemleri ise, müşteri eylemlerini tahmin etmek ve özelleştirilmiş pazarlama planları oluşturmak gibi gelişmiş analitik özellikler sunuyor. Müşteri verilerini analiz etmek için temelde büyük veri ve veri madenciliği yöntemlerini kullanan bu ileri teknolojiler, işletmelere rekabetçi pazarlarda stratejik avantajlar sunmakta. Makine öğrenimi ve yapay zekanın CRM yazılımına katkıları, özellikle müşteri segmentasyonunda, müşteri yaşam döngüsü analizinde ve satış ve çapraz satış stratejilerinin uygulanmasında çok önemli bir rol oynamaktadır. Ayrıca bu teknolojiler, müşteri şikayetlerinin ve geri bildirimlerinin daha hızlı ve verimli bir şekilde analiz edilmesini sağlayarak işletmelerin müşteri memnuniyetini artırmaya yönelik proaktif çözümler geliştirmelerini sağlar. Makine öğrenimi ve yapay zeka çerçevesinde, CRM yazılımının veri

analiz kapasitesi artırılarak müşteri-iş etkileşimleri hakkında derin bilgiler sağlandı ve özellikle pazarlamada iş süreçlerini (BPA) otomatikleştirdi. Bu çalışmanın temel amacı, CRM yazılımında yapay zeka ve makine öğrenimi entegrasyonlarının müşteri analizi üzerindeki etkisini ayrıntılı olarak incelemektir. Spesifik olarak, çalışma, müşteri sadakatini artırmada, müşteri davranışını tahmin etmede ve müşteri etkileşimlerini kişiselleştirmede yapay zeka ve makine öğreniminin rolünü araştıracaktır. Bu teknolojilerin işletmeler tarafından müşteri odaklı stratejilerin geliştirilmesine katkısı değerlendirilecektir. Makine öğrenimi ve yapay zekanın müşteri segmentasyonu, müşteri yaşam döngüsü yönetimi ve veri odaklı pazarlama stratejileri üzerindeki etkilerini analiz ederek, bu çalışma bu entegrasyonların CRM yazılımındaki dönüştürücü değişiklikleri nasıl yönlendirdiğini araştıracaktır.

Anahtar Kelimeler: CRM, Yapay Zeka, Yazılım, Makine Öğrenmesi, Analiz.

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ABBREVIATIONS

AI	:	Artificial Intelligence
CRM	:	Customer Relationship Managemet
ML	:	Machine Learning



1. INTRODUCTION

This article examines the purpose, significance, research questions, and methodology of a thesis focused on the integration of Artificial Intelligence (AI) and Machine Learning (ML) into Customer Relationship Management (CRM) software. The rapid evolution of technology has transformed CRM practices, requiring a deeper understanding of how these integrations impact customer analytics and business performance. This study aims to contribute to the existing literature by providing insights into the impacts of AI and ML in CRM systems and ultimately improve customer engagement and retention strategies. The emergence of AI and ML technologies has significantly impacted various industries, especially in the field of customer relationship management (CRM). The aim of this thesis is to investigate how these technologies can be integrated into CRM software to improve customer analytics and enhance business outcomes. As organizations increasingly rely on data-driven decision making, understanding the role of AI and ML in CRM becomes crucial. The integration of these technologies allows businesses to more effectively analyze customer behavior, predict customer churn, and adapt their marketing strategies accordingly [1]. The significance of this research lies in its potential to provide organizations with actionable insights that can lead to improved customer retention and satisfaction. By leveraging AI and machine learning, businesses can move beyond traditional CRM practices that are often based on static data analysis to a more dynamic approach that takes into account real-time customer interactions and preferences. This shift not only improves customer experience but also increases profitability by optimizing marketing efforts and resource allocation. Several key research questions were formulated to guide this research: 1. How do AI and machine learning integrations in CRM software impact customer analysis and segmentation? 2. What are the implications of predictive analytics on customer retention strategies in CRM systems? 3. How can organizations effectively implement AI and ML technologies in their existing CRM frameworks? 4. What challenges do businesses face when integrating AI and ML into their CRM practices, and how can these challenges be mitigated? These questions aim to explore the multifaceted relationship between AI, ML, and CRM and provide a comprehensive understanding of how these technologies can be used to increase customer engagement and loyalty [2].

The methodology used in this research will be a mixed-method approach that combines quantitative and qualitative data collection techniques. This approach provides a more holistic understanding of the impact of AI and ML on CRM practices.

The quantitative data will be collected through surveys distributed to CRM professionals across industries. These surveys will focus on the current use of AI and ML in CRM systems, perceived benefits and challenges, and the impact on customer analytics and retention strategies [42]. Additionally, secondary data will be collected from existing literature and case studies highlighting successful applications of AI and ML in CRM contexts. Qualitative data will be obtained through in-depth interviews with industry experts and CRM practitioners. These interviews will provide insights into the practical applications of AI and ML in CRM and the challenges encountered during integration [3]. The combination of both types of data will facilitate a comprehensive analysis of the research questions. Quantitative data will be analyzed using statistical methods to identify trends and correlations between AI/ML integration and customer analytics results. Techniques such as regression analysis and factor analysis will be used to assess the impact of predictive analytics on customer retention strategies [4]. Qualitative data obtained from the interviews will be analyzed using thematic analysis, which will allow for the identification of common themes and insights regarding the integration of AI and ML into CRM practices. This dual approach will increase the validity and reliability of the research by triangulating the findings [5]. This research aims to contribute to the current knowledge on CRM by providing empirical evidence on the benefits and challenges associated with AI and ML integrations. The findings are expected to provide practical recommendations for organizations looking to improve their CRM practices through technology adoption.

2. WHAT IS CRM? CRM FROM PAST TO PRESENTS

Customer Relationship Management is a strategic approach that collects and synthesizes all data related to customers, including customer information, assets and offers, and interactions with company representatives involved in the effective management of customer relationships. The system allows users to access the data in the definition and understands what is happening at each stage. This understanding also allows businesses to develop a complete customer profile in order to increase customer loyalty and provide sustainable competitive advantage, allowing them to make decisions based on large data sets.

Customer data can be collected and analyzed to optimize marketing, sales, and customer service processes such as sales forecasting, sales incentive modeling, product innovation, territory segmentation, and campaign design. CRM tools and software play an important role in customer loyalty by streamlining customer interaction processes and accelerating the sales process.

From database management systems in the 1970s and 1980s to the 1990s, CRM has evolved from a structure consisting solely of a data processing and collection system to a comprehensive system that integrates sales, marketing, and customer service.

But CRM has a much older history. Invented in the 1950s by Hilda Neilsen [6], the rolodex is essentially a rotating card filing device used to store contact lists. Its name, which is a combination of the words "rolling" and "index", has been generalized as a metonym for the personal organizer or the total accumulation of business communications that perform this function. In the aforementioned usage, it began to be used to describe the value of the communications of the investors, the board of directors or the CEO of the business, or the effect or feature of the small world network of the organizational structure. Rolodexes stored customer contact information; when the customer's information was needed, the desired files were accessed by rotating the rolodex. However, rolodexes were inadequate like notebooks. Accessing information took a long time, and it was difficult to update information and delete old information. It was not easy to make inferences from data. The foundations of CRM were undoubtedly laid with rolodexes.

In the past, the marketing approach was product-oriented. The businesses' processes stretched from production to the customer and there was not much competition. A product would be produced and put on the market and everyone would buy and use similar things. The customer did not have much choice and the opportunity to express their wishes. The only parameters for the customer were generally the ability to purchase and the product to be cheap. Companies had unbelievable profit margins. Since there was little competition, they could sell the product at a high price. [7]

The foundations of CRM were laid especially after the competition started to manifest itself clearly. Large companies operating in America, which have many customers or offer many products/services, but more importantly, live in competition at all times and where most free market economies are implemented as accurately as possible, began to attach importance to the concept of CRM in the late 1970s. In this period, companies acted from a different perspective and tried to understand the real behavior of customers in order to create their strategies.[8]

In addition, marketing strategies based on "Demographic Information Analysis", which had not been done until then, were also very useful. During this period, organizations sent cards to customers on their birthdays, distributed villa brochures in Sunday newspapers to those living in expensive districts, offered education loans to those with children, and made these classifications by looking at criteria such as whether the customer lived in a luxurious district, whether he had a car, or whether he was the manager of a company. They reached a superior position during that period.

As explained above, some of the companies knew their customers to some extent by using basic demographic information such as the neighborhood where their customers lived, income level, family structure, and the brand of car they used. However, in addition to the fixed, demographic information of the customers, there were also some transactions they carried out. These transactions gave companies a clue that was 100 percent accurate. This clue clearly revealed people's lifestyles, purchasing tendencies, consumption habits, and their use/non-use of the service channels offered. For detailed analysis of customer transactions, large companies have directed their most valuable human resources to these

projects, invested in technology, and entered into long-term and great expectations. New starters gain a competitive advantage. Companies that approach this issue correctly and benefit from it correctly have realized that CRM is a living project and, in fact, a way of life, and have updated their organizations and strategies accordingly. Customers who used to only get into a white car can now get into a car with the features they want for a much cheaper price. The only trump card that companies had to sell their products was to cut prices, but this was a short-term solution. Nowadays, customer loyalty has decreased and if the customer does not choose one company, he/she may purchase products from another company. As a result, competitive pressure in the markets, increasingly similar products, product and service differentiation becoming increasingly difficult, and profit rates decreasing; led businesses to restructure in the field of marketing.

And CRM emerged, whose main purpose is to increase the share of their pocket money by dealing directly with existing and relatively loyal customers, instead of constantly finding new customers and thereby increasing market share.

CRM consists of Human, Business Processes and Technology components as a standard. These parts will be explained in detail throughout the thesis.

2.1 CRM AND HUMAN

The most important factor of CRM projects is human resources. Businesses that want to run CRM applications are forced to undergo serious changes. This change will occur both in cultural and organizational terms. However, the cultures of the companies will play the most effective role in the success of this change program.

In projects where change is required, individuals need to understand and adopt the new thinking and way of working. Getting employees to accept changes is not an easy process. Human beings are inherently resistant to change. In addition, change is even more difficult if the business culture does not include innovative and creative staff. Having creative staff in the staff of businesses ensures that employees are open to change, which allows projects to be completed in a shorter time. For this reason, some businesses may lay off employees because they only do the job assigned to them but do not offer any innovation or

improvement suggestions. However, it is also possible to come across the opposite in companies that are not open to change. If the change request does not come from the upper management, CRM efforts will fail. Even if top management sees the CRM project as the future of the business, it will be easier to ensure employee participation. If businesses do not support change and have alienated their creative staff, even if management wants to implement a CRM project, they do not have the resources to execute the project.

In summary, the human component in CRM plays a critical role in the success of the system because, no matter how advanced the CRM software is, effective use of the system and sustainable management of customer relations directly depends on the competence of the employees and their interaction with the system. For example, in a bank, customer representatives can use CRM software to analyze customers' past transactions, make personalized suggestions tailored to their needs, and increase customer satisfaction by providing quick feedback. However, this result depends on the employees' ability to correctly use the data provided by the CRM and their ability to communicate correctly with the customer. For this reason, the human component is the most important element that maximizes the effect of technology in CRM processes.

2.2 INTEGRATION OF AI AND MACHINE LEARNING

Artificial Intelligence (AI) and Machine Learning (ML) are at the forefront of technological progress, revolutionizing industries and shaping the future of digital transformation. While artificial intelligence refers to the development of systems that can perform tasks that typically require human intelligence, such as reasoning, learning, and decision-making, ML is a subset of artificial intelligence that allows systems to learn from data and evolve over time without explicit programming [9]. The integration of artificial intelligence and ML has received significant attention due to its ability to increase efficiency, optimize processes and generate valuable information in various fields.

AI and ML have become indispensable in areas such as healthcare, finance, marketing and customer relationship management (CRM). For example, in healthcare, artificial intelligence-supported systems help diagnose diseases, personalize treatment plans, and predict patient outcomes [10]. Similarly, ML algorithms in the financial sector contribute to

greater accuracy and efficiency by helping fraud detection, risk management, and algorithmic trading [11]. The integration of artificial intelligence and ML into CRM systems has also changed the way businesses interact with customers by providing personalized services, predictive analytics and automated customer support [12].

Moreover, the convergence of AI and ML technologies has enabled more sophisticated data analysis and decision-making capabilities. Algorithms such as deep learning and reinforcement learning are now being used to overcome complex problems that were once thought to be unsolvable by traditional computational methods [13]. This integration facilitated advances in natural language processing, computer vision, and robotics, allowing machines to interact with the environment in a smarter and more intuitive way.

As AI and ML continue to develop, their integration is expected to further accelerate innovation in various industries. Research shows that enterprises that adopt artificial intelligence and ML technologies can experience significant improvements in productivity, customer satisfaction and competitiveness [14]. This trend highlights the importance of understanding the potential benefits and challenges of integrating artificial intelligence and ML as organizations seek to leverage these technologies to gain a competitive advantage in an increasingly digital world.

The integration of artificial intelligence and ML represents a transformative change in how industries operate, providing unique opportunities for innovation and growth. As the field continues to advance, it is very important for both businesses and researchers to research the implications of these technologies and develop strategies for their effective implementation.

2.2.1 AI, Machine Learning and Main Concepts

Artificial Intelligence (AI) and Machine Learning (ML) have become fundamental components of modern computing, driving advances in technology, business, and society in general. AI encompasses a wide range of technologies and methodologies that aim to create machines that mimic human intelligence, including problem solving, reasoning, and perception; while Machine Learning, a subfield of AI, focuses on the development of

algorithms that allow systems to learn from data, recognize patterns, and make decisions with minimal human intervention. [9].

Artificial intelligence is not a monolithic field, but a discipline that includes techniques, models, and applications as a political field. We divide artificial intelligence into two main types. These will be; narrow/weak artificial intelligence and broad/strong artificial intelligence. In the first type of artificial intelligence, we refer to systems designed to perform a specific task, such as facial recognition, speech translation, or autonomous driving. These systems operate within defined boundaries and lack the general reasoning abilities of humans [15]. In contrast, general artificial intelligence represents the theoretical concept of machines that can perform any intellectual task that a human can. While strong artificial intelligence remains largely hypothetical, ongoing research in areas such as cognitive computing and neuromorphic engineering aims to push the boundaries of machine intelligence [16].

One of the fundamental challenges in AI is to create systems that can mimic human cognitive processes. Machines are not only asked to process information, but also to understand and reason about it in a meaningful way. Simple AI techniques include logic-based approaches (such as symbolic AI), probabilistic models, and biologically inspired methods such as neural networks. These methodologies are often integrated into hybrid systems that combine different AI paradigms to solve complex problems, from medical diagnoses to natural language processing (NLP) [17].

Machine Learning, which we define as a subset of artificial intelligence, is important due to its practical applications and the availability of large data sets. The primary goal of ML is to enable machines to make inferences by identifying patterns and to learn from data by improving performance over time. ML models can be divided into three main types: supervised learning, unsupervised learning, and reinforcement learning [18].

The most common form of machine learning, where algorithms are trained on labeled datasets, is called Supervised Learning. Popular algorithms used in supervised learning include decision trees, support vector machines (SVMs), and neural networks, which aim to map input data to the correct output by minimizing the error in the system's predictions. Applications range from image classification to speech recognition [19].

Unsupervised learning, unlike supervised learning, deals with unlabeled data. The goal is to find hidden patterns, clustering, or structures in the data. Clustering algorithms such as K-means and dimensionality reduction techniques such as Principal Component Analysis (PCA) are examples of unsupervised learning methods. These techniques are widely used in customer segmentation, anomaly detection, and market analysis [20].

Reinforcement learning (RL) involves training an agent to interact with an environment and make a series of decisions. The agent receives rewards or punishments based on its actions. the goal is to maximize cumulative rewards. RL has shown remarkable success in robotics, gaming (notably AlphaGo), and autonomous systems [21].

There are several basic concepts underlying the functionality of AI and machine learning systems.

Neural networks, modeled after the human brain, are a fundamental concept in both AI and machine learning. They consist of interconnected nodes (neurons) that process data and identify patterns. The breakthrough in neural networks came with the emergence of deep learning, a special subset of machine learning that uses deep neural networks with many layers [22]. Deep learning models have transformed fields such as computer vision, speech recognition, and natural language processing, providing an unprecedented dataset for tasks such as object detection, translation, and autonomous driving [23].

Deep learning techniques, especially convolutional neural networks (CNNs) and repetitive neural networks (RNNs), have been particularly effective in areas such as image and video analysis, and sequential data tasks such as time series prediction and language modeling [24].

Natural Language processing (NLP) NLP is a branch of artificial intelligence that focuses Decently on the interaction between computers and human (natural) languages. NLP applications that involve enabling machines to Decipher, interpret and generate human language in a way that is both meaningful and useful include machine translation, sentiment analysis, chatbots and speech identification. [25]. Techniques such as tokenization, parsing

and machine translation combined with deep learning models such as Transformers have revolutionized the field of NLP, leading to breakthroughs such as GPT-3 [26].

Transferable learning is an approach in which the knowledge gained from solving a problem in ML is applied to a different but related problem. It is especially useful in areas where labeled data are scarce; it allows models trained on large datasets to fine-tune smaller, task-specific datasets [27]. Transfer learning has been widely adopted in areas such as computer vision and NLP, where pre-trained models such as BERT (Bidirectional Encoder Representations from Transformers) can be adapted to various language tasks [28].

Reinforcement learning (RL) is based on the idea of intermediaries who learn optimal behaviors through trial and error in an environment. RL, which usually includes the use of Markov Decision Processes (MDPs), which provide a mathematical framework for modeling decision-making scenarios, RL has been seen in autonomous systems, robotics, and even healthcare applications, where people and institutions learn dynamic decision-making strategies [21].

Until this part, we have talked about how artificial intelligence and ML systems make life easier and become increasingly integrated into everyday life. As a result, the issues surrounding ethics, prejudice and transparency have gained importance. ML algorithms often inherit the biases found in educational data and cause discriminatory results in areas such as recruitment, criminal justice and lending [29]. Researchers and policy makers are also focusing on creating fair, transparent and accountable artificial intelligence systems that minimize bias and promote equality.

2.2.2 AI and ML in CRM Software Systems

Customer relationship Management (CRM) software has developed significantly with the integration of Artificial Intelligence (AI) and Machine Learning (ML) technologies. With traditional CRM systems, it was used to manage customer data, monitor interactions and improve communication with customers. With the advent of artificial intelligence and ML, CRM platforms have become more intelligent systems that can analyze large amounts of data, predict customer behavior, personalize experiences, and automate tasks. This situation

has led to more efficient processes and improved decision-making process in enterprises in various sectors [12].

CRM software serves as the backbone of customer-oriented businesses. This helps companies maintain strong relationships with their customers. Thanks to the CRM integration of AI and ML, it has also been a game changer that has increased the ability of enterprises to interpret customer data and offer personalized experiences. Artificial intelligence is especially useful for automating routine tasks such as managing customer interactions and creating reports, while ML algorithms provide predictive analytics and smarter recommendations by identifying patterns in customer behavior [30].

The capabilities of modern CRM platforms are now intertwined with artificial intelligence and ML functions. AI-driven tools such as chatbots, virtual assistants and recommendation engines allow businesses to provide customer service around the clock and interact with customers on a more personalized level [31].

Now the customer shows interactive participation. Machine learning models have become a system that makes it easier for businesses to predict customer needs and adjust their marketing or sales strategies accordingly by analyzing customer histories to predict future interactions.

At this point, we should talk about the contributions of artificial intelligence and ML to CRM systems; one of the most valuable contributions is undoubtedly the ability to analyze customer data for actionable insights. Traditional CRM systems only store and organize data, but artificial intelligence-powered CRMs are able to process large data sets, extract insights, and offer predictions. For example, machine learning models can predict which customers are most likely to run out, enabling businesses to take proactive measures to retain them [12]. It also helps enterprises to prioritize high-value customers and allocate resources more efficiently by estimating the lifetime value of customers.

Predictive analytics in CRM systems are widely used in industries such as retail, finance and telecom. For example, Amazon's CRM provides highly personalized product recommendations by leveraging artificial intelligence algorithms to analyze customer

purchase histories and browsing behavior. As customers receive specific recommendations related to their preferences, this becomes the cornerstone of Amazon's success [40].

AI and ML have significantly improved the personalization of CRM software. Thanks to machine learning algorithms, customer data has been analyzed and it has become possible to group customers into segments according to their behavior, preferences and demographics. By enabling businesses to create more targeted marketing campaigns, it ensures that the right message reaches the right customer at the right time. Artificial intelligence-oriented CRM systems use personalization engines to adapt email marketing, website content and product recommendations and improve the customer experience.

Netflix offers the perfect example of artificial intelligence-based personalization in CRM. The platform uses ML algorithms to recommend shows and movies based on users' viewing history. This type of customer segmentation, which is constantly evolving based on new data inputs, engages users by providing relevant recommendations and increases customer satisfaction [32].

Another noteworthy issue, Artificial intelligence-powered chatbots have actually become increasingly popular as a customer interaction tool in CRM systems. Chatbots have emerged with the aim of enabling businesses to offer real-time support without human intervention by using natural language processing (NLP) and machine learning to simulate human conversations. These chatbots can handle queries ranging from simple FAQs to more complex customer service issues, enabling businesses to efficiently scale up their customer service operations.[38].

If we want to present this with a concrete example, for example, Salesforce's Einstein AI platform offers chatbots integrated into the CRM system. These bots can interact with customers through various channels such as websites, messaging apps and email, answer customer questions, book appointments and even make product recommendations. This allows enterprises to improve customer engagement while freeing up human representatives for more complex tasks.

AI and ML have also greatly improved the sales automation features in CRM systems. Traditionally, sales teams rely on manual data entry and analysis to monitor customer interactions and manage potential customers. However, AI-powered CRM systems are now able to automate much of this process by using ML algorithms to track interactions, score leads, and suggest the next best action for sales representatives. This not only saves time, but also improves the accuracy of sales forecasts and lead management.

When we take the example of Hubspot, the CRM system uses artificial intelligence to help sales teams by automating lead scoring and identifying the best opportunities to close opportunities. The system analyzes data such as email opening rates, website visits and social media interactions to prioritize potential customers, allowing sales teams to focus on potential customers with the highest conversion potential [31]. This form of automation that we have mentioned allows businesses to close deals faster and more effectively by streamlining their workflows.

Another critical application of artificial intelligence in CRM systems is emotion analysis. Emotion analysis arises by using NLP and ML to interpret customer emotions according to their interaction with the business. By analyzing customer reviews, social media posts, or support tickets, the AI can detect whether the customer is satisfied or frustrated with the business. This allows enterprises to proactively respond to negative feedback and improve customer service.

For example, brands such as Coca-Cola have been using artificial intelligence-oriented sentiment analysis tools to track customer returns on social media for many years. Coca-Cola also analyzes the feelings and thoughts of its customers in real time from social media platforms, which can quickly resolve customer concerns, respond to negative feedback and improve customer satisfaction. This real-time understanding of customer sensitivity allows enterprises to develop their products and services more effectively. [41].

Until this part, we have mentioned the numerous benefits of integrating AI and ml into CRM systems, but there are also a few difficulties in integrating AI and ml into CRM systems. One of the most important challenges is that the data quality is not stable. AI and ML models

are only as good as the data they are trained on, which means that low-quality or incomplete data can lead to incorrect predictions and recommendations.

In addition, privacy concerns related to the collection and use of customer data pose a challenge for businesses as customers become more aware of how their data is being used and stored. There are also challenges such as AI transparency and ensuring trust. Many AI-focused CRM systems operate as "black boxes", which means that users may not fully understand how the AI reaches its predictions or decisions. This lack of transparency can lead to mistrust and Deceptions among both businesses and customers. [39].

To summarize, with the integration of artificial intelligence and ML into CRM software, it has revolutionized the way businesses manage customer relationships, increasing efficiency, personalization and customer satisfaction. From automating sales processes to providing personalized recommendations and real-time customer support, artificial intelligence-driven CRMs have become invaluable tools for businesses across industries by providing a wide range of services.

As these technologies continue to evolve, we can expect CRM systems to become even more complex, offering deeper insights and more advanced automation.

But along with these, challenges related to data quality, privacy and AI transparency must also be addressed in order to fully exploit the potential of AI and ML in CRM systems. Businesses that successfully overcome these challenges will be well positioned to provide exceptional customer experiences and gain a competitive advantage in their field.

The integration of Artificial Intelligence (AI) and Machine Learning (ML) into Customer relationship Management (CRM) systems has revolutionized the way businesses interact with customers. We have already mentioned that CRM systems now offer features such as automation, personalization and predictive analytics that allow companies to provide improved customer experiences, simplify operations and make data-based decisions. These capabilities provide businesses with a competitive advantage by enabling them to better understand their customers, anticipate needs, and act efficiently [30].

Automation is one of the main features of modern CRM systems, which allows enterprises to reduce manual work, increase productivity and improve accuracy. It manages repetitive tasks such as data entry, lead assignment, email tracking and customer service queries with artificial intelligence-oriented automations. This frees employees to focus on strategic activities that require human understanding [33].

The most important example of CRM automation is Zendesk's Response Bot, which automatically responds to customer questions with relevant knowledge base articles or redirects the query to a human agent when necessary. This reduces response times and increases customer satisfaction while minimizing the workload of customer service teams. Another example is hubspot, where marketing teams use artificial intelligence to automate workflows, such as sending personalized follow-up emails, after a customer interacts with the content on a website. This increases engagement and conversion rates [34].

Automation also plays a very important role in sales. Salesforce's Einstein artificial intelligence automates lead scoring, which uses historical data and customer behavior to prioritize leads based on their likelihood of converting. This makes sales teams more productive by focusing their efforts on high-quality potential customers, increasing close rates and efficiency [35].

Personalization has become a must-have feature for customer engagement, and artificial intelligence-powered CRM systems make it possible to deliver highly customized experiences at scale. Intelligent CRM platforms collect and analyze customer data to create personalized interactions, such as personalized email campaigns, product recommendations, and targeted offers.

For example, Spotify uses its artificial intelligence-powered CRM to personalize each user's playlists based on their listening history and preferences. The platform analyzes a large amount of data, such as what users listen to at different times of the day, and recommends new tracks accordingly. This high level of personalization has been a key factor in Spotify's customer retention and satisfaction rates.

In e-commerce, Sephora uses artificial intelligence-driven CRM personalization to improve both the online and in-store shopping experience. Sephora can offer personalized product recommendations by analyzing customer purchase histories, browsing behaviors, and even skin tones through its artificial intelligence-powered Color IQ system. This has helped the beauty retailer increase customer loyalty and sales by offering a more customized shopping journey [36].

Amazon, another leader in personalization, uses predictive analytics and artificial intelligence algorithms to recommend products to customers based on their browsing and purchase history. The recommendation engine of the platform is responsible for accounting for 35% of its total revenue, which shows how powerful personalization can be in increasing sales. [40].

3. THE IMPACT OF INTEGRATION ON CUSTOMER ANALYTICS

In today's competitive business environment, understanding customer behavior and needs has become more critical than ever. Variable customer profile and behavior also appear as a threat element for companies. Companies are increasingly relying on data-driven strategies to gain insight into customer preferences, improve the customer experience, and increase retention rates.

AI and ML enable CRM systems to move beyond reactive analysis to predictive predictions, enabling companies to predict customer behavior and preferences. For example, Salesforce, one of the world's leading CRM platforms, uses its artificial intelligence-powered engine Einstein to provide predictive predictions and recommendations. Einstein helps businesses analyze customer interactions and recommend the next best actions, personalized marketing strategies, and targeted promotions, all of which increase customer engagement and satisfaction.

Another example is Hubspot's AI-driven tools that analyze customer emails, behavior, and interactions, allowing sales teams to focus on high-priority leads and automate repetitive tasks. By taking advantage of ML algorithms, these systems can identify patterns and trends in customer data that are almost impossible to detect manually.

As businesses continue to adopt artificial intelligence-driven CRM solutions, the impact on customer analytics is profound. For example, companies such as Amazon and Netflix use ML algorithms to make personalized product and content recommendations based on previous customer behavior. This personalization not only improves the user experience, but also increases sales and customer loyalty. In fact, research shows that artificial intelligence-assisted personalization can increase sales by 15 to 20%, underscoring its importance in today's marketing.

The integration of artificial intelligence and ML into CRM systems transforms customer analytics from explanatory reporting to actionable and predictive predictions. It allows companies to analyze large volumes of data in real time, making data-based decisions more

accessible and efficient. As a result, AI and ML not only improve the analytical capabilities of CRM systems, but also develop stronger, more personalized customer relationships.

In this part of our thesis, we will examine how artificial intelligence and ML integration are shaping the future of customer analytics. We will examine the key developments, their applications in real-world CRM systems and the benefits achieved for both businesses and customers.

3.1 THE IMPORTANCE OF PROCESS MANAGEMENT

Process management is one of the basic elements that determine the efficiency of a CRM system. Process management in CRM aims to ensure the regular and optimized progress of customer interactions, facilitate data flow and, as a result, increase customer satisfaction. Process management is not limited to customer service, but also improves the performance of sales and marketing departments. The CRM process starts primarily with listening to customers, understanding what kind of company and product customers expect from this company, and in what way they want this product to be delivered to them. When the strategy is roughly clear, the customers are categorized. Then, customers should be identified by creating an analysis similar to the SWOT analysis. After that, information should be obtained on issues such as customer needs and service expectations at all levels in the categories.

As an example of this, popular CRM platforms such as Salesforce automate sales processes, easing the workload of sales representatives and enabling them to respond to customer requests faster. So how does CRM approach those who have the same product and in the same industry? While competing with the same products in the same sector, companies can approach their customers from different angles. The reason for this is that the processes that make up the operational part of CRM applications also have to differ. Therefore, it is important that the architecture determined in line with the company's strategies is managed well within the scope of CRM components. In order for this process to be managed, all stages of the process should be established in a solid way.

In the generally accepted CRM implementation stages, it should be investigated whether the enterprise needs a CRM system first, and after the decision is made that the enterprise needs

a CRM project, the preparation, planning, design and implementation stages are monitored respectively.

- a. **Preparation Stage:** The most important stage of CRM studies is the preparation stage. Success or failure is largely determined at this stage. For this reason, first of all, the size of the CRM project should be decided and the decided application should be dedicated. Those who implement CRM projects in enterprises should consider CRM as a restructuring tool for the purpose of increasing competitiveness, not just to be interested in the topic, to apply CRM only as a technology investment or to increase productivity. The preparation phase includes determining the benefits and needs that the CRM system will bring to the business. This stage also begins with the analysis of the current state of the company, customer management strategies and goals.

For example, an e-commerce company realizes that its existing customer base cannot be managed efficiently and that customer loss is high. At this stage, the company analyzes every channel (website, social media, e-mail) through which they contact the customer before implementing the CRM system and determines that it needs the integration of these contact points. During the preparation process, it evaluates the methods of collecting customer data and how to improve customer relations.

Let's take the example one step further: Amazon. While preparing the CRM system, Amazon analyzed customer shopping habits in detail and took steps to increase customer loyalty in accordance with these data. During the preparation phase, it has identified the technologies necessary to create personalized recommendation systems based on customer data.. Because CRM projects are big change projects. Exchange projects are also more comprehensive than ERP projects due to the fact that they are based on basic strategies. Not only as processes, but also the usual way of thinking will change. If the high-level decision-making authority does not commit itself to the project in such a big change, failure will be inevitable.

So how does the process get set in motion? How does this organism create itself? Once it is decided that the business culture is ready for change, a project organization that will continue the work should be determined. Basic elements of project organization; The

project sponsor who will undertake the success or failure of the project, provide all kinds of support to the project manager and is also responsible for following the project plans, a project manager who is experienced, has knowledge of the concepts of the CRM system, knows the business and, if possible, the market in which it operates, and the operational department (marketing, sales) in the project team. , logistics, finance, service, etc.) managers. The assignment of personnel to be included in this section of the project team should be explained after the business is introduced to the CRM concept. The project team is the unit that will trigger and sustain change in the business. The next step is to open the basic concepts of CRM to discussion within the business. Company managers should be introduced to the basic elements of CRM through various meetings and training activities. The last step is to announce the project within the business.

The business's work with a consultant person or company is an issue that should be considered if a competent company or person can be found and the budget is provided. The companies and consultants from which consultancy will be received should definitely have CRM project experience.

- b. Planning Phase: The planning phase is the phase where the right business strategies are determined in CRM projects. It is the phase where strategic decisions are made on how the CRM system will be structured and which departments of the business will be included in this system. It is essential that there are marketing, sales, logistics, finance, and human resources department managers in the working group. In addition to each manager, it is also of great importance that the personnel who will be involved in the operations are included. The necessary resources for the CRM system are allocated and the integration processes of the CRM are planned in detail. It should be based on the analysis phase. In this way, the business strategies of the company will be determined as a basis and these business strategies will form the basic goals/vision of the CRM project. In the planning phase, the business and market that the company has been doing for years will be rediscovered. Even the customer definition of the company may change. Let's consider an example. After determining that it needs a CRM system to improve customer relations, an automotive company plans to create separate modules for sales, service and customer service departments. During the planning phase, it is decided which

departments the CRM system will be integrated into and how, how much budget will be allocated and which CRM platform will be used. For example, let's say our company is Tesla. During the planning phase, it decided to digitalize after-sales services and customer support processes. In this way, the integration of sales teams and service centers into the CRM system was planned to ensure fast and uninterrupted service to customers.

- c. Design Phase: The design phase includes customizing the CRM system according to the needs of the business. At this stage, it is determined how the customer data collection, management and analysis processes will work. At the same time, user-friendly interfaces and workflows compatible with the company's internal processes are created. Example: A retail company designs a CRM system that integrates its customers' in-store and online shopping experiences. In this system, an interface is designed where store employees can view customers' online orders and make recommendations based on customer history. The fact that the CRM system has a user-friendly interface makes it easier for employees to use this system effectively.

Sample Company: Kahve Dünyası has integrated its customer loyalty program and mobile application in its CRM design. It has designed a system that offers personalized campaigns and rewards by monitoring customer preferences and shopping history. As a result, the customer and the business are both satisfied.

After reviewing the activities and business strategies of the business in the planning stage, the next step is to design the business lifestyle. At this stage, using the One-to-One marketing (1:1) strategy developed by Peppers and Rogers Group would be the most appropriate method. 1:1 Marketing adopts the establishment of long-term and mutually profitable relationships with selected customers. According to this method, each customer should be treated differently in line with his or her needs. Every contact should bring the company closer to the customer. The most powerful aspect of 1:1 marketing is that it is based on very correct strategies and also has a concrete applicable methodology. This methodology is called IDIC (Identify / Differentiate / Interact / Customize) and consists of four steps.

- i. Identify: Determining the customer profile
- ii. Differentiate: Categorization of customers according to their needs
- iii. Interact: A situation in which there is a mutual exchange of information.
- iv. Customize: Changing business services and products in accordance with these needs.

For customer-oriented restructuring, customers must first be defined. They should then be classified according to their needs and values, and continuous feedback relationships should be established with them in the most appropriate environments. These relationships will ensure better knowledge and understanding of the customer each time, and as a result, business services and products will be changed in line with these needs and demands.

- d. Implementation Phase: The implementation phase is the phase where the CRM system is implemented and integrated into the operations of the business. During this phase, employees are trained on how to use the system, customer data is transferred to the system, and CRM modules are activated. The success of the implementation process is closely related to employees understanding the benefits of the system and using the system effectively. In short, the implementation phase is the phase where the designed system will be implemented. At this stage, the differences between the current system and the designed system should be determined and how the new system can be switched to should be analyzed. Example: A healthcare organization implements a CRM system to manage patient appointments, patient records, and patient feedback. During the implementation phase, healthcare personnel are given training on how to use the CRM system and patient information is transferred to the digital environment. With the active use of the system, patient appointments are managed more effectively and patient satisfaction is increased. While implementing the CRM system in the MHRS system, it has implemented powerful data analysis modules to securely manage patient data and provide personalized healthcare services. During the implementation phase, services based on patient feedback and patient history are provided, while the appointment system is also included in the integration.

In order for CRM to be implemented successfully, the preparation, planning, design and implementation stages must be carried out carefully. The needs of the business are determined in the preparation phase, strategies are developed in the planning phase, processes are customized in the design phase, and the CRM system is implemented in the implementation phase. Each stage of CRM is critical to optimizing customer relationships and improving business efficiency.

There are multiple stages for businesses to activate CRM applications. In order to activate the implementation phase, it proceeds as a relationship-based marketing strategy, CRM system design, redesign of functional roles, redesign of business processes and technology support.

- a. Marketing strategies need to be created in businesses with a relationship-based marketing strategy. In CRM applications, the technology is commonly supplied first, and then the processes and strategy are tried to be adapted to the supplied technology. This is a wrong move and leads to failure. It is conventional wisdom to expect people and processes to adapt to technology. However, adapting technologies according to people is a more accurate and up-to-date strategy. Let's make it concrete by giving an example; The travel company determines that it needs a CRM system in order to respond to customer demands faster and increase customer satisfaction. During the planning phase, basic goals are determined, such as collecting customer data, analyzing it and providing personalized services. The company decides that sales, marketing and customer support teams will actively use this system.
- b. The aim of the Redesign of Functional Roles part is to minimize the differentiation that will occur in the job descriptions of the employees and the functioning of the business as a result of the changes to be made by defining the work packages. Take, for example, the functional roles of the sales force. In addition to selling, it is essential to spend more time with the customer and gather information. The sales force will naturally be redesigned based on the customer. Since most routine orders will come from phone and internet by creating a supply according to the needs of sales consultants, the current bonus system will be affected.

- c. The system called redesigning business processes, also known as Re-Engineering, is actually a change engineering operation for switching to CRM application. Designing business processes according to the technology required for CRM. Designing software-supported processes. Processes should be designed in a way that the strategy should be implemented and software should be determined according to the redesigned processes. For example, after the banking organization selects Microsoft Dynamics 365 as its CRM system, it configures it to be integrated into CRM customer services and sales processes. The bank integrates customers' loan applications, account opening processes and financial consultancy services into the CRM system, ensuring that all information about each customer can be accessed from a single platform.

After detailing the CRM components, we also need to talk about the stages of CRM, which include *customer selection*, *customer acquisition*, *customer retention* and *customer deepening*. This is the area where artificial intelligence and machine learning are needed and used the most. Customer selection involves determining the target audience and potential customers of the business. At this stage, the company decides which customer groups to focus on and conducts market analysis to use its resources most efficiently. In a nutshell, the essence of the customer selection phase is to select customers who will provide profit to the business. At the stage of determining the target audience, the business defines the age and income range of the customer base it wants to appeal to. In this way, strategies can be created to reach the correct customer group. Then, segmentation is made according to the characteristics of the specified target audience; the audience is divided into different segments according to age, income and customer profile. Positioning and brand/customer planning for these segments are put into action, and appropriate brand and product strategies are created for each segment. In this direction, the company prepares effective campaigns to increase sales and win back old customers. Additionally, new products are designed and marketed according to identified customer needs, which allows the business to gain new customers and deepen existing customer relationships. For example; When a software company develops a CRM product for the digital transformation needs of small and medium-sized enterprises (SMEs), it determines through market research that SMEs are the largest

target customer group. It determines that businesses in this group need digitalization and can invest in cloud-based CRM solutions, and shapes the marketing strategy in this direction.

The customer acquisition phase covers the process of gaining the customer base that the business targets. Marketing campaigns, sales strategies and customer services are actively involved in gaining new customers. The aim here is only to make sales. In this phase, the primary goal is to create strategies to sell to customers that will generate profit. Offers that will provide sales are presented to customers by conducting needs analysis. For example, BimCell has implemented a successful CRM strategy to gain new customers with an aggressive pricing strategy and "no contractual obligations" campaigns.

An eCommerce platform offers loyalty programs and personalized discount coupons to keep customers coming back. In addition, it invests in customer support services to improve the experience of its customers and minimizes losses by offering quick solutions to customers who have negative experiences. It provides special benefits to regularly returning customers and encourages them to spend more time on the platform.

This is the phase of CRM to ensure customer loyalty. Also known as the customer protection phase. In the customer protection phase, the goal depends on the answer to the question of how long customers will continue to be customers of businesses. This stage is one of the most critical stages. Retaining the existing ones, gaining new customers and keeping customer satisfaction high, and ultimately maintaining long-term relationships are determined at this stage.

As an example of the subject we mentioned above, the strategy of providing many advantages from BluTV membership to free and fast cargo delivery with Hepsiburada Premium service is a good example of customer retention.

The process of increasing existing customers' loyalty to the business and increasing their added value is called customer deepening. At this stage, the aim is to make more sales by offering additional products and services to the main customers. The aim is to provide new benefits from the relationship where continuity is ensured. This stage is mostly based on information systems applications, and customer needs analyzes are made with these

applications. Cross-selling campaigns are organized in line with the customer profiles determined as a result of the analyzes made. Apple is a very successful example of a customer deepening strategy. It offers iPhone users additional products and services such as Apple Watch, AirPods, and Apple Music. In this way, customers both spend more and become more loyal to the Apple ecosystem.

3.2 THE IMPORTANCE OF INTEGRATION ARCHITECTURE IN CRM SYSTEMS

First of all, we need to define the Integrative CRM architecture. It is the system that allows the information obtained from every contact point where a business interacts with the customer to be combined in a central system. In this way, a consistent data flow is ensured between different departments and customer demands and needs are responded to more quickly and efficiently. It makes it possible for businesses to gain competitive advantage by exceeding customer expectations. Additionally, the importance of complementary architecture in CRM (Customer Relationship Management) systems has become an increasingly important issue. This architecture plays a critical role, particularly in terms of data management, optimization of business processes and improvement of customer experience. Integrative CRM architecture offers businesses a 360-degree customer view by enabling the integration of data from different channels and systems.

So what are the advantages of integration? Data Consistency and Accessibility, Business Process Automation and Efficiency, Customer Experience Improvement and Real-Time Data Analysis, respectively.

For example, by collecting a customer's purchase history, marketing campaigns and support requests on a single platform, better strategic decisions can be made regarding the customer [33]. This is data consistency and accessibility.

Then again, for example, the Zoho CRM platform offers solutions that automate business processes by integrating sales, marketing and support processes [36]. This is Business Process Automation and Efficiency.

As another example, Amazon enriches the customer experience by integrating customer data and making personalized product suggestions. This is Customer Experience Improvement.

Finally, platforms such as Salesforce allow sales and marketing strategies to be constantly optimized with real-time data analysis tools [33]. And this is an example of real-time data analysis.

CRM integration architecture consists of a structure that combines the CRM system with the organization's other software solutions (such as ERP, SCM, HRM). The basic components of this structure are;

a. Data Layer: It is the basic infrastructure that the CRM system uses to share data with other systems. This layer ensures that databases work harmoniously with each other. Data is generally exchanged through methods such as RESTful APIs or SOAP web services. For example, when pulling customer data from an e-commerce system into a CRM, data validation and data matching processes occur at this layer [37].

b. Business Process Layer: This is the layer that manages the interaction of CRM systems with other business processes. This layer determines how an event in one system is triggered in other systems. For example, a sales order created in an ERP system can be processed into the CRM system and this data can be sent as a notification to the sales team. BPM (Business Process Management) software is used for this type of integration.

c. Application Layer: In CRM integration, interactions between CRM software and third-party applications are located in this layer. Here, middleware software enables the conversion and transportation of data. For example, it supports data integration and process management by using middleware tools such as Salesforce and Mulesoft. Middleware is a critical component that enables data transfer between different systems and transforms data formats.

3.2.1 Integration Communication Methods

CRM systems are integrated with many third-party digital systems due to their structure. These integrations ensure dynamic data flow, synchronous and accurate transfer of data

changes made in CRM system data and third-party systems to the CRM system, and processing of changes made in each digital channel on the main database at the end of the day and logging of the most up-to-date data in the relevant CRM system. The following communication methods are commonly used in these data flows.

3.2.2 Synchronous Communications

One of the most commonly used communication methods in CRM systems and similar digital systems is synchronous communication with the request-response method.

In this type of communication, the client system sends the update made on its own system to the CRM system by making a request via a path provided by the relevant digital CRM system. Based on this request, it checks whether the current data is transmitted correctly with the response it will return and can trigger again in case of an error. This communication is typically based on HTTP/HTTPS. Such communications occur through APIs and SOAP/RESTful APIs are commonly used. With this architecture, real-time data access is provided in the CRM system. For example, all the information about a sale made from a cash register can be sent instantly to the database to which the CRM system is connected. In this way, a call center user in a CRM system providing call center service can access the information about the customer's recent sales very quickly and accurately.

3.2.3 Asynchronous Communications

In this type of communication, updated data is not sent instantly in a third-party digital system. It is used especially in high-volume sales data transfers, bulk data transfers or non-critical data flow situations.

In this structure, the data that needs to be sent to the CRM system is stored in a queue structure and sent at a predetermined time period at the end of the day or via a job. As in the synchronous communication type, the request/response structure is generally used. The most important difference from synchronous communication is that requests to the relevant CRM system are made at a scheduled time, not at the time the data is updated.

3.2.4 Web Services and APIs

Central to the integration architecture are web services and APIs, which allow CRM systems to interact with external environments. These services automate the sharing of data and business operations, enabling the CRM to function dynamically with other platforms.

REST APIs: One of the most favored integration techniques in CRM systems is RESTful APIs. The primary benefit of this architecture is its operation over the HTTP protocol, which facilitates easy connection with web-based systems. REST APIs can transmit data in JSON or XML formats, allowing for swift and adaptable data exchange between CRM systems and other applications. For example, linking the CRM with marketing automation tools can help track customer interactions in real time through REST APIs.

SOAP Web Services: SOAP (Simple Object Access Protocol) web services are particularly prominent in larger enterprise systems and are chosen for more complicated and security-oriented integration needs. SOAP is more structured and XML-based, adhering to security standards such as WS-Security. These integrations are typically used for transferring financial information or sensitive data to CRM systems.

3.2.5 Soap/Rest Comparison

SOAP vs. REST Comparison: SOAP provides robust debugging and security features but may use more system resources and operate at a slower pace than REST. Conversely, REST is lighter and quicker, although it might be more limited for complex transactions and security requirements. Thus, the selection of the protocol should be carefully assessed based on integration demands.

4. CONCLUSION

CRM provides important contributions to the marketing activities of businesses in four main frameworks. First of all, thanks to CRM applications, it is possible to win back abandoned customers by offering them attractive opportunities; Its contribution in this field varies between 10% and 20%. Secondly, CRM plays a major role in creating customer loyalty and helps businesses achieve their goals of retaining customers for life; this contribution varies between 15% and 20%. The third contribution is seen in the process by which the business finds new customers; CRM contributes between 3% and 4% to the business acquiring new customers and increasing its market share. Finally, thanks to data warehousing and data mining applications, customer profiles are determined and cross-selling can be made; CRM's contribution in this area is between 2% and 3%. Considering these data, it is understood that CRM makes a significant contribution to marketing activities, especially in creating customer loyalty and winning back abandoned customers. Considering that marketing strategies around the world are primarily based on retaining existing customers, then gaining back lost customers, and finally acquiring new customers, it becomes clear how critical CRM is in terms of marketing.

CRM (Customer Relationship Management) systems initially began with Rolodexes that organized customer information with physical tools such as card systems. However, along with the digitalization process, CRM software has enabled businesses to manage customer data much more efficiently. Technologies such as data analytics and automation have gained importance in the transformation of CRM systems since the 2000s. In parallel with these developments, artificial intelligence (AI) and machine learning (ML) integrations stand out as a major innovation in the CRM field in recent years.

The integration of AI and ML into CRM has enabled the systems to have a data-driven structure. These innovations, which allow for more in-depth analysis of customer interactions and behaviors, have transformed CRM into a structure that predicts customer needs and offers personalized experiences. For example, companies such as Amazon, Spotify, Google, Apple and Netflix have managed to increase customer loyalty by analyzing customer habits and offering them special product and content recommendations with

artificial intelligence-based CRM systems. Artificial intelligence also automates customer services through natural language processing (NLP) and chatbot technologies, so that faster and more effective responses can be provided to customer requests.

Machine learning took data analysis in CRM systems to the next level. ML algorithms predict customer behavior using CRM data and help businesses develop the most appropriate strategies. In this way, customers' future purchasing behavior can be predicted by examining past customer interactions. For example, based on data such as which products the customer has viewed and added to the cart, an e-commerce company can predict what that customer may purchase in the future and organize personalized campaigns accordingly.

If we consider the effects of artificial intelligence and machine learning on CRM from a SWOT analysis perspective, their strengths include better management of customer data and the capacity to provide personalized experiences. Its weaknesses can be listed as the dependence on data accuracy and the infrastructure costs required to manage large data sets. In terms of opportunities, the automation solutions offered by AI and ML in CRM and the optimization of customer interactions provide businesses with a great competitive advantage. However, in terms of threats, the risks that data security and privacy violations can pose to businesses cannot be ignored.

Artificial intelligence and machine learning have transformed CRM systems from being just tools that manage customer data to intelligent systems that proactively manage interaction with customers. For example, CRM platforms such as Salesforce make it possible to provide customer-specific solutions while guiding sales teams with artificial intelligence-based prediction models. However, since effective use of these technologies is directly related to collecting and managing accurate data, businesses need to strike a careful balance in this regard.

Because artificial intelligence (AI) and machine learning (ML) bring many advantages that technological advances offer to human life, but also pose potential dangers. These hazards can have important ethical, social and economic consequences for both individuals and

societies. In this context, the dangers posed by AI and ML to humans are shaped around issues such as data security, unemployment, social inequalities and ethical violations.

First, the impact of AI and ML on data privacy is a significant area of debate. These technologies make predictions by processing large amounts of data, but these data collection processes can compromise the privacy of individuals. For example, the Cambridge Analytica scandal is a concrete example of how AI can become a tool for manipulation and abuse through non-consensual use of personal data. AI and ML algorithms offer powerful tools that can intervene in individuals' political preferences or shopping habits by analyzing individuals' behavior with data collected from social media platforms. This can lead to both the violation of individuals' privacy rights and the weakening of democracies.

The traditional workforce faces the risk of losing people's jobs with the development of artificial intelligence and automation. For example, a study by McKinsey predicts that by 2030, automation could result in the loss of between 400 and 800 million jobs worldwide. Particularly individuals working in repetitive and routine jobs are the ones who will be most affected by this transformation. The advancement of robotics in the manufacturing sector and the proliferation of artificial intelligence-based chatbots in customer service tend to replace the human workforce. This could lead to rising unemployment rates and deepening income inequalities.

The ethical dimension of AI and ML is also a deep concern. In particular, the use of these technologies in decision-making processes may cause prejudices and injustices to be reinforced. Machine learning algorithms have the potential to replicate and systematize biases inherent in the data sets on which they are trained. For example, the artificial intelligence used in an American bank's credit evaluation system tended not to give loans to black individuals due to the biases in the data it was trained on. Such situations may have consequences that threaten social justice and equality, and reveal that ethical principles must be strictly observed in areas where AI is used.

Finally, the effects of AI and ML on social manipulation and the spread of misinformation are also serious threats. Deepfake technologies are one of the most current examples of these

threats. Deepfake videos produce unreal content by manipulating people's images and sounds. This technology can be used to create misinformation campaigns against political figures, conduct reputational assassinations, and create social unrest. For example, the use of deepfake videos in the 2020 US presidential elections has raised serious concerns about the reliability of the election process.

Although artificial intelligence and machine learning are powerful tools that transform human life, the risks they bring with them should not be ignored. It is of great importance to develop regulations and ethical standards for the safe and fair use of these technologies, which pose serious dangers in areas such as data security, unemployment, ethical violations and dissemination of false information. The fact that these technologies can be used both for the benefit and for the detriment of humans reveals that future developments must be carefully monitored.

What we are trying to put forward throughout the thesis is the fact that the use of artificial intelligence (AI) and machine learning (ML) technologies in CRM (Customer Relationship Management) systems provides many advantages such as more efficient management of customer data and providing personalized service. However, these technologies can have various harmful consequences when not implemented correctly or when ethical rules are ignored. In this context, some examples where AI and ML in CRM may be detrimental are around data privacy, reinforcement of biases, loss of the human element in customer experience, and the effects of excessive automation on customer loyalty. First, one of the biggest risks of AI and ML in CRM is the potential threats to data privacy and security. AI and ML algorithms make predictions based on customers' personal data and strategic decisions are made on this data. However, how the data collected during this process is used and stored may compromise customers' privacy rights. For example, large companies can cause privacy violations by using people's sensitive information without permission through data they collect from social media platforms and online shopping sites. The Cambridge Analytica scandal is a concrete example of misuse of CRM data and use of AI for manipulative purposes. In this case, individuals' political preferences were manipulated by using customers' unauthorized data, creating a significant impact on public opinion. Such violations damage customer trust and may result in legal consequences. Another danger is

the reinforcement of prejudices. AI and ML algorithms make decisions based on the data sets on which they are trained, which can lead to the reinforcement of biases and unfairness in CRM systems. If a CRM system is trained with biased elements such as gender, race, or economic status contained in historical data, it systematizes those biases. For example, if an insurance company uses an AI-based risk assessment system based on historical customer data, it could offer high premiums to individuals living in low-income areas. Similarly, the AI algorithm used in a bank's loan approval process may tend to reject loan applications against low-income individuals based on a previous negative credit history for this group. This continues to perpetuate inequalities and can increase discrimination in society. The loss of the human element in the customer experience is another area where AI and ML in CRM can be detrimental. Customers often expect personal attention and human touch when interacting with businesses. However, AI and ML-based automation solutions, especially technologies like chatbots and automated response systems, can speed up customer service but also eliminate the human touch. For example, a customer who is constantly faced with automated messages instead of a customer service representative may not feel valued enough and their loyalty to the brand may decrease. Additionally, customers with complex issues may not be able to fully express their problems due to the limited understanding of automated systems. This situation may negatively affect customer satisfaction and lead to decreased customer loyalty in the long run.

Finally, the negative effects of excessive automation on customer loyalty should not be overlooked. Although AI and ML provide operational efficiency by increasing automation in CRM systems, they can lead to the adoption of a mechanical approach in relationships with customers. Especially when loyalty programs and sales strategies are carried out completely automatically through customer data, the individual needs and expectations of customers may not be taken into account sufficiently. For example, a retail chain can continually offer the same type of products to its customers based on an AI-based recommendation system. However, these suggestions can become monotonous, ignoring the dynamic and changing needs of the customer. This situation may weaken the bond between the customer and the business and lead to customer loss in the long run.

As a result, while the use of AI and ML in CRM offers great opportunities when applied correctly and ethically, it also carries various risks. Dangers such as data security breaches, amplification of biases, loss of the human touch in customer experience, and over-automation indicate that these technologies must be managed responsibly. Therefore, when using AI and ML in CRM systems, businesses should develop policies that will protect customers' privacy and comply with ethical standards. At the same time, it is of great importance to balance these technologies in a way that increases customer satisfaction, without completely eliminating human interaction elements. While adapting to this rapidly changing technology, we must also take precautions against dangers.

While writing the thesis, my primary hypothesis is; "How artificial intelligence and machine learning integrations transform customer analytics processes in CRM software and what are the effects of this transformation on predicting customer behavior, personalized service delivery and customer loyalty?" was to seek answers. And the result is in your hands.

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