

## ARTIFICIAL INTELLIGENCE (AI) IN CRM – POSSIBILITY OF EFFECTIVE INTEGRATION, OPPORTUNITIES AND THREATS

Katarzyna ŁUKASIK-STACHOWIAK

Częstochowa University of Technology, Faculty of Management; k.lukasik-stachowiak@pcz.pl,  
ORCID: 0000-0001-7632-9513

**Purpose:** The purpose of this article is to discuss the aptitude and readiness of companies to carry out effective integration of Customer Relationship Management (CRM) systems with Artificial Intelligence.

**Design/methodology/approach:** The article attempts to answer the following research questions: RQ1: Are companies ready to use AI in their CRM systems? RQ2: What are the most common AI tools used in CRM systems? RQ3: What are the most common opportunities and threats of using AI in CRM systems? In view of the above, an analysis of national and international literature sources and an analysis of recent research from the IT industry on trends in the use of AI, particularly in customer service, as well as an original pilot study using an online questionnaire were adopted as the research method. The pilot research was conducted among 104 companies via the Internet.

**Findings:** The evaluation of the data collected showed that companies are aware of the calls made on them by the evolution of modern technologies using artificial intelligence and how important it is, in view of the above, to integrate the CRM system with AI and, where possible, to use its facilities to improve customer service and business in general.

**Research limitations/implications:** The conducted study was of a pilot nature, in the future it is planned to conduct a wider research in order to verify a greater number of variables affecting the integration of AI with CRM. Artificial Intelligence is a constantly evolving topic, limiting the verification of only a few variables affecting the integration of AI with CRM may quickly become obsolete.

**Practical implications:** The integration of AI capabilities with CRM is recognised as one of the key factors for improving the speed and efficiency of customer service. The pilot survey indicated what the general sentiment and readiness of companies to use the potential of AI is, how the application of AI can help organisations gain the adaptive organisational capabilities needed to increase overall business efficiency and CRM effectiveness, paying attention to the key goals and opportunities, paying attention to the key goals and opportunities that have been described in detail, as well as the risks associated with the integration of artificial intelligence with CRM.

**Social implications:** In view of the widespread fear of replacing some work positions with Artificial Intelligence, the conducted research indicates that some of them may be a bit exaggerated and some justified, especially when it comes to repetitive analytical tasks in the CRM system.

**Originality/value:** The article deals with the current topic of using Artificial Intelligence solutions in business.

**Keywords:** CRM, Artificial Intelligence, enterprises, customer, management

## 1. Introduction

Artificial Intelligence (AI) was first defined in 1956 as the science and engineering of creating intelligent machines. Over the subsequent decades of the 20th century, AI has gradually evolved into intelligent machines and algorithms that can reason, learn from each other and mimic human intelligence (McCarthy, 2007). The Journal of the UK Institute of Business Ethics defines AI as, “A term generally used to describe the simulation of elements of human intelligence processes by machines and computer systems. AI is characterised by three main features: (1) Learning - the ability to acquire relevant information and rules to use it; (2) Reasoning the ability to apply acquired rules and use them to reach approximate or finite conclusions (3) Iteration - the ability to change a process based on new information acquired” (Business Ethics and Artificial Intelligence, 2018). Since the topic of AI has become so popular and important, it is no wonder why policymakers around the world are considering regulating the most important use of AI (Schuett, 2019). Also, the European Commission (COM, 2018, COM, 2018 final, COM 2019) and the European Parliament (Resolution on Civil Law Rules on Robotics, 2017; Resolution on Autonomous Weapon Systems, 2018; Report on a comprehensive European industrial policy on artificial intelligence and robotics, 2019) explain what AI is, describing it as the ability of machines to exhibit human skills such as reasoning, learning, planning and creativity. AI enables technical systems to perceive their environment, deal with what they perceive and solve problems, working towards a specific goal. The computer receives the data (already prepared or collected with its sensors, such as a camera), processes it and reacts (Enhölm et al., 2022). AI systems can adapt their behaviour to some extent by analysing the consequences of previous actions and acting autonomously (<https://www.europarl.europa.eu/...>, 2020). Researchers have broadened the definition of AI (which can perform cognitive tasks, particularly learning and problem-solving) to include exciting technological innovations such as machine learning and neural networks (Wang, 2019; Zawacki-Richter et al., 2019). Nowadays, the use of AI has become widespread in various industries, mainly for commercial purposes. AI is applied in business, science, art and education to improve the user’s experience or enhance productivity. AI applications also exist in numerous areas of our daily lives (e.g. smart home devices, smartphones, Google, Siri) (Ng et al., 2021). There are also non-commercial projects using AI technologies for socially beneficial outcomes, the number of which has increased significantly worldwide in recent years (this is so-called AI for social good or AI4SG) (Cowls et al., 2021). As can be seen from the

above, AI is used on many different levels. Many companies and consumers/customers have already become accustomed to the ever-increasing challenges posed by AI. However, there are still individuals or companies that are quite sceptical about technological inventions and innovations. Nevertheless, judging by the opportunities AI offers companies, speeding up and streamlining their operations in various areas, eventually even the sceptics will have to be convinced by the new AI-driven reality. Given this and to fill the research gap, the article will attempt to discuss the issue of integrating AI with one of the most important areas of any company, namely customer service, and more specifically with, the CRM system. The current AI tool used in CRM and the opportunities and potentials associated with this will be identified. Therefore, the research questions posed are as follows: RQ1: Are companies ready to use AI in their CRM systems?; RQ2: What are the most common AI tools used in CRM systems?; RQ3: What are the most common opportunities and risks of using AI in CRM systems?

## **2. An overview of the literature**

### **2.1. Artificial intelligence in business**

The results of the latest McKinsey Global AI Survey indicate that AI adoption continues to grow and the benefits are significant. As the use of AI in business becomes more widespread, the tools and best practices to make the most of AI have also become more sophisticated (The state of AI in 2021). This means that AI in business is no longer treated in terms of unrealistic possibilities, it has become commonplace for companies and a consequence of adapting to a changing environment using technological innovations and virtual solutions (Perifanis, Kitsios, 2023). In addition to market giants such as Apple, Oracle and Microsoft, more and more companies are seeing this technology as an opportunity for their business, both in manufacturing and services. The latest results of a survey commissioned by IBM show that the percentage of businesses that have adopted AI now stands at 35%, an increase of 4% from the previous 2021 survey. Surprisingly, it is not companies from America or Europe that see the greatest potential in AI, but, as the latest IBM study shows - China and India have the highest levels of AI saturation, at 58% and 57%, respectively, while statistics from, for example, the United States show an AI saturation of 25%, and the UK 26% (<https://www.erp-view.pl/...>, 2022). However, according to various sources (<https://www.money.pl/...>, 2023; <https://forsal.pl/lifestyle/...>, 2023), this is about to change, as Microsoft has earmarked as much as \$10 billion to invest in the artificial intelligence platform (i.e. chatbot - ChatGPT) developed by OpenAI, apparently seeing the potential of this technology and therefore wanting to base its future business on it. Google has relatively recently unveiled its response to the advent of ChatGPT, namely Bard, whose features are just as impressive as ChatGPT's, so the revalue for the user will be fierce.

Of course, one of the most frequently cited barriers to using AI in business is the high cost of this investment. Meanwhile, also from a global survey conducted by IBM, it is concluded that by no means are financial issues of companies behind the limited implementation of artificial intelligence, but, as respondents in the global survey indicated, limited AI skills, knowledge or experience was listed first (34% of indications), while only for 29% is the price too high and for 25% the lack of tools or platforms for model development is a barrier. A similar proportion (24%) also indicate that the problem is that it is too complex or difficult to integrate or scale (24%) and that the high complexity of the data is an obstacle (24%) (<https://www.erp-view.pl/...>, 2022). A study conducted by PwC in 2023 shows precisely the issue of spending on AI. The results of this study show that global spending on AI will reach \$500 billion in 2023, while by 2030, it is estimated that the potential contribution of AI to the global economy will be \$15.7 trillion (<https://www.erp-view.pl/rynek-it...>, 2022). According to the researchers, AI will operate in critical areas and solve key problems for businesses, this is the opinion of the vast majority - as many as 95% - of the managers surveyed who took part in the AI Engineering Survey. Interestingly, the same people declare that it is a challenge for them to scale AI-based applications, with 76% of respondents saying they have problems with this (The state of AI in 2021, <https://www.mckinsey.com/...>, 2021), a far higher indication than the IBM survey cited earlier demonstrates. By contrast, according to Eurostat (Use of artificial intelligence in enterprises, 2021), in 2021, only 8% of companies in the EU with at least 10 employees will be using AI-supported technologies, including chatbots. Moreover, according to Eurostat research, the large enterprises used AI more than small and medium enterprises. In 2021, 6 % of small enterprises, 13 % of medium enterprises and 28 % of large enterprises used AI. This difference might be explained, for example, by the complexity of implementing AI technologies in an enterprise, economies of scale (i.e. enterprises with larger economies of scale can benefit more from AI) or costs (i.e. investment in AI may be more affordable for large enterprises).

Business activities undertaken with the use of AI are forced by the increasing competition of global giants. Technological changes create both new labor markets and create structured databases, which allows us to redefine the needs or expectations of consumers, even those that have not yet been discovered. It is noteworthy that when preparing forecasts for technology, we do not pay attention to the social and legal, and often also market, consequences of its implementation, which will be discussed later in this paper. It is difficult to predict the direction of technological development. It is certain that marketing technologies supported by tools based on machine learning will not only change economic activity, but will also affect social, political and economic reality. Business sees its future in technologies such as IoT, machine-to-machine communication, augmented reality (AR), 5G technology and advanced predictive technology, all of which are underpinned by artificial intelligence (Kitsios, Kamariotou, 2021; Loureiro et al., 2021). Companies have found a powerful ally in AI that improves the efficiency of their core business and supports operational business processes. In this way, artificial intelligence serves as a tool to support e-commerce (Karimova, 2016); financial operations and information

analysis processes for commercial operations (Cavalcante et al., 2016; Ince, Aktan, 2009; Maknickiene, Maknickas, 2013); fraud detection processes in financial operations (West, Bhattacharya, 2016); or textual analysis of financial information (Shravan Kumar, Ravi, 2016; Xing et al., 2018). In addition, AI plays an important role in marketing-related processes (Chopra, 2019; Lee et al., 2020; Li et al., 2017; Wirth, 2018); customer management (Ledro et al., 2022); product launch, after-sales service and inventory management (Sheta et al., 2015) and in the implementation of Industry 4.0 processes (Ramakrishna et al., 2020).

### 3. Research

#### 3.1. Research methods

The research was conducted among 104 companies from September 2022 to March 2023 using the CAWI method and it was a pilot study. The respondents were requested to complete the online survey questionnaire. The purpose of this studies is to discuss the aptitude and readiness of companies to carry out effective integration of Customer Relationship Management (CRM) systems with artificial intelligence. The article attempts to answer the following research questions: RQ1: Are companies ready to use AI in their CRM systems? RQ2: What are the most common AI tools used in CRM systems? RQ3: To analyze the above issues, both secondary studies presented in the national and abroad literature sources and reports and the author's pilot study using an online questionnaire are used. What are the most common opportunities and threats of using AI in CRM systems? The characteristics of the respondents are presented in Table 1.

**Table 1.**

*Research sample characteristics*

<b>Enterprise size</b>					
	Micro	Small	Medium	Large	One-person
Sample size	13 (13%)	43 (41%)	37 (36%)	9 (9%)	2 (2%)
<b>Type of business conducted</b>					
	Industrial activities	Service activities	Commercial activities	Construction activities	Other
Sample size	16 (15%)	58 (56%)	21 (20%)	6 (6%)	3 (3%)
<b>Operation period of the current business</b>					
	Less than a year	1-5 years	6-10 years	Over 10 years	
Sample size	3 (3%)	6 (6%)	39 (38%)	56 (54%)	
<b>Enterprise coverage</b>					
	Local	Regional	National	International	
Sample size	10 (10%)	12 (12%)	59 (57%)	23 (22%)	

Source: author own work.

Most of the surveyed companies are small (41%) and medium-sized (36%), they mostly provide service activities (56%), for the 54% companies operation period of the current business is over 10 years, and the market coverage for 57% companies is national (Table 1). Selected questions were used in the paper to give the answers for three main RQ.

### 3.2. Results of the research - Artificial intelligence in CRM systems

*RQ1: Are companies ready to use AI in their CRM systems?*

Particularly in customer relationship management (CRM) AI has found space to utilise its potential, e.g. giants such as Salesforce, Oracle and Microsoft are equipping their CRM solutions with AI-based modules. Integration of AI with CRM started around 2017. As recently as 2015, the global CRM market was forecast to be worth \$37bn in two years. Those predictions were confirmed, and the total market is now expected to be worth more than \$82 billion by the end of 2025. Such dynamic growth will be due, among other things, to modern technologies that will completely remodel the way in which customer relationships are managed. According to own research conducted on 104 companies (of various sizes), there is a lot of interest in using AI solutions in the CRM system (Table 2).

**Table 2.**

*Are companies ready to use AI in their CRM systems?*

Enterprise size	General implementation of AI in CRM system		
	Yes (%)	No (%)	Total
Micro	3 (23%)	10 (77%)	13
Small	16 (37%)	27 (63%)	43
Medium	28 (76%)	9 (24%)	37
Large	6 (67%)	3 (33%)	9
One-person	-	2 (100%)	2
<b>Total</b>	53	51	104

Source: author own work.

More than half of the surveyed enterprises (51%) use AI solutions in their CRM systems. As could be predicted, it is especially the group of medium and large companies that uses the solutions offered by AI in CRM systems. Other results are not as impressive as it was indicated earlier in the article, probably this situation depends mainly on the lack of knowledge and skills on the possibility of using AI in customer service. However, this is a development area and sooner or later smaller companies will find a way to use this modern technology.

According to IDC analysis (Ismail, 2017), between 2017 and 2021, AI-supported CRM systems will contribute \$1.1 trillion to the value of the business of companies using CRM. Therefore, organisations should develop and replenish their resources so that they can use the funds raised to invest in AI. If implemented properly, then AI can drive creativity in organisations and, when integrated with CRM (Bag et al., 2021; Balakrishnan, Dwivedi, 2021), also support rapid, intuitive decisions based on real-time data and data-driven predictions (Dwivedi, Wang, 2022; Grover et al., 2020). The implementation of AI into CRM is seen as having a positive impact on organisational performance when complemented by the

organisation's improved ability to accept the technology and the strength of employees' cognitive acceptance of the new system, thanks to the expertise acquired (Massi et al., 2020). The scale of application of AI in CRM is very broad; assuming that this is not yet the end of its possibilities, it is highly likely that in the future human labour, in the area of customer service, will be partially or completely replaced by AI (Rzepecka, 2019).

Meanwhile, still human and artificial intelligence work together on a complementary basis (Kurzweil, 2000; Frey & Osborne, 2013). Thus, in the case of CRM - AI is used to analyse data of a different nature about customers in order to assess their buying habits, likes and dislikes, etc., which generated knowledge is still used by humans to make strategic marketing, sales decisions, etc. A CRM system integrated with AI is essential to increase customer loyalty, increase revenue and increase an organisation's competitive advantage (Chatterjee et al., 2019). That is, the main applications of AI in CRM systems include predicting customer behaviour, suggesting the next best action or product recommendations for a given customer segment. In the next few years, it is very likely that AI will be used in marketing and sales in such a way that marketers will plan the goals and results of campaigns in CRM systems, and the AI itself will select customer segments and choose activities to carry out the campaign from the catalogue of activities of a given company (based on historical data) to achieve the set results (<https://mitsmr.pl/b/co-dalej-z-crm...>, 2019). Using AI in CRM systems processes can bring many benefits to an organisation, such as improved process efficiency, better customer service and increased sales. In 2017, it was predicted that in the context of CRM, AI would have a major impact on (Gantz et al., 2017): (1) accelerating sales cycles, (2) improving lead generation and qualification levels, (3) increasing revenue resulting from optimised marketing activities, (4) optimising service/product pricing, (5) accelerating resolution of issues reported by customers, (6) supporting the construction of branding campaigns, (7) call centre savings while increasing resolution rates, (8) savings in employee recruitment, (9) optimising logistics processes, (10) fraud prevention and detection.

Thus, AI-based CRM systems provide centralised processes that help effectively manage relationships with thousands of customers. Integrating AI with CRM to analyse available data from internal and external sources effectively improves organisational performance. Also, with AI solutions such as (1) machine learning, (2) predictive analytics, (3) automation, or (4) sentiment analysis, for example - the CRM system increases its potential by: (1) intensive monitoring of patterns and trends over time, instead of rigid and coded instructions, (2) faster data-driven decision-making, sales forecasting and efficient allocation of resources at all levels, (3) automation of even complex work, (4) the ability to capture, analyse and visualise how customers perceive products and services (Josiassen et al., 2014; Kochański, 2016).

*RQ2: What are the most common AI tools used in CRM systems?*

There are countless opportunities to effectively improve and strengthen the CRM system integrated with AI (Saxena, 2017; Nguyen, Waring, 2013; Verma, Verma, 2013). Most commonly, AI is used in CRM for the following **purposes**: (1) communication (Rogowska,

2010; Neves, Barros, 2003; Deryugina, 2010), (2) automatic capture of customer data from various sources (Jarek et al., 2018; Kozłowska, Rodzik, 2018; Shang et al., 2017), (3) expanding the customer database (Kietzmann et al., 2018), (4) customer sentiment surveys (Warszycki, 2019). Own research has shown which of the AI technologies is most often used in the surveyed enterprises, adequate to the size of the company (Table 3).

**Table 3.**

*AI tools used in CRM systems*

Enterprise size	AI in CRM system					
	General implementation of AI in CRM system	Communication (virtual assistant):		Automated data capture from a variety of sources (Activity Capture)	Extending the customer database (e.g. Predictive Lead Scoring)	Exploring customer sentiment (e.g. Opportunity Insights)
	Yes (%)	Chatbot	Voicebot			
Micro	3 (23%)	1	-	1	1	2
Small	16 (37%)	5	4	16	8	15
Medium	28 (76%)	21	17	26	22	25
Large	6 (67%)	6	6	6	6	5
<b>Total</b>	<b>53 (51%)</b>	<b>33</b>	<b>27</b>	<b>49</b>	<b>37</b>	<b>47</b>

Source: author own work.

The results of the research do not differ significantly from the averages presented in various sources. Medium and larger enterprises use most of the AI tools included in the study in their CRM systems, such as chatbots, voicebots, Activity Capture, or Predictive Lead Scoring and Opportunity Insights.

By analysing the subsequent above purposes, it is possible to match them with the specific solutions offered by AI a supporting CRM. Adequate to the purpose (1), communication between company and customer is increasingly provided by the *virtual assistant*, which customers have grown accustomed to and has become a cost-effective solution for companies. This remote helper can automate the receipt and management of multiple messages and recovery actions. Virtual assistants take the use of data to the next level by such things as “learning” it according to specific patterns. The virtual assistant will take care of managing notifications about when to catch up with customers and what the best form of communication should be for the person (chatbot, voicebot).

For example, a voicebot intelligent assistant calls a customer who has abandoned a shopping cart, collects feedback and offers a discount or alternative based on the previous choice. And most importantly, it personalises and automates communication. As a result, the intelligent voice assistant is able to convert abandoned shopping carts at a much higher level of efficiency than other tools. Solutions such as Siri and Amazon Alexa have accustomed consumers to using conversational but intelligent voice assistants. Therefore, companies, seeing the benefits of using such solutions for both sides of the purchasing process, are increasingly using AI-powered voicebots for purchasing conversations, i.e. conversational commerce (Schmidt et al., 2018; Bolton et al., 2021; Tulshan, Dhage, 2019). But in fact, the reach and capabilities of the virtual

assistant are extensive, e.g. Siri, Google Assistant, Microsoft Cortana and Amazon Alexa, are generally available on state-of-the-art mobile phones or in homes (e.g. Amazon Echo and Google Home) and cars (e.g. the Google Assistant connection with Hyundai). Virtual assistants can communicate with the various IoT devices on which the supported operating system runs. And yes, Siri only works with Apple devices - iPhone, iPad, iPod Touch, Home Pod, Mac, Apple Watch and Apple TV. Microsoft Cortana works with Windows 10, Android, Xbox One, Skype, iOS, Cyanogen and Windows Mixed Reality devices. Alexa works with Amazon's Resound, Fire and Dash families of things, as well as various interesting Android and iOS devices (Tulshan, Dhage, 2019).

Regarding the purpose (2), that is, *automated data capture*, it is artificial intelligence integrated into CRM that provides the ability to now collect customer information from a variety of sources, such as, but not limited to, WhatsApp, social networks (e.g. Twitter) or IoT devices with as little or no human intervention as possible. This saves time for customer service staff by discarding the copying of physical information entered into the system. They can use this opportunity if only to strengthen their contacts with customers.

In addition, the Activity Capture function also works well here - it analyses all e-mails and calendar events, automatically assigning them to the relevant records (such as customers, sales opportunities, etc.). It eliminates the need for traders to waste time on manual data cross-referencing, which is subject to considerable risk of error and, moreover, intrusive in everyday work. Furthermore, by anticipating customer behaviour, organisations can take customised action to subtly personalise communications and create genuine enthusiasm for each potential customer. In this way, they can reinforce a positive corporate image and stimulate an increase in the number of potential customers (Ngai et al., 2008; Smith, Rupp, 2002; Kansbod, 2022; Monod et al., 2022). For example, Microsoft is launching a new sales-oriented component of its Viva platform. Viva Sales is a CRM companion application that is expected to integrate with Teams, Outlook and Office, including Word, Excel and PowerPoint. It also works with Microsoft Dynamics 365 Sales CRM and third-party CRM systems. Viva Sales is based on automatically capturing customer data and integrating it with calls and chats in Teams and e-mails in Outlook. According to the developers, the component turns the Microsoft 365 platform into an intelligent sales assistant. Viva Sales uses a set of predictive AI technologies, "Context IQ" to generate contextual reminders and recommendations (Sulikowski, 2022).

As for the purpose (3) - i.e. *extending the customer database* - SI also found its application. Depending on the type of customer, their willingness to share information with the company varies; some do it willingly, others rather infrequently and they only care about completing the transaction and not about completing the data in their purchasing profile. Here, the AI acts as a dedicated expert who not only analyses and collects data from the available pool but additionally encourages customers to provide new data. They will make the customer profile in the CRM system more complete, which will translate into the more effective building of relationships and contacts between the company and the consumer. Furthermore,

AI interference in, for example, customer loyalty programmes, allows the AI, after a customer has made a purchase, to associate which products have been purchased and assign them to a personalised user profile. With access to such information, we can have a real impact on subsequent consumer choices. The Predictive Lead Scoring tool used here automatically analyses everything about individual customers (i.e. their metadata, related events, sales topics) and assigns them an appropriate score - i.e. a value that determines the customer's sales potential, as well as its value to the company. Predictive scoring segregates the customers collected in the CRM system, informing which ones are worth focusing on.

Analysing the role of AI towards the (4) purpose i.e. *exploring customer sentiment*, it can be noticed that AI can also be used to explore customer sentiment and then to establish techniques that increase customer engagement. Intelligent machine algorithms can select audiences according to purchase history, gender, online behaviour, location and other such characteristics or behaviours. Using the results gathered previously, the CRM software will be more accurate, creating tailored messages that will have an impact on the customer to a greater or lesser extent. It is also worth mentioning the call centre, which is still being used to build a relationship with the customer and check their mood, here too AI has its uses. As the capabilities of call centre supervisors are quite limited, it is assumed that they can only analyse about 1-5% of the calls made, which does not allow for the identification of the entirety of problems, with AI it is possible to verify 100% of customer calls and better assess the level of customer satisfaction with the service (<https://www.forbes.pl/...>, 2022). Again, another tool, Opportunity Insights, analyses current communications exchanged with contractors (e.g. e-mails from potential customers) based on historical data collected in the CRM system, informing users of the increase or decrease in sales opportunities and suggesting what steps they should take to close the topic successfully.

In addition, AI uses information to understand projects, guide ideal approaches, predict outcomes and computerise customer engagement processes. The use of AI in CRM systems will make organisations smarter and enable them to conduct marketing and sales activities with any customer, regardless of the scale of the business. The data collected in a CRM system is worthless if it is not used. However, a lack of time and adequate human resources can result in customer information not being used. In order to use the data effectively, it is necessary that the information is properly sorted and organised. Only then will a better understanding of the customer by the company be possible. The use of AI in CRM systems will make the communication carried out by organisations much more effective and efficient in terms of resources used (<https://initius.pl/news/...>, 2019).

*RQ3: What are the most common opportunities and risks of using AI in CRM systems?*

For a better understanding of the use of artificial intelligence in CRM systems, the surveyed enterprises were asked about the opportunities and threats they face in connection with the implementation of modern solutions to the customer service system (Table 4). In this question

were used three most frequently discussed and analyzed opportunities and threats in literature and Internet sources. They were discussed in detail in the Table 4.

Referring to the obtained research results and analysis of literature sources, it is obvious that AI creates a number of opportunities and possibilities for customer service. It is also worth noting that, in most organisations, CRM systems need to meet the challenges of the future in order to fully exploit the potential offered by the volumes of data available worldwide, cloud computing and data from the so-called Consumer IoT (Stein et al., 2013).

**Table 4.**  
*Opportunities and threats of AI in CRM systems*

Answers	Main opportunities and threats of AI in CRM systems					
	opportunities			threats		
	Better understanding of customer needs and its retention	Improving and speeding up customer service	Trend to use a combination of cloud and on-premise platforms for AI	Lack of support for large volumes and speed of loading and unloading data	An access to machine intelligence and ability to build neural networks	AI abuse (e.g. deepfakes, security of use) and lack of legal regulations
Yes	49 (92%)	44 (83%)	36 (68%)	35 (66%)	20 (38%)	41 (77%)
No	0	2 (4%)	6 (11%)	10 (19%)	19 (36%)	5 (9%)
I don't know	4 (8%)	7 (13%)	11 (21%)	7 (13%)	14 (26%)	7 (13%)

Source: author own work.

According to experts, the reality is that CRM development will be driven more towards Data Management Platforms (DMPs) in the near future than the development of existing systems, as no CRM system in its current form can handle the volume and velocity of data loading and unloading that will be needed for effective marketing (Libai et al., 2020). From the form in which the data is stored to the lack of an application programming interface (API) to add data from third-party sources (data fabrics) in real-time, this obviously means that current systems cannot cope with analysing this data to segment customers correctly. Equally important when it comes to adapting a CRM system to new conditions, is to pay attention to the popularity of the cloud and the petabytes of data collected by internet users, so there is access to machine intelligence and the possibility of building neural networks as a service (AI-a-a-a-S) in CRM systems, which make the use of AI in sales start to make sense. Therefore, implementing a CRM system integrated with AI is essential for all organisations working in B2B settings to analyse vast amounts of data and obtain useful business information for decision-making (Chatterjee et al. 2019). Nonetheless, it is comforting and forward-looking to note that, according to a study by Salecforce.com, most companies (whether high performers or not) tend to use a mix of cloud and on-premise platforms for AI, similar to general IT workloads. However, high-performance companies use cloud infrastructure much more often than their competitors: 64% of their AI workloads take place in the public or hybrid cloud, compared to 44% at other companies. This group of companies also access a wider range of AI capabilities and techniques in the public cloud, for example, as they claim to use the cloud twice as much

as the rest for natural language speech understanding and facial recognition (The state of AI in 2021).

It is also worth considering another issue related to some AI solutions like ML (Machine Learning), in order not to be suspected by e.g. a customer of AI abuse. One of the more popular abuses of AI are so-called deepfakes, which involve using AI to create or manipulate audio and visual content to make it authentic. The deepfake method is ideal for use in disinformation campaigns, as it is difficult to distinguish at first glance from real content. Also of interest, although also partly controversial for reasons of security of use (there have been cases of ChatGPT generating malware e-mail), is the previously mentioned ChatGPT in customer service (Yu et al., 2021). However, it has many advantages, improving and speeding up customer service, an AI-based chatbot can interact with customers in a natural and conversational way. It enables companies to provide 24/7 customer service, responding quickly to customer queries and providing accurate and timely answers. The chatbot is designed to learn from customer interactions, so that over time it is able to provide more accurate and personalised responses. ChatGPT is also able to understand customers' moods and intentions, so it can provide more effective responses to customer queries. Importantly, ChatGPT allows companies to easily integrate with CRM systems and payment processing platforms. This allows companies to automate and streamline their customer service processes, making it easier to respond quickly and accurately to customer enquiries. It also offers a number of other features, such as a customisable chatbot interface, integration with third-party services and customer service call tracking (Shafeeg et al., 2023). The most frequently cited reasons for using ChatGPT in CRM are (Rizvi, 2017; Latinovic, Chatterjee, 2022; Wamba-Taguimdje et al., 2020): (1) automated on-demand support (24/7 customer service), (2) cost-effective solution (even for small businesses, fast customer service without the need for additional staff), (3) easy to use (easy to set up and use, user-friendly interface that makes it easy for customers to access support), (4) scalable solution (allowing companies to adapt customer service operations to meet changing needs), (5) configurable solution (allows companies to tailor customer service agents and processes to their specific needs to be efficient and effective).

Any ethical issues related to the use of AI in business are also quite an important issue, which also applies to customer service itself (Dignum, 2018). It is not without reason that the European Commission published on 8 April 2019 a document called Ethics Guidelines for Trustworthy AI<sup>18</sup> developed by the European Commission's Independent High-Level Expert Group on Artificial Intelligence (AI-HLEG). The guidelines developed aim to promote Trustworthy AI defined by three components fulfilled throughout the entire AI system lifecycle. These components are (1) compliance with the law and all applicable rules and regulations; (2) ethicality, i.e. adherence to ethical principles and values; (3) robustness, both technically and socially, given that even with good intentions, AI systems can cause unintended harm. Efforts should be made for these three components to occur simultaneously, and when this does not occur, efforts should be made to harmonise them. In view of the above, the argumentation

of the OECD experts from the “Science, Technology and Industry” research group that it is necessary to regularly produce measurement and empirical data on the development of the AI is undoubtedly correct, as it is currently of vital importance for economic and political decisions (Baruffaldi et al., 2020).

One of the biggest concerns about customer service automation relates to job losses. Automation, computerisation and artificial intelligence are strongly influencing the labour market, thereby shaping new qualifications and skills. Unofficially, it is said that soon approx. 30% of current consultants will no longer perform their current duties and, according to the World Economic Forum, up to 85 million jobs worldwide will be replaced by machines by 2025, but 97 million new jobs will be created (Battina, 2018; Goyal, Aneja, 2020; Shaw et al., 2019). However, this does not mean, for example, that consultants are saying goodbye to their jobs in the industry for good. Based on past experience, it can be concluded that humans and their creativity, associated with out-of-the-box thinking, will not be able to be replaced by machines or even advanced programmes. Already, the demand for data analysts and people who can pick out trends from data is very high. Furthermore, both humans and AI have relative strengths, with humans leading the way in intuition, empathy, broad judgement and complex reasoning. Therefore, in order for companies to reap the benefits of artificial intelligence, the focus should be on promoting full or partial delegation of decisions that enhance managers’ capabilities.

#### **4. Discussion and conclusions**

The importance of artificial intelligence is becoming apparent as the contours of digital transformation become clearer. Companies have realised the value of the data at their disposal. Now they need the tools to make better use of them. And the shift towards self-service and the associated reduction in costs, especially for repetitive processes, as well as the attention to the so-called customer experience, is decisive for the competitiveness of companies, which makes them constantly reach for AI-based solutions. Simple activities can be expected to be replaced by technology and become automated. There is no doubt that AI has incredible potential for business in various areas of its operations. Still, where some see opportunities, others see a threat, and so scientists are trying to avoid at all costs a future in which we will not be able to recognise texts created by artificial intelligence from those that are human-made. However, the results of their study suggest that this not-so-optimistic future has already arrived, and the distinction mentioned may not be possible (Enholm et al., 2022; Dwivedi et al., 2021).

Despite the many challenges - business is already appreciating the potential of intelligent algorithms, seeing that their application allows them to build a competitive advantage. For companies to adapt to digital transformation, including the integration of AI into the

customer service process, a precise rethink is required in the first place, e.g. which AI solutions/tools are necessary in the existing CRM modules. This is important in terms of planning the costs of implementation and follow-up, thereby training employees. The fact that the intended changes in the company are being properly promoted cannot be overlooked here, and this is followed by an appropriate attitude and conviction on the part of employees to these forward-looking solutions.

In practice, the more management is convinced of the usefulness of the new CRM system integrated with AI, the better the attitude of employees will be to use it and take it for granted to achieve success in the area of customer service. Therefore, the top management of the organization should make interested employees aware of the usefulness and effectiveness of this new system, it can, for example, publish success stories of the new system and its solutions that are already successfully used in other organizations. The management of organizations implementing a CRM system integrated with AI should make holistic attempts to shape the attitude of employees towards the intentions of adopting the new system.

Conducting a systematic review of national and international literature, as well as own pilot studies, indicated that companies are aware that digitalisation has become a necessity and that AI will replace human labour in many areas. Of course, a more advanced level of implementation of AI solutions is shown by the larger surveyed enterprises. But it still leaves much to be desired. In view of this, the integration of AI capabilities with CRM is recognised as one of the key factors for improving the speed and efficiency of customer service. The survey provided answers to the research questions posed (RQ1, RQ2, RQ3), thereby indicating what the general sentiment and readiness of companies to use the potential of AI is, how the application of AI can help organisations gain the adaptive organisational capabilities needed to increase overall business efficiency and CRM effectiveness, with four key purposes and details the opportunities and risks that the integration of AI with CRM presents.

AI is a constantly evolving topic, it provides some companies with fear and for others it is another development opportunity, which is why they approach it with enthusiasm. One way or another, this is the future of economics, economy, and sociology, each of these areas will sooner or later have to face the solutions offered by artificial intelligence. Therefore, this article is a prelude to continuing further research in this area.

## References

1. Bag, S., Pretorius, J.H.C., Gupta, S., Dwivedi, Y.K. (2021). Role of institutional pressures and resources in the adoption of big data analytics powered artificial intelligence, sustainable manufacturing practices and circular economy capabilities. *Technological Forecasting and Social Change*, 163, 120420, <https://doi.org/10.1016/j.techfore.2020.120420>
2. Balakrishnan, J., Dwivedi, Y.K. (2021). Role of cognitive absorption in building user trust and experience. *Psychology and Marketing*, 38(4), 643-668. <https://doi.org/10.1002/mar.21462>
3. Baruffaldi, S., van Beuzekom, B., Dernis, H., Harhoff, D., Rao, N., Rosenfeld, D., Squicciarini, M. (2020). Identifying and measuring developments in artificial intelligence: Making the impossible possible. OECD Science. *Technology and Industry Working Papers*, 5, 1-68. DOI:10.1787/5f65ff7e-en.
4. Battina, D.S. (2018). The future of artificial intelligence at work: A review on effects of decision automation and augmentation on workers targeted by algorithms and third-party observers. *Computers in Human Behavior*, 123(4). DOI:10.1016/j.chb.2021.106878.
5. Bolton, T., Dargahi, T., Belguith, S., Al-Rakhami, M.S., Sodhro, A.H. (2021). On the Security and Privacy Challenges of Virtual Assistants. *Sensors*, 21(7), 2312. <https://doi.org/10.3390/s21072312>.
6. *Business Ethics and Artificial Intelligence* (2018). *Business Ethics Briefing*, 58, January. London: The Institute of Business Ethics. Retrieved from: <https://www.ibe.org.uk/resource/ibe-briefing-58-business-ethics-and-artificial-intelligence-pdf.html>.
7. Cavalcante, R., Brasileiro, R.C., Souza, V.L.F., Nobrega, J.P., Oliveira, A.L.I. (2016). Computational intelligence and financial markets: A survey and future directions. *Expert Systems with Applications*, 55, 194-211. <https://doi.org/10.1016/j.eswa.2016.02.006>.
8. Chatterjee, S., Ghosh, S.K., Chaudhuri, R., Nguyen, B. (2019). Are CRM systems ready for AI integration? A conceptual framework of organizational readiness for effective AI-CRM integration. *The Bottom Line*, 32(2), 144-157. <https://doi.org/10.1108/BL-02-2019-0069>.
9. Chopra, K. (2019). Indian shopper motivation to use artificial intelligence: Generating Vroom's expectancy theory of motivation using grounded theory approach. *International Journal of Retail & Distribution Management*, 47(3), 331-347. <https://doi.org/10.1108/IJRDM-11-2018-0251>.
10. Co dalej z CRM? Pięć wyzwań w zarządzaniu relacjami z klientami (2019). *MIT Sloan Management Review Polska*. Retrieved from: <https://mitsmr.pl/b/co-dalej-z-crm-piec-wyzwan-w-zarzadzaniu-relacjami-z-klientami/PfAZoc70M>.
11. Cowsls, J., Tsamados, A., Taddeo, M., Floridi, L. (2021). A definition, benchmark and database of AI for social good initiatives. *Nat. Mach. Intell.*, 3, 111-115. <https://doi.org/10.1038/s42256-021-00296-0>.

12. Deryugina, O.V. (2010). Chatterbots. *Scientific and Technical Information Processing* 37(2), 143-147, <https://doi.org/10.3103/S0147688210020097>.
13. Dignum, V. (2018), Ethics in artificial intelligence: introduction to the special issue. *Ethics and Information Technology*, Vol. 20, No. 1, 1-3, doi: 10.1007/s10676-018-9450-z.
14. Dwivedi, Y.K., Wang, Y. (2022). Guest editorial: Artificial intelligence for B2B marketing: Challenges and opportunities. *Industrial Marketing Management*, 105, 109-113; <https://doi.org/10.1016/j.indmarman.2022.06.001>.
15. Dwivedi, Y.K., Hughes, L., Ismagilova, E. et al. (2021). Artificial Intelligence (AI): Multidisciplinary Perspectives on Emerging Challenges, Opportunities, and Agenda for Research, Practice and Policy. *International Journal of Information Management*, 57, 101994, <https://doi.org/10.1016/j.ijinfomgt.2019.08.002>.
16. Enholm, I.M., Papagiannidis, E., Mikalef, P., Krogstie, J. (2022). Artificial intelligence and business value: A literature review. *Information Systems Frontiers*, 24(5), 1709-1734. <https://doi.org/10.1007/s10796-021-10186-w>.
17. *European Commission. Artificial Intelligence for Europe* (COM(2018) 237 final) (2018). Retrieved from: <https://digital-strategy.ec.europa.eu/en/library/communication-artificial-intelligence-europe>.
18. *European Commission. Building Trust in Human Centric Artificial Intelligence* (COM(2019)168), (2019). Retrieved from: <https://digital-strategy.ec.europa.eu/en/library/communication-building-trust-human-centric-artificial-intelligence>.
19. *European Commission. Coordinated Plan on Artificial Intelligence* (COM(2018) 795 final) (2018). Retrieved from: <https://digital-strategy.ec.europa.eu/en/library/coordinated-plan-artificial-intelligence>.
20. *European Parliament. Report on a comprehensive European industrial policy on artificial intelligence and robotics* (2018/2088(INI)). (2019). Retrieved from: [https://www.europarl.europa.eu/doceo/document/A-8-2019-0019\\_EN.html](https://www.europarl.europa.eu/doceo/document/A-8-2019-0019_EN.html).
21. *European Parliament. Resolution on Autonomous Weapon Systems* (2018/2752(RSP)). (2018). Retrieved from: [https://www.europarl.europa.eu/doceo/document/TA-8-2018-0341\\_EN.html](https://www.europarl.europa.eu/doceo/document/TA-8-2018-0341_EN.html).
22. *European Parliament. Resolution on Civil Law Rules on Robotics* (2015/2103(INL)). (2017). Retrieved from: [https://www.europarl.europa.eu/RegData/etudes/ATAG/2017/599250/EPRS\\_ATA\(2017\)599250\\_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/ATAG/2017/599250/EPRS_ATA(2017)599250_EN.pdf).
23. Eurostat 2021. Retrieved from: [https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Use\\_of\\_artificial\\_intelligence\\_in\\_enterprises#Enterprises\\_using\\_artificial\\_intelligence\\_technologies](https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Use_of_artificial_intelligence_in_enterprises#Enterprises_using_artificial_intelligence_technologies).
24. Frey, C.B., Osborne, M.A. (2013). *The Future of Employment: How susceptible are jobs to computerisation?* University of Oxford, Retrieved from: [https://www.oxfordmartin.ox.ac.uk/downloads/academic/The\\_Future\\_of\\_Employment.pdf](https://www.oxfordmartin.ox.ac.uk/downloads/academic/The_Future_of_Employment.pdf).
25. Gantz, J.F., Murray, G., Schubmehl, D., Vesset, D., Wardley, M. (2017). *A Trillion-Dollar Boost: The Economic Impact of AI on Customer Relationship Management Sponsored by:*

- Salesforce*, June, Retrieved from: [https://www.salesforce.com/content/dam/web/en\\_us/www/documents/white-papers/the-economic-impact-of-ai.pdf](https://www.salesforce.com/content/dam/web/en_us/www/documents/white-papers/the-economic-impact-of-ai.pdf).
26. Goyal, A., Aneja, R. (2020). Artificial intelligence and income inequality: Do technological changes and worker's position matter? *Journal of Public Affairs*, 20(4), DOI:10.1002/pa.2326.
  27. Graca, S.S., Barry, J.M., Doney, P.M. (2015). Performance outcomes of behavioral attributes in buyer-supplier relationships. *Journal of Business and Industrial Marketing*, Vol. 30, No. 7, 805-816, <https://doi.org/10.1108/JBIM-04-2014-0072>.
  28. Grover, P., Kar, A.K., Dwivedi, Y.K. (2020). Understanding artificial intelligence adoption in operations management: Insights from the review of academic literature and social media discussions. *Ann. Oper. Res.*, <https://doi.org/10.1007/s10479-020-03683-9>.
  29. Ince, H., Aktan, B. (2009). A comparison of data mining techniques for credit scoring in banking: A managerial perspective. *Journal of Business Economics and Management*, 10(3), 233-240. <https://doi.org/10.3846/1611-1699.2009.10.233-240>.
  30. Ismail, N. (2017). *A Trillion-Dollar Boost: The Economic Impact of AI on Customer Relationship Management*. IDC, Retrieved from: <https://www.information-age.com/trillion-dollar-industry-economic-impact-ai-crm-6258/>.
  31. *Jak sztuczna inteligencja przyczynia się do poprawy obsługi klienta call center?* Technologia Ender Turing (2022). Retrieved from: <https://www.forbes.pl/jak-sztuczna-inteligencja-przyczynia-sie-do-poprawy-obslugi-klienta-call-center/xsyv61p>.
  32. Jarek, K., Mazurek, G., Hałas-Dej, S. (2018). Marketing i sztuczna inteligencja. *Przedsiębiorczość i Zarządzanie*, XIX, 5, 191-206.
  33. Josiassen, A., Assaf, A.G., Cvelbar, L.K. (2014). CRM and the Bottom Line: Do All CRM Dimensions Affect Firm Performance? *International Journal of Hospitality Management*, 36, 130-136. <https://doi.org/10.1016/j.ijhm.2013.08.005>.
  34. Kansbod, J. (2022). *The Implementation of social CRM: Key features and significant challenges associated with the practical implementation of social Customer Relationship Management*. Retrieved from: <http://urn.kb.se/resolve?urn=urn:nbn:se:miun:diva-45240>.
  35. Karimova, F. (2016). A survey of e-commerce recommender systems. *European Scientific Journal*, 12(34), 75-89. <https://doi.org/10.19044/esj.2016.v12n34p75>.
  36. Kietzmann, J., Paschen, J., Treen, E. (2018). Artificial Intelligence in Advertising: How Marketers Can Leverage Artificial Intelligence Along the Consumer Journey. *Journal of Advertising Research*, vol. 58, no. 3, p. 264.
  37. Kitsios, F., Kamariotou, M. (2021). Artificial intelligence and business strategy towards digital transformation: A research agenda. *Sustainability*, 13(4), 2025.
  38. Kochański, T. (2016). Pozyskiwanie wiedzy z systemów klasy Customer Relationship Management. *Przedsiębiorczość i Zarządzanie*, 17(3.3), 21-29.
  39. Kozłowska, A., Rodzik, A. (2018). Chatboty: perspektywy rozwoju technologii informatycznych w kontakcie z klientem. *Acta Universitatis Nicolai Copernici Zarządzanie*, 45(1).

40. Kurzweil, R. (2000). *The Age of Spiritual Machines: When Computers Exceed Human Intelligence*. New York: Penguin.
41. Latinovic, Z., Chatterjee, S.C. (2022). Achieving the promise of AI and ML in delivering economic and relational customer value in B2B. *Journal of Business Research*, 144, 966-974. <https://doi.org/10.1016/j.jbusres.2022.01.052>.
42. Ledro, C., Nosella, A., Vinelli, A. (2022). Artificial intelligence in customer relationship management: literature review and future research directions. *Journal of Business & Industrial Marketing*, Vol. 37, No. 13, 48-63. <https://doi.org/10.1108/JBIM-07-2021-0332>.
43. Lee, L.W., Dabirian, A., McCarthy, I.P., Kietzmann, J. (2020). Making sense of text: Artificial intelligence-enabled content analysis. *European Journal of Marketing*, 54(3), 615-644. <https://doi.org/10.1108/EJM-02-2019-0219>.
44. Li, B., Hou, B., Yu, W., Lu, X., Yang, C. (2017). Applications of artificial intelligence in intelligent manufacturing: A review. *Frontiers of Information Technology & Electronic Engineering*, 18(1), 86-96. <https://doi.org/10.1631/FITEE.1601885>.
45. Libai, B., Bart, Y., Gensler, S., Hofacker, C.F., Kaplan, A., Kotterheinrich, K., Kroll, E.B. (2020). Brave new world? On AI and the management of customer relationships. *Journal of Interactive Marketing*, 51, 44-56. <https://doi.org/10.1016/j.intmar.2020.04.002>.
46. Loureiro, S.M.C., Guerreiro, J., Tussyadiah, I. (2021). Artificial intelligence in business: State of the art and future research agenda. *Journal of business research*, 129, 911-926.
47. Maknickiene, N., Maknickas, A. (2013). Financial market prediction system with Evolino neural network and Delphi method. *Journal of Business Economics and Management*, 14(2), 403-413. <https://doi.org/10.3846/16111699.2012.729532>.
48. Massi, M., Rod, M., Corsaro, D. (2021). Is co-created value the only legitimate value? An institutional-theory perspective on business interaction in B2B-marketing systems. *Journal of Business & Industrial Marketing*, Vol. 36, No. 2, 337-354. <https://doi.org/10.1108/JBIM-01-2020-0029>.
49. McCarthy, J. (2007). From here to human-level AI. *Artificial Intelligence*, 171(18), 1174-1182. <https://doi.org/10.1016/j.artint.2007.10.009>.
50. *Microsoft i ChatGPT. Amerykański gigant szuka swojego miejsca w branży sztucznej inteligencji* (2023). Retrieved from: <https://forsal.pl/lifestyle/technologie/artykuly/8644794,microsoft-i-chatgpt-gigant-miejsce-branza-sztucznej-inteligencji.html>.
51. *Miliardy dolarów od Microsoftu. Gigant chce zainwestować we właściciela ChatGPT* (2023). Retrieved from: <https://www.money.pl/gospodarka/miliardy-dolarow-od-microsoftu-gigant-chce-zainwestowac-we-wlasciciela-chatgpt-6854002590583360a.html>.
52. Monod, E., Lissillour, R., Köster, A., Jiayin, Q. (2022) Does AI control or support? Power shifts after AI system implementation in customer relationship management. *Journal of Decision Systems*, 1-24. DOI: 10.1080/12460125.2022.2066051.
53. Neves, A.M.M., Barros, F.A. (2003). XbotML: A Markup Language for Human Computer Interaction via Chatterbots. In: J.M.C. Lovelle, B.M.G. Rodríguez, J.E.L. Gayo, M. del Puerto Paule Ruiz, L.J. Aguilar (eds.), Web Engineering. ICWE 2003. *Lecture Notes*

- in Computer Science*, vol 2722. Berlin-Heidelberg: Springer. [https://doi.org/10.1007/3-540-45068-8\\_31](https://doi.org/10.1007/3-540-45068-8_31).
54. Ng, D.T.K., Leung, J.K.L., Chu, K.W.S., Qiao, M.S. (2021). AI literacy: Definition, teaching, evaluation and ethical issues. *Proceedings of the Association for Information Science and Technology*, 58(1), 504-509. doi: 10.1002/pra2.487.
  55. Ngai, E., Moon, K., Liu, J.N., Tsang, K., Law, R., Suk, F., Wong, I. (2008). Extending CRM in the Retail Industry: An RFID-Based Personal Shopping Assistant System. *Communications of the Association for Information Systems*, 23. <https://doi.org/10.17705/1CAIS.02316>.
  56. Nguyen, B., Simkin, L. (2017), Internet of things and marketing: the state of play, future trends and the implications for marketing. *Journal of Marketing Management*, Vol. 33, No. 1/2, 6. DOI:10.1080/0267257X.2016.1257542.
  57. Nguyen, T.H. and Waring, T.S. (2013), The adoption of customer relationship management (CRM) technology in SMEs: An empirical study. *Journal of Small Business and Enterprise Development*, Vol. 20 No. 4, 824-848. <https://doi.org/10.1108/JSBED-01-2012-0013>.
  58. Perifanis, N.-A., Kitsios, F. (2023). Investigating the Influence of Artificial Intelligence on Business Value in the Digital Era of Strategy: A Literature Review. *Information*, 14, 85. <https://doi.org/10.3390/info14020085>.
  59. *Pięć sposobów, jak sztuczna inteligencja może zmienić systemy CRM w 2019 roku* (2019). Retrieved from: <https://initius.pl/news/piec-sposobow-jak-sztuczna-inteligencja-moze-zmienic-oprogramowanie-crm-w-2019-roku/>.
  60. Ramakrishna, S., Ngowi, A., De Jager, H., Awuzie, B.O. (2020). Emerging industrial revolution: Symbiosis of Industry 4.0 and circular economy: The role of universities. *Science Technology and Society*, 25(3), 505-525. <https://doi.org/10.1177/0971721820912918>.
  61. Rizvi, M. (2017). *Implications of internet of things (IoT) for CRM. Customer Think*. Retrieved from: <https://customerthink.com/implications-of-internet-of-things-iot-for-crm/>.
  62. Rogowska, D. (2010). The use of programs based on artificial intelligence method - chatterbots in creating relations with clients. *Ekonomia i Zarządzanie*, 2(4), 137-146.
  63. Rzepecka, P. (2019). W jakim stopniu sztuczna inteligencja jest w stanie zastąpić człowieka? *Studia Pedagogiczne. Problemy Społeczne, Edukacyjne i Artystyczne*, 34(34), 161-171.
  64. Saxena, S. (2017). Enhancing ICT Infrastructure in Public Services: Factors Influencing Mobile Government (M-Government) Adoption in India. *The Bottom Line: Managing Library Finances*, 30, 279-296. <https://doi.org/10.1108/BL-08-2017-0017>.
  65. Schmidt, B., Borrison, R., Cohen, A., Dix, M., Gärtler, M., Hollender, M. et al. (2018, October). *Industrial virtual assistants: Challenges and opportunities*. Proceedings of the 2018 ACM International Joint Conference and 2018 International Symposium on Pervasive and Ubiquitous Computing and Wearable Computers, pp. 794-801.
  66. Schuett, J. (2019). *A legal definition of AI*. arXiv preprint arXiv:1909.01095.

67. Shafeeg, A., Shazhaev, I., Mihaylov, D., Tularov, A., Shazhaev, I. (2023). Voice Assistant Integrated with Chat GPT. *Indonesian Journal of Computer Science*, 12(1). DOI: <https://doi.org/10.33022/ijcs.v12i1.3146>.
68. Shang, D., Shang, D., Wu, W., Wu, W. (2017), Understanding mobile shopping consumers' continuance intention. *Industrial Management and Data Systems*, Vol. 117, No. 1, 213-227. DOI:10.1108/IMDS-02-2016-0052.
69. Shaw, J., Rudzicz, F., Jamieson, T., Goldfarb, A. (2019). Artificial intelligence and the implementation challenge. *Journal of medical Internet research*, 21(7). DOI: 10.2196/13659.
70. Sheta, F.A., Ahmed, S.E.M., Faris, H. (2015). A comparison between regression, artificial neural networks and support vector machines for predicting stock market index. *International Journal of Advanced Research in Artificial Intelligence*, 4(7). <https://doi.org/10.14569/IJARAI.2015.040710>.
71. Shravan Kumar, B., Ravi, V. (2016). A survey of the applications of text mining in financial domain. *Knowledge-Based Systems*, 114, 128-147. <https://doi.org/10.1016/j.knosys.2016.10.003>.
72. Smith, A.D., Rupp, W.T. (2002). Application service providers (ASP): moving downstream to enhance competitive advantage. *Information Management & Computer Security*, 10(2), 64-72. DOI:10.1108/09685220210424113.
73. Stein, A.D., Smith, M.F., Lancioni, R.A. (2013). The development and diffusion of customer relationship management (CRM) intelligence in business-to-business environments. *Industrial Marketing Management*, 42(6), 855-861. <https://doi.org/10.1016/j.indmarman.2013.06.004>.
74. Sulikowski, K. (2022). *Microsoft Viva Sales: nowa aplikacja towarzysząca dla systemów CRM*. Retrieved from: <https://www.centrumxp.pl/Publikacja/Microsoft-Viva-Sales-nowa-aplikacja-towarzyszaca-dla-systemow-CRM>.
75. *Sztuczna Inteligencja rozlewa się po świecie* (2022). Retrieved from: <https://www.erp-view.pl/rynek-it/30036-sztuczna-inteligencja-rozlewa-sie-po-swiecie.html>.
76. *Sztuczna inteligencja to bajka dla dorosłych* (2022). Retrieved from: <https://www.erp-view.pl/rynek-it/29983-sztuczna-inteligencja-to-bajka-dla-doroslych.html>.
77. *Sztuczna inteligencja: co to jest i jakie ma zastosowania?* (2020). Retrieved from: <https://www.europarl.europa.eu/news/pl/headlines/society/20200827STO85804/sztuczna-inteligencja-co-to-jest-i-jakie-ma-zastosowania>.
78. *The state of AI in 2021*. Retrieved from: <https://www.mckinsey.com/capabilities/quantumblack/our-insights/global-survey-the-state-of-ai-in-2021>.
79. Tulshan, A.S., Dhage, S.N. (2019). Survey on Virtual Assistant: Google Assistant, Siri, Cortana, Alexa. In: S. Thampi, O. Marques, S. Krishnan, K.C. Li, D. Ciunzo, M. Kolekar (eds.), *Advances in Signal Processing and Intelligent Recognition Systems. SIRS 2018. Communications in Computer and Information Science*, vol. 968 (pp. 190-201). Singapore: Springer, [https://doi.org/10.1007/978-981-13-5758-9\\_17](https://doi.org/10.1007/978-981-13-5758-9_17).

80. Verma, D., Verma, D.S. (2013). Managing customer relationships through mobile CRM in organized retail outlets. *International Journal of Engineering Trends and Technology*, Vol. 4, No. 5, 1696-1701.
81. Vlačić, B., Corbo, L., Costa e Silva, S., Dabić, M. (2021). The evolving role of artificial intelligence in marketing: A review and research agenda. *Journal of Business Research*, 128, 187-203. <https://doi.org/10.1016/j.jbusres.2021.01.055>.
82. Wamba-Taguimdje, S.-L., Fosso Wamba, S., Kala Kamdjoug, J.R., Tchatchouang Wanko, C.E. (2020). Influence of artificial intelligence (AI) on firm performance: the business value of AI-based transformation projects. *Business Process Management Journal*, Vol. 26, No. 7, 1893-1924. <https://doi.org/10.1108/BPMJ-10-2019-0411>.
83. Wang, P. (2019). On defining artificial intelligence. *Journal of Artificial General Intelligence*, 10(2), 1-37.
84. Warszycki, M. (2019). Wykorzystanie sztucznej inteligencji do predykcji emocji konsumentów. *Studies and Papers of the Collegium of Management and Finance*, 173, 111-121.
85. West, J., Bhattacharya, M. (2016). Intelligent financial fraud detection. *Computers & Security*, 57, 47-66. <https://doi.org/10.1016/j.cose.2015.09.005>.
86. Wirth, N. (2018). Hello marketing, what can artificial intelligence help you with? *International Journal of Market Research*, 60(5), 435-438. <https://doi.org/10.1177/1470785318776841>.
87. Xing, F.Z., Cambria, E., Welsch, R.E. (2018). Natural language based financial forecasting: A survey. *Artificial Intelligence Review*, 50(1), 49-73. <https://doi.org/10.1007/s10462-017-9588-9>.
88. Yu, P., Xia, Z., Fei, J., Lu, Y. (2021). A survey on deepfake video detection. *IET Biometrics*, 10(6), 607-624. <https://doi.org/10.1049/bme2.12031>.
89. Zawacki-Richter, O., Marín, V.I., Bond, M., Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education – where are the educators? *Int. J. Educ. Technol. Higher Edu.*, 16, 39. doi: 10.1186/s41239-019-0171-0.