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An investigation on Conversational Artificial Intelligence Platforms (CAIP) in the banking/finance industry – practical and innovative future recommendations in the form of artificial intelligence

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**Abstract**

The following thesis will focus on the general topic of Artificial Intelligence (AI). The main purpose of this work is to investigate how generally AI is being implemented and developed in modern times. Additionally, it examines CAIP (conversational artificial intelligence technologies) within the banking industry. Through a literature review, the implementation and innovation of such technologies and the impact they have within the financial sector are investigated. The examination is extended by expert interviews from leading companies. These interviews discuss industry practices and innovative ideas that contributes a different perspective on the conversational artificial intelligence features in the banking industry.

**Keywords:** Artificial Intelligence, Technology Adoption, Classification Algorithm, Travel and Tourism, Banking, Construction, Software as a Service, Conversational AI, State of Adoption

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## 1 Introduction

### 1.1 Introduction into CAIP technologies

The emerging use of powerful conversational artificial intelligence platform (CAIP) technologies and their potential impacts on our society and consumers are vast. AI (artificial intelligence) technology promotes the efficiency of machines, devices, and digital services for the aid of humans. AI technology includes well-proofed algorithms that automate the steps and decisions needed to complete physical and cognitive tasks (Fuhrman & Mooney, PhD, 2021). By 2026, the conversational AI market is expected to reach \$18.4 billion at a Compound Annual Growth Rate (CAGR) of 21.8%, up from \$6.8 billion in 2021. (Conversational AI market outlook: 2021 trends and predictions, 2021). This shows that both businesses and their clients view CAIP, and AI technologies are valuable. This benefits both businesses and customers; AI can help cut costs, increase revenue, and above all enhance the customers' experience. Gartner study, *Competitive Landscape: Conversational AI Platform Providers*, estimates that overall revenue of conversational AI platforms to reach \$2.5 billion, growing at a rate of 75% per year. (Lee & Roy, 2021). The study further predicts that conversational AI vendors will further create these technologies out of necessity to differentiate them from their competitors – offering their clients multi-use cases and multi-industry requirements (Lee & Roy, 2021).

The past ten years has seen the rapid emergence of “Machine Learning” (ML). These computationally intensive approaches are applied to massive datasets to spot the statistical relationship and make more accurate predictions. “Deep Learning” (DL) systems over the past five

years have evolved to allowing computer systems to “self-learn” complex pattern recognition and intelligent response abilities. This evolution has fueled disruptive applications throughout a range of complex cognitive areas, such as but not limited to: Natural Language Processing (NLP), radiology and diagnosis of illness, digital personal assistants, autonomous driving, marketing, and finance (Charm , et al., 2020).

## 1.2 Covid 19 and Chat Artificial Intelligence (AI)

The COVID-19 pandemic drove consumers towards online channels. Entire industries had to respond to this increased demand. Survey results ran by Mckinsey & Company confirmed that this rapid shift in demand is moving toward permanent digital interaction with consumers (Charm , et al., 2020). Respondents said that at least 80 percent of their customer interactions are digital in nature, three times higher than pre COVID-19 (Charm , et al., 2020). Respondents of the survey reported a significant change in areas such as remote working, adjusting customer needs, and customer preferences for remote interactions (Charm , et al., 2020). With the implementation of chat AI and CAIP technologies, survey-takers believe that they are more than twice as likely to maintain these shifts and that these implementations will remain across sectors even after the COVID-19 pandemic (Charm , et al., 2020).The integration of conversational AI was accelerated by the COVID-19 pandemic. PricewaterhouseCoopers, multinational professional services firm, conducted a study that found that 52% of companies stepped up their adaptation of artificial intelligence in 2020 as a direct result of COVID-19. (Likens, Shehab, Rao, & Lendler, 2020).

In a post COVID-19 society, consumers are more likely to care about customer experience and where they spend their money. Instead of physically going into a branch or store, consumers will

be more likely to interact with brands online. This shift pushes industries to implement such AI and CAIP technologies to enhance their consumer's online experience (Likens, Shehab, Rao, & Lendler, 2020).

### 1.3 Methodology

Through an extended literature review, this topic is investigated and analyzed in detail. The analysis of the current trends in the market, current applications, and future uses supports this work. The literature selected is comprised of diverse academic journals, published surveys, and reports. These publications from leading multinational companies working in the industry and well-renown research centers offer a scholarly and data driven perspective. Furthermore, four expert interviews are held with leading professionals working in the industry and particularly with CAIP technologies. Companies interviewed include Polish based social listening and conversational AI company, Sentione; financial services multinational, Allianz; and leading banks, BNP Paribas, and Bank of America. It is reminded that these expert interviews add additional, professional opinions and are not a representative of the company's perspective and roadmap.

## 2 Implementation of CAIP

### 2.1 Current uses of CAIP technologies across sectors

Research institute, Gartner, estimates that around the world there are over 2,000 natural language technology (NLT) providers and most provide CAIP technologies. CAIPs are the building block technology for the development and implementation of chatbots and virtual assistants. CAIP technologies can be utilized by software developers or solution providers to create conversational

user interfaces (CUIs), chatbots, and virtual assistants for a multitude of uses. This type of technology offers integration into chat interfaces which can be messaging platforms, social media, SMS messaging, and website chats. Research published by Capgemini revealed that enterprises across banking, insurance, and retail that have implemented CAIP and AI technologies report more than 20% reduction in both customer service costs and overall customer churn (Taylor, et al., 2020). Gartner research institute estimates that 40% of enterprises by 2023 will have invested conversational AI which would be up by 5% from today (Jump, Casey, & Lee, 2021). For the banking and finance industry, it is estimated that by 2023, the implementation of virtual agents will save \$7.3 billion globally in operational costs (Smith, 2021). Furthermore, more than 18% of credit unions have already integrated some form of CAIP technology, and another 18% plan to do so by the end of 2022 (Conversational AI market outlook: 2021 trends and predictions, 2021).

The competition between providers is a clear reflection of the fact that this market has rapid growth and high potential. With each vendor striving to establish their positional power early on in this growth phase, we can see that the industry will only increase in competitiveness (Roy & Lee, 2021). Other industries and sectors that will heavily increase their implementation of CAIP technologies are telecommunications, insurance, e-commerce, and healthcare.

### 3 Industry leader interviews

#### 3.1 Expert interview with Bartek Bazinski

In this expert interview with, Bartek Bazinski, COO and Co-Founder of SentiOne, provider of Conversational AI services and platforms, we discussed the evolving marketing surrounding

artificial intelligence. Our conversation ranges from practical implementation to theoretical propositions, we touch on where the future of this market lies and where artificial intelligence has had the most impact on our current society. It is noted that these interviews represent a personal, professional opinion rather than the perspective of their company.

Starting off looking in the future, we discussed the introduction of Mark Zuckerberg's revolutionary, *Metaverse*. We know that artificial intelligence has entered our lives for the long-term, is the revolution still to come or are we amid it now? *"That's right, the AI revolution is already happening. When we presented our voicebots and chatbots to the market just 2 years ago, there was a lot of interest, but companies had no plans to automate customer service on a larger scale."* Bazinski also touched on the impact of the Covid-19 pandemic. He mentioned that the outbreak of the pandemic changed the approach to implementing voicebots. He says, *"Automation has become a real business need, and bot buying processes that used to take up to 15 months now are much shorter, closer to 3 months actually."* The most popular business application of artificial intelligence is data analytics. Bartek further explains that what this data can do for agencies using AI is improve the conversion of video and image ads. This means for example if users are more likely to click an ad if it includes purple and the actors silhouette appears in the lower right corner – then agencies will create such ads based on that data.

Looking in, we investigated what are the challenges society faces in the context of artificial intelligence: improving it, eliminating errors, or crossing into the digital revolution. *"The real challenge, however, is for regulators - for several years both the European Union and the U.S. have been looking for ways to ensure that new technology is in good hands, does not harm anyone,*



*and users are educated and aware of how to use it... It's not the technology itself that can cause concern, but its applications - proper regulation and education are so necessary."*

This expert interview with Bartek Bazinski offered insightful ideas and brought forward connections to another research. In a study published by conversational AI company, *Boost AI*, points to an emergence of virtual agent networks. This means that networks or servers would be designed to connect a range of bots through one unified interface. This network will allow each chatbot to identify when it needs to redirect the user to a more adequate chatbot; this effortless transition enhances the customer experience (Conversational AI market outlook: 2021 trends and predictions, 2021).

### 3.2 Expert interview with Pascal Meese

During this expert interview with Allianz's Pascal Meese, who leads their innovation team and is responsible for conversation AI as a product owner, we investigate a different perspective that touches on the impact of conversational AI and its future. Meese's professional insights offers personal and educated opinions from his point of view. Meese divulges his experiences with CAIP technology and how his team at Allianz uses them for customer experience. It is noted that these interviews represent a personal, professional opinion rather than the perspective of their company.

The most common use cases in Meese work are working with chatbots and voicebots for customers. Voicebots: are of real tax system, to route the ticket towards the right people who take care specifically of this topic. Chatbots: for travel & home use cases, allowing them to ask questions and to be handed over to human agent (if necessary), also to do contract changes (name after marriage, question about invoice). For the coming years, the aesthetic of voicebots and

chatbots will change to more human features. Meese stresses that chatbots and voicebots are made for *“guiding the customers to the journey and not around the journey”*. He further explains that giving bots a more human touch would help avoid misunderstandings and other conversational factors. He says, *“people would appreciate transparency when the operator tells them they are chatting with a bot and not a human- this part of explanation can be helpful to have the customer be fully onboard”*. We further discussed the turbulence and impact of the COVID-19 pandemic on CAIP technologies. Meese touched upon the fact that remote work interrupted the processes of implementation although it had no changes in strategic aspects and did not add any further target or problems in the process. Meese states that people are still hesitant when using conversational AI, he says: *“Many customers have very few experiences with this type of technology. For those customers who have some experiences, unfortunately they are not generally positive. However, now that there have been major improvements in the technology in this industry, the image is improving.”* The rapid growth of this industry is important to consider when analyzing its impact on customer service experience within the banking and finance sector. Meese explains further that there were major problems previously since the CAIP technology is advanced. As the customers are inexperienced, it was crucial to have many skilled agents who can help with this type of technology.

Meese explains that when hiring, it can be difficult to find experienced agents and even more difficult to make sure they are trained properly – constantly educating them of the news. Even though that voicebots and chatbots might be an investment, they can be configured to be more effective, improve response time, and give the human agents more time to answer specific questions. Meese’s expert interview ended with an important reminder about the relationship with

artificial intelligence and human beings and their efficiency. *“It’s rather about supporting the agent then replacing him, to support him in the complex and complicated parts, therefore increasing in responding quicker and better, therefore holding the client on a longer time. For the next years: bots will not replace the people so far. It’s not about optimizing the employee costs, rather increasing customer satisfaction!”*

### 3.3 Expert interview with Rafal Piotrowski

Rafal Piotrowski, Innovation Architect with BNP in their Poland office, offers practical and critical analysis in our interview. Piotrowski, working within the banking industry, gave us first-hand experience of CAIP technologies and how they have been growing, evolving, and disrupting – for the better – the banking industry regarding customer experience. It is noted that these interviews represent a personal, professional opinion rather than the perspective of their company.

Looking specifically into the impact of COVID-19 and the implementation of CAIP technologies. Piotrowski offers us a broader perspective. He examines that during the pandemic, CAIP technologies gained paced when it came to their implementation. *“There is growth in payment schemes and means of payment – think Blink or BuyNowPayLater -) making companies having to focus on different ends at the same time with the same quality and speed in the service. Banks have not been capable of scaling up with the increase of actions from customer side, therefore new forciers are needed.”* Discussing the customer experience with CAIP technologies, Piotrowski says that they learned through experience with building chatbots that the bot has very specific capabilities. On the providers side, there are multiple ways to explain a problem. This makes it

nearly impossible to prepare the bot for all possible questions, statements, and responses. Companies need to be prepared to make a chatbot as human as possible – therefore, the team behind its creation must be highly skilled.

Piotrowski offers use insights on which types of use-cases BNP implements CAIP technologies. CAIP technologies were used to address internal customer needs to cover a set of questions within the procurement department. This type of work involved diverse questions regarding the purchase of new assets and procurement. They built a knowledge basis that would be able to answer questions that are related to the services and products that the bank provides, giving this type of information to the sales team allowed them to be more efficient and save time. This time saved was then used to focus on their actual job of selling rather than answering questions.

Piotrowski touched on the importance of education and competence when building these technologies. In vertical expansion in the pre-existing use-cases, they plan to add the voice support function to the chat support for clients. He states that this will be able to process the customers question independently of the channel of contact. Moreover, the quality and speed of answers will always be consistent with high standards. They are planning to add new and innovative transactional capabilities to their bots, to also proceed actions – not just offer informative advice or direction for customers. Horizontal expansion involves new types of use-cases, for example, the integration of chatbot logic. Chatbot logic includes dynamic information sources (knowledge basis such as intranet and information portals), taking the question asked and looking at existing insights to match knowledge areas to ensure that the customer's request is completed accurately. This type

of innovation and implementation only enhances the customers experience and improves the CAIP technologies across sectors.

### 3.4 Expert interview with Arun Sekar

To round out our research, this interview with Arun Sekar, product leader of conversational AI with Bank of America reiterates important trends and innovations with CAIP technologies while also giving a deeper look into the banking and finance industry. It is noted that these interviews represent a personal, professional opinion rather than the perspective of their company. Sekar offers honest and analytical insight on the general response of consumer experience to CAIP technologies.

Comparing the AI technologies prior to the COVID-19 pandemic, Sekar realizes that there is room for improvement within the industry and with CAIP technologies. Due to the COVID-19 pandemic, many within the industry were behind on the implementation and development of these technologies. *“...the initial wave was not successful as AI technologies were not as advanced as they are right now. We saw services improve due to the implementation of deep technologies like sentiment analysis, deep learning, NLU and NLP. Our industry has to keep up with consumers as they are starting to ask for more complicated tasks such as opening/asking for loans.”* COVID-19’s impact accelerated this development on the company side, deploying features in the technology that allowed clients to handle most of their finances without having to physically go into a branch. Currently, within the banking and finance industry, Sekar experiences have been with day-to-day transactions for clients, going into consumer and wealth management banking. Sekar, like other interviewees, emphasizes that AI and CAIP technologies should be used to *“self-serve”* the clients. This type of technology was created to be focused on the customer’s

needs – that is where the focus needs to be, on their needs and wants, not on the assumption of what we think. Overall, Sekar's expertise offers an experienced perspective of what these leading technologies are doing, can do, and will be doing in the near future. When implementing CAIP technologies, it is pivotal that companies keep the focus on the customer experience, diminishing the divide between providers and clients.

## 4 Conclusion

### 4.1 Future Outlooks of CAIP Technologies

A consistency through the interviews conducted was the emphasis on scalable tech and enhancing the customer experience by focusing on their specific needs. The first generation of chatbots, as previously mentioned, were overall unsuccessful due to their limited actions and lack of human touch. If a chatbot can only answer questions regarding the customer's contract details, it is incapable of helping with anything related or a more intricate request. Chatbots need to be visible and user-friendly. If the chatbot is in a place where users have difficulty finding, it will be less effective simply due to the fact no customers are using it. For current and future implementation, it will be crucial for these technologies to include skilled virtual agents that can respond to questions of different types with high accuracy levels. Automated chatbots and voicebots will become the main channel for customer service. Sparebank 1 SR-Bank, one of Norway's leading digital-first banks, implemented a virtual agent at the center of its customer service. All traffic via SR-Bank's website is directed through the chatbot and now automates 42% of all B2B and B2C traffic. A customer survey released by SR-Bank's customers reported that 75% prefer using their virtual agent, Bank, rather than talking to a human (Conversational AI market outlook: 2021 trends

and predictions, 2021). This “chat-first” approach will be an important policy for companies to implement to allow for large-scale automation.

CAIP technologies will further improve their human touch and only augment human work, not replace it. Many employees fear AI technology as they think it was designed to replace them, but it is an important asset to enhance how they do their jobs. The customer service sector was previously considered “high-risk” of being automated. However, this sector is uniquely placed to be trained and upskilled; playing an important role for the future of their industry (Conversational AI market outlook: 2021 trends and predictions, 2021). The practice and upkeep of conversational AI will allow employees to continue their services and support but with more efficiency. (Genesys, 2018). More and more, enterprises are implementing conversational AI to help improve systems internally. Giving chatbots for different departments will give employees immediate access to information which is more efficient than asking repetitive questions.

#### 4.2 Personal Summary

At Sentione our most unique proposition is our technology. Our algorithms are currently able to monitor and analyze speech in 81 languages, which covers 71% of the world's population. Every day we collect 42 million public utterances from the Internet - social media posts, comments, contributions to forums and articles, which serve as training material. As a result, our bots understand the intent of the interlocutors with an efficiency of 96% - better than many real humans. The use of AI in customer service is growing in popularity. After the introduction of lockdown, the load on bank hotlines increased by up to 80%, overloaded consultants were not able

to handle all cases, and customers were annoyed by the long wait for a call; an effective voicebot can answer even 1000 calls per second.

For future development, it would be important to implement effective voicebots. At Sentione and within the social listening and marketing industry, natural language understanding engines combined with simple interfaces allows the building of CAIP chatbots without the involvement of an IT team. Using the AI-powered solution, it allows us to help automate customer management processes easier than ever before. We help automate customer service using AI, collect real-time consumer insights, control businesses online reputation, and help improve online customer care.



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