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Emerging Technologies in Customer Service

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ABSTRACT

Technology has improved the customer service experience for both agents and customers. Service technology is bringing the customer and service provider together. Customer service is no longer tied to desks, shifts, or physical offices - and neither are customers. Channels like chat, email, and messaging are not just preferred but expected. There is no doubt that providing better customer support is the only way to survive. As a result, new technology adaptations for customer service are happening faster. These new technologies in customer service include artificial intelligence, chatbots, blockchain, and predictive analytics. This paper examines the impact of emerging technologies on customer service.

KEYWORDS: *technology, emerging technologies, customer service, customer support.*

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INTRODUCTION

Years back, there were limited ways for customers to interact with brands. Customers could either visit in person or call a representative, and brands could assume that the journeys would follow a particular route. Times are changing. Customers of today are more empowered and informed than before, and with the rise of technology and the Internet, they have access to an abundance of channels they can use during their journey to resolve issues. Today, customer service no longer waits on hold. Often, it solves the problem before a customer finishes typing. Customers expect instant answers, human-like understanding, and zero repetition. The customer service and support function is vital to maintaining customer loyalty and influencing brand perceptions. Businesses are under pressure to provide faster, more convenient and more expert customer service to meet these expectations [1]. Figure 1 shows a typical customer service team [2].

The old model of fixing what is broken and responding when asked no longer holds up in a world where customer expectations are sky high. Today's customers do not just want fast support. They want support that feels made for them. They expect brands to be available on their preferred support channels, respond instantly, and deliver personalized service without making them repeat themselves. Successful teams will shift from reactive human requests to proactive customer experience orchestration. The focus of customer service will move from managing demand to value creation. Figure 2 shows what customers are now expecting [3].

WHAT ARE EMERGING TECHNOLOGIES?

Technology may be regarded as a collection of systems designed to perform some function. It can help alleviate some of the challenges facing business today. Emerging technology is a term generally used to describe new technology. The term often refers to technologies currently developing or expected to be available within the next five to ten years. Any imminent, but not fully realized, technological innovations will have some impact on the status quo.

Emerging technologies are shaping our societies. They continue to affect the way we live, work, and

interact with one another. Emerging technology (ET) lacks a consensus on what classifies them as "emergent." It is a relative term because one may see a technology as emerging and others may not see it the same way. It is a term that is often used to describe a new technology. A technology is still emerging if it is not yet a "must-have" [4]. An emerging technology is the one that holds the promise of creating a new economic engine and is trans-industrial. ET is used in different areas such as media, healthcare, business, science, education, or defense.

The characteristics of emerging technologies include the following [5]:

- *Novelty:* Emerging technologies are typically new or novel, meaning they have yet to be widely adopted or used. They often represent a significant departure from existing technologies or processes.
- *Potential for Disruption:* Emerging technologies have the potential to disrupt existing markets, industries, or ways of doing things. They may also displace existing businesses or industries.
- *Uncertainty:* Because emerging technologies are still in the early stages of development, there is often a high uncertainty surrounding their future potential and impact. It can be challenging to predict how they will evolve.
- *Rapid Change:* Emerging technologies often evolve rapidly, with new developments and innovations emerging frequently. It can make keeping up with the latest trends and advancements challenging.
- *Interdisciplinary*: Emerging technologies often involve multiple disciplines or fields of study, such as computer science, engineering, and biology. They may require collaboration across different fields and industries to develop their potential fully.

Emerging technologies are worth investigating. They are responsible for developing new products or devices. As emerging technologies continue to evolve, engineering is poised for a transformative future. Emerging technologies have driven innovation and progress in today's rapidly evolving digital landscape. The collective impact of emerging technologies such as artificial intelligence, machine learning, big data, and the Internet of things is undeniably transformative. Some emerging technologies are shown in Figure 3 [6], while Figure 4 shows the impact of emerging technologies on society [7].

EMERGING TECHNOLOGIES IN CUSTOMER SERVICE

Channels like AI chatbots, self-serve support, and omnichannel service are becoming increasingly popular. Emerging technologies like AI, sentiment analysis, and robotic process automation will empower customer service reps and give them the tools they need to succeed in their roles. Some technologies will become the catalyst for new customer service positions. Popular emerging technologies include the following [8-11]:

1. *Artificial Intelligence:* At its core, artificial intelligence (AI) consists of a group of technologies that when combined can automate tasks that are time intensive and often expensive to do manually. Customer service and support leaders are feeling pressure from other enterprise leaders to adopt generative AI (genAI) in their function. They believe AI can now deliver better customer service than human agents, driven by faster responses, consistent answers, and always-on availability. They believe that AI presents an opportunity for headcount reduction, with limitless potential for automation. Some customers would be willing to use a GenAI assistant for customer service interactions on their behalf. Almost every company, from Google to Microsoft, is adopting AI technology because it will be the biggest part of our next-generation technology. The incorporation of AI-powered technologies in customer service has brought about a significant transformation in how businesses engage with and cater to their clientele. Figure 5 shows various uses of AI in customer service [10].
2. *Robotic Process Automation*: RPA employs software robots or "bots" to automate repetitive tasks traditionally carried out by human agents. RPA is particularly beneficial in customer service for activities such as data entry, form processing, and handling basic customer inquiries. It unburdens humans from dull time-consuming tasks, and has the ability to perform those tasks more quickly. As humans progress through repetitive tasks, it is easy to make mistakes due to fatigue or disinterest. RPA software never gets tired and is able to perform movements consistently and accurately. RPA software is faster and can adapt to new processes without the learning curve. Similar to AI, RPA has shortcomings. One of these shortcomings is that RPA cannot deal with exceptions to the structured rules that are used to create it. RPA is also incapable of most of the automations that AI can execute.

3. *Chatbots:* Most customers prefer to chat rather than talk on call or send an email. In the past, customers used to go to an office or store and talk to an agent to clarify any confusion before making a purchase. Over time, live chatbots have replaced that. Today, almost all kinds of business websites have the option to live chat with an agent. AI is integrated with chatbots to convert them into virtual assistants. In addition to being active 24/7, it is also more accurate at narrowly defined tasks allowing human agents to transition to work that requires a more human touch. Chatbots can operate round the clock, ensuring that customers can seek assistance at any time, regardless of time zones or business hours. For example, Alibaba uses AI chatbots to handle support across Taobao's massive e-commerce platform. By taking over routine queries like order status and returns, Alibaba scales self-service effortlessly, while letting human agents focus on more complex issues. As shown in Figure 6, Alibaba's AI chatbots use natural language processing (NLP) and machine learning (ML) to interpret queries and generate human-like responses [3].
4. *Internet of Things:* Everything from your wristwatch to home appliances to your car is connected to the Internet. We call this the Internet of things (IoT). IoT not only gives you encrypted control over your devices, but it also gives you access to real-life data. This data is used for the further development of that product or support. IoT is already reshaping customer service and the support system. The support team can even predict possible issues and be proactive in finding a solution.
5. *Blockchain:* Cryptocurrency itself is probably not going to radically change customer success. However, blockchain technology has fascinating applications for contracting and how transparent payments will be in the future. With smart contracts, machines get to enforce and execute contract terms and payments without human involvement.
6. *Immersive Technologies:* Customer service is becoming more visual and hands-on. The next wave of support will use augmented reality (AR), virtual reality (VR), and video to make troubleshooting faster, clearer, and more intuitive. Augmented reality will let agents (or even customers) overlay instructions directly onto equipment using AR glasses or camera apps. Virtual reality is entering training and remote support. There are a lot of possibilities for immersive technologies.
7. *Social Media:* Social media is a convenient channel to access. It will become a standard customer service tool. With social commerce on the rise, customers expect to access support on social channels more than ever before. They do not want the hassle of finding a number to call or waiting in line to chat with a service rep. Brands who do not embrace this channel will likely damage their reputation. Most unhappy customers jump to Facebook, Instagram, or X (formerly Twitter) to share a grievance or criticize a brand.
8. *Predictive Analytics:* By using predictive analytics, businesses enable the optimization of operations and resources effectively for customers. By analyzing historical data and identifying patterns and trends, the client is able to better optimize the use of resources such as personnel, equipment, and materials. This predictive capability serves to avert problems and elevate customer satisfaction by providing solutions proactively.
9. *Sentimental Analysis:* Another customer support industry trend gaining popularity in is sentimental analysis. AI tools that leverage advanced natural language processing (NLP) and machine learning (ML) algorithms to provide real-time sentiment analysis of customer interactions are becoming popular. Customer service training has traditionally been one-size-fits-all. However, as sentiment analysis tools make it easier to identify each rep's strengths and weaknesses, training will become more tailored to the employee's needs. For example, Microsoft's Azure Cognitive Services provide sentiment analysis APIs that can swiftly ascertain the sentiment of customer feedback, facilitating timely and appropriate interventions.
10. *Omnichannel Service:* Customers can interact with your brand through multiple channels, including social media, third-party review platforms, emails, SMS, and your website. To deliver consistent support, you need to sync all communication channels, so your team and customers can work seamlessly between them.
11. *Self-service:* There is an overwhelming preference for self-service across all industries as customers attempt to solve problems on their own before contacting a live representative. The self-service model has become increasingly popular over the years due to the fact that savvy customers want the freedom to troubleshoot problems at their own pace. It involves sophisticated customer interaction methods, like interactive FAQs, virtual assistants, and

community forums. Big businesses are embracing self-service because it lowers their costs of doing business. They want to give customers better tools to solve issues independently.

Other emerging technologies include machine learning (ML), and natural language processing (NLP).

APPLICATIONS OF EMERGING TECHNOLOGIES IN CUSTOMER SERVICE

Advancements in AI, sentiment analysis, and chatbots are poised to further transform customer service, making interactions more intuitive, empathetic, and effective. These advancements have empowered businesses to improve customer experiences through more effective, personalized, and prompt interactions. Common applications of emerging technologies in customer service include the following [1,8]:

- *Automation:* Embracing automation has become essential. Automation is reshaping what customers expect and how teams deliver. By adopting an automation-first approach, leaders can drive long-term value creation. To operate effectively at scale, organizations will automate core operational tasks such as data cleansing, records management, knowledge creation, and governance. Automation will also power quality and compliance. By automating customer service processes, businesses can achieve greater efficiency, reduce costs, and allocate resources more effectively.
- *Data Analytics*: In today's world, everything runs on data. If you want to create the best support system for your customers, then data is something you need to prioritize. Data analysis can be a hectic job. In the future, AI can do this for you with well-explained reporting. Customer service data will also help marketing and sales teams approach potential customers with stronger messaging and objection handling.
- *Screen-sharing:* Screen-sharing technology is already evolving in the support industry. Not only customers but also agents are finding screen-sharing more convenient. It gives them real-time visuals of the customer's device. If the issues need more than one expert to solve, then there is a video conferencing option. Not only customers but also agents are finding screen-sharing more convenient. It gives them real-time visuals of the customer's device.

BENEFITS

Emerging technologies will unburden employees from the mundane, repetitive tasks of answering frequently asked questions or entering data and enable them to spend more time on design, strategy, and implementation. These technologies enable businesses to deliver personalized, real-time interactions, automate routine tasks, and predict customer needs, enhancing customer journeys. Eventually, AI will free up humans to work on customer experience improvement and business development. Other benefits include the following [1,12]:

- *Customer Experience:* This plays a decisive role in determining the success of a business, directly impacting customer satisfaction, loyalty, and overall brand perception. Customer experience encompasses all the interactions between a customer and a brand, from the first time they hear about it to the support they receive after making a purchase. As consumer expectations evolve, businesses are compelled to innovate and enhance their customer experience strategies. In today's fiercely competitive business environment, organizations are increasingly turning to technology to bolster their customer service capabilities. Artificial intelligence has been transformative in this realm, offering innovative solutions to meet the ever-changing expectations of customers.
- *Customer Satisfaction:* Each technology offers practical applications that address key opportunities, improving customer satisfaction and operational effectiveness. Constant accessibility to customer support tends to enhance service dependability and customer satisfaction. The capability to provide continuous support fosters customer trust and engagement, particularly in industries with high customer interaction volumes. Customers facing complex problems may prefer human agents who can provide more comprehensive solutions, which can impact customer satisfaction.
- *Personalization:* Personalization technologies in customer service are designed to customize interactions and suggestions based on individual customer preferences, behaviors, and requirements. Companies adopt personalization to enhance customer experiences by offering tailored recommendations and services based on preferences and behaviors. This involves using machine learning algorithms and data analytics to create a seamless and personalized customer journey. The ability to hyper-personalize will improve.

CHALLENGES

In spite of the benefits, integrating AI into customer experience poses challenges such as ensuring data

privacy and security, handling complex queries effectively, maintaining a human touch in automated interactions, addressing biases in AI algorithms, and achieving seamless integration with existing systems. Current AI systems struggle to fully replicate human aspects, resulting in a gap between customer expectations and actual service delivery. To address this challenge, future directions could involve developing AI systems that simulate human empathy and interaction. Other challenges include the following [3,8,12]:

- *Ethical Concern:* Concerns about data privacy and security, as well as the need for transparency and ethical considerations in AI applications, are critical issues that businesses must address. Research in AI ethics focuses on establishing frameworks and guidelines to ensure AI systems' transparency, fairness, and accountability.
- *Operational Costs*: By reducing the effort required to raise requests to near zero, AI assistants will likely enable customers to raise requests at a much higher rate. Widespread adoption of AI assistants by customers poses a cost risk that could undermine any gains made by customer service automation.
- *Increasing Loyalty*: If customers start automating their interactions through the use of third-party AI, organizations will have to adapt to handle interactions with nonhuman customers. This prevents opportunities for value enhancement and reduces the quality and quantity of voice of the customer data that can be gathered.
- *Collaboration:* The future of customer service is all about AI-human collaboration.. The future is not man versus machine, but it is man with machine. AI will handle the heavy lifting (routing, summarizing, suggesting), while humans do what they do best: empathize, adapt, and think on their feet. It is a partnership, not a handoff. For example, an e-commerce website utilizes collaborative filtering to recommend products and services based on similar user preferences, providing a personalized and enjoyable shopping experience.
- *Transparency:* It is crucial to maintain transparency in data usage by clearly communicating the procedures for handling and safeguarding customer data. Customers are understandably worried about the collection, usage, and protection of their personal data. Adhering to stringent ethical standards in the development and implementation of AI can help address these concerns.

CONCLUSION

The future of customer service sits at an intersection: smarter tech, sharper strategy, and stronger alignment with business goals. It is not gated by budget or scale. It is taking shape through the daily choices modern support teams make to work smarter and deliver better experiences. With AI and self-service channels gaining more ground, it is evident that human-driven support will drastically decrease in the future. This is because smaller, less complicated issues will be solved by either the customer independently or by an AI bot.

Emerging technologies including AI, RPA, and IoT will lead to more self-service, reduced customer inquiry volume, and better customer experiences. These technologies improve the ability of customer service agents to understand and address customer needs promptly. With emerging technologies, humans will still be necessary. As technologies evolve, their integration into customer service is anticipated to become more sophisticated, driving further enhancements in the customer experience. More information about emerging technologies in customer service can be found in the following related journal*: Journal on Emerging Technologies.*

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Figure 1 A typical customer service team [2].

Figure 2 What customers are now expecting [3].

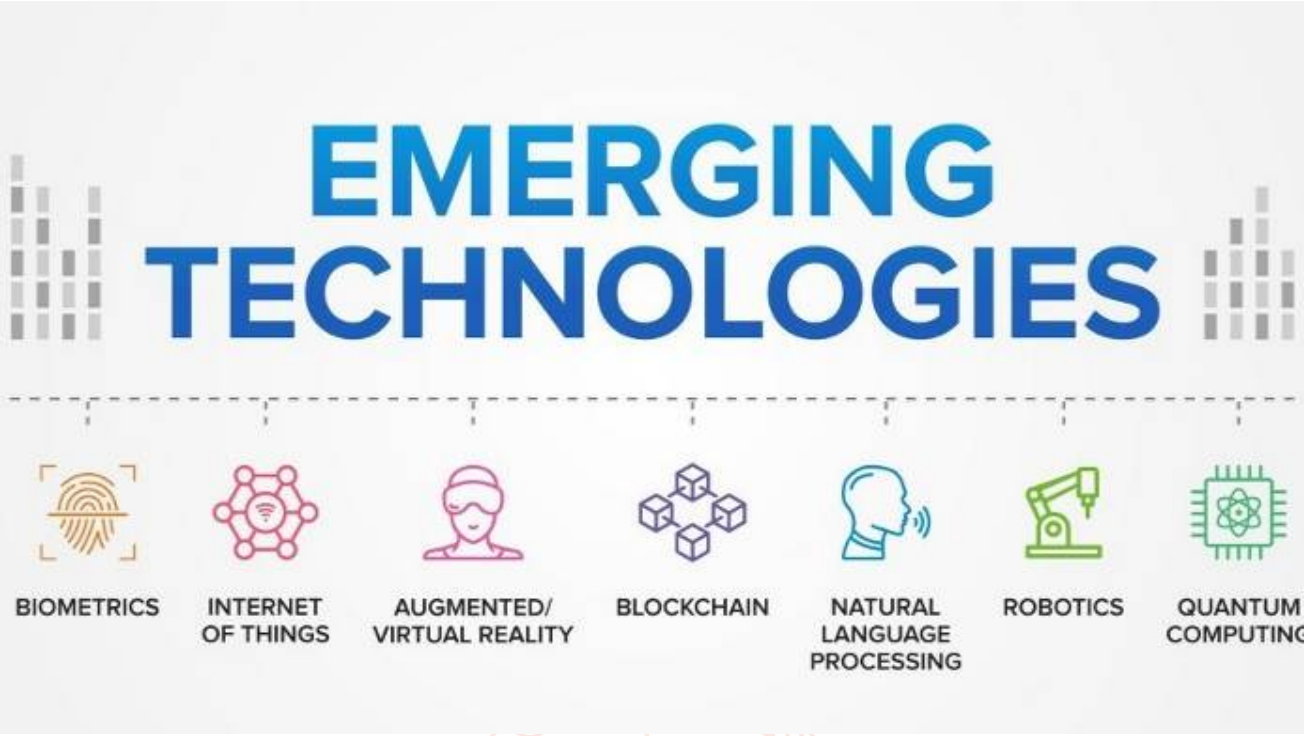

Figure 3 Some emerging technologies [4].

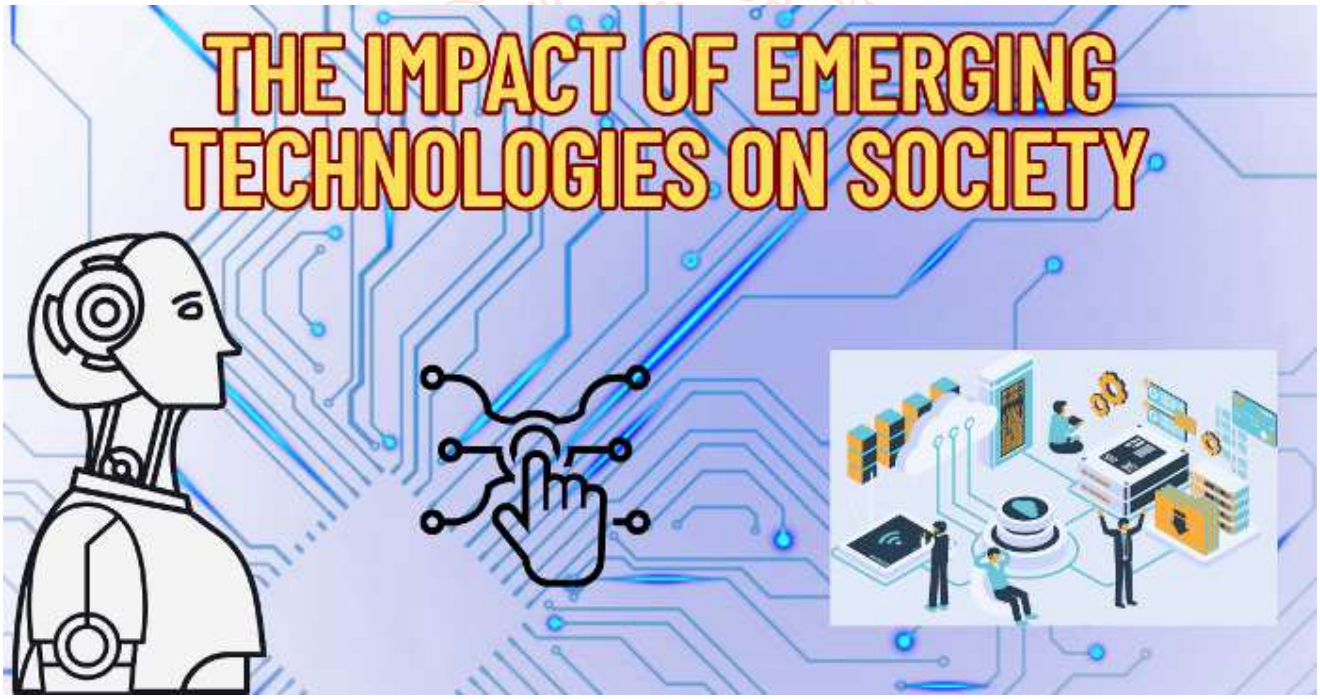

Figure 4 Impact of emerging technologies on society [7].

Figure 5 Various uses of AI in customer service [10].

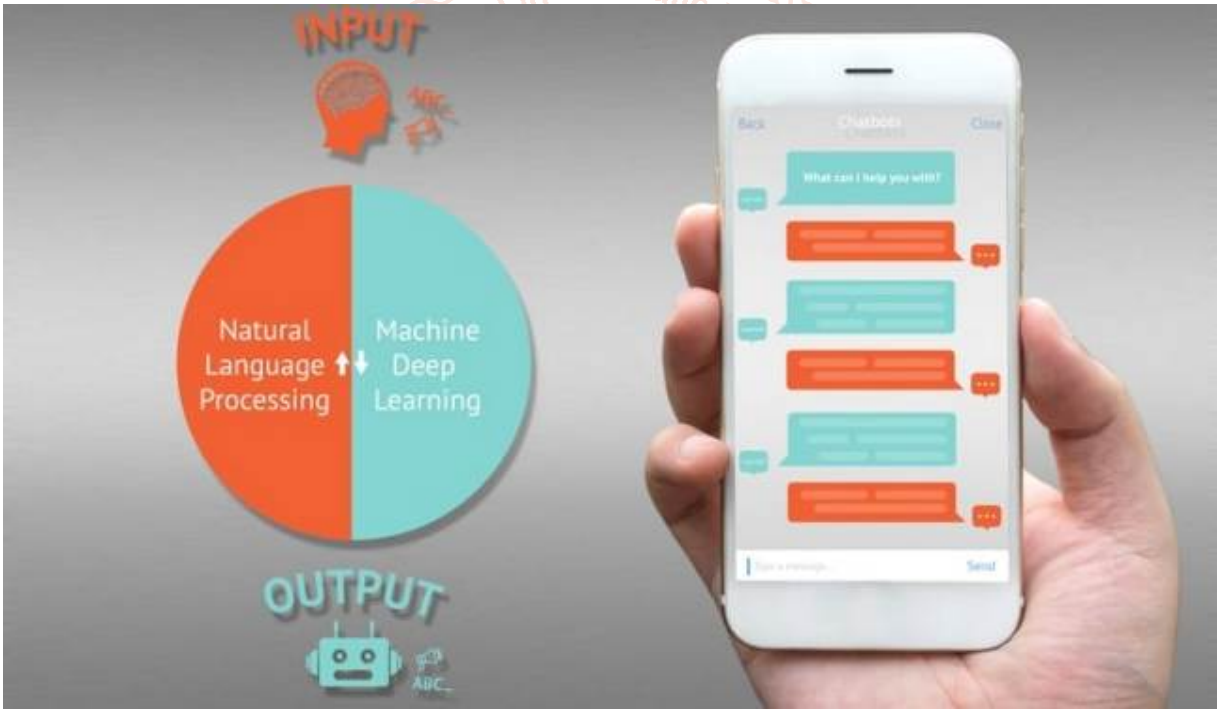

Figure 6 Alibaba's AI chatbots use NLP and ML to interpret queries and generate human-like responses [3].