

**ARTIFICIAL INTELLIGENCE IN CUSTOMER SERVICE:  
EVOLVING ROLES AND EXPECTATIONS**

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By

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On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

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## **CUSTOMER EXPERIENCE AND THE FOURTH INDUSTRIAL REVOLUTION**

The origins of the modern corporation can at least in part be traced back to 1876, when Alexander Graham Bell's invention of the telephone enabled timely and efficient remote interaction between producers and consumers for the first time, allowing companies to scale their enterprises far beyond the physical and geographical boundaries that had existed before. Since then, entrepreneurs and scientists alike have engaged in continuous technological innovation to attempt to improve how customers engage with the companies they purchase from, including the introduction of the toll-free telephone number by AT&T in 1967, the development of modern customer relationship management (CRM) technology in the 1980's, and most notably, the advent of the Internet (Gomez, 2021). The nature and quality of these customer interactions, and the perceptions that said customers have towards these interactions, is collectively known as "Customer Experience" (CX), a term which has been assigned an ever-increasing level of importance by many industry professionals in recent years (Batra, 2019, p. 138). As such, many companies are now turning to cutting edge CX technologies, such as AI chatbots and other conversational assistants, with one study showing that nearly three quarters of surveyed businesses listed measures like these as crucial to their CX strategy (Capgemini Research Institute, 2019). Many customers are embracing these changes as well, placing more trust in the ability of these new technologies to resolve their tickets with each passing year, while those in customer service roles have seen a dramatic shift in workplace dynamics resulting from the use of automated systems (Helpshift, 2019). These technologies are part of what Schwab (2016) and many others have dubbed the "Fourth Industrial Revolution" (p. 7), a series of sociotechnical advancements that blur the lines between the digital and physical worlds and, within the context of CX, aim to empower customers and create highly personalized experiences (PWC, 2016).

With the introduction of these novel technologies to the workplace, new challenges have emerged, including the prevalence of bias in certain automated decision making systems (Dastin, 2018), unease among employees due to a fear of replacement (Fisher, 2019), and the overall struggle to establish a symbiotic relationship between various users and their AI counterparts (Deloitte, 2017), to name a few. These challenges have sparked debates regarding how to best enforce accountability for the creators and users of these AI solutions (Wyden, 2022), the need for transparency in the development of classification algorithms (Hagras, 2018), as well as methodologies for integrating these technologies into existing organizations and workflows (Makarius et al., 2020).

The accompanying technical report features a detailed analysis of the design and development of a dashboard created for use by customer service representatives at Wayfair. This analysis includes a discussion regarding the incorporation of usability principles into the design, as well as the process of collaborating with customer service representatives and managers, incorporating their feedback in order to create a better experience for both the representative and the customer. The loosely coupled STS research project is a scholarly article focusing on the proliferation of Artificial Intelligence (AI) and Machine Learning (ML) technologies in the field of CX, and attempts to answer how the advancement of these technologies are shaped by various sociotechnical factors, and how they in turn influence the roles and expectations of the social groups that come into contact with them, namely customers, customer service representatives and managers, and business owners, among others. This analysis uses the Social Construction of Technology (SCOT) framework pioneered by Bijker & Pinch (1984). The relationships within the network of relevant social groups are shown in Figure 1 on the following page.

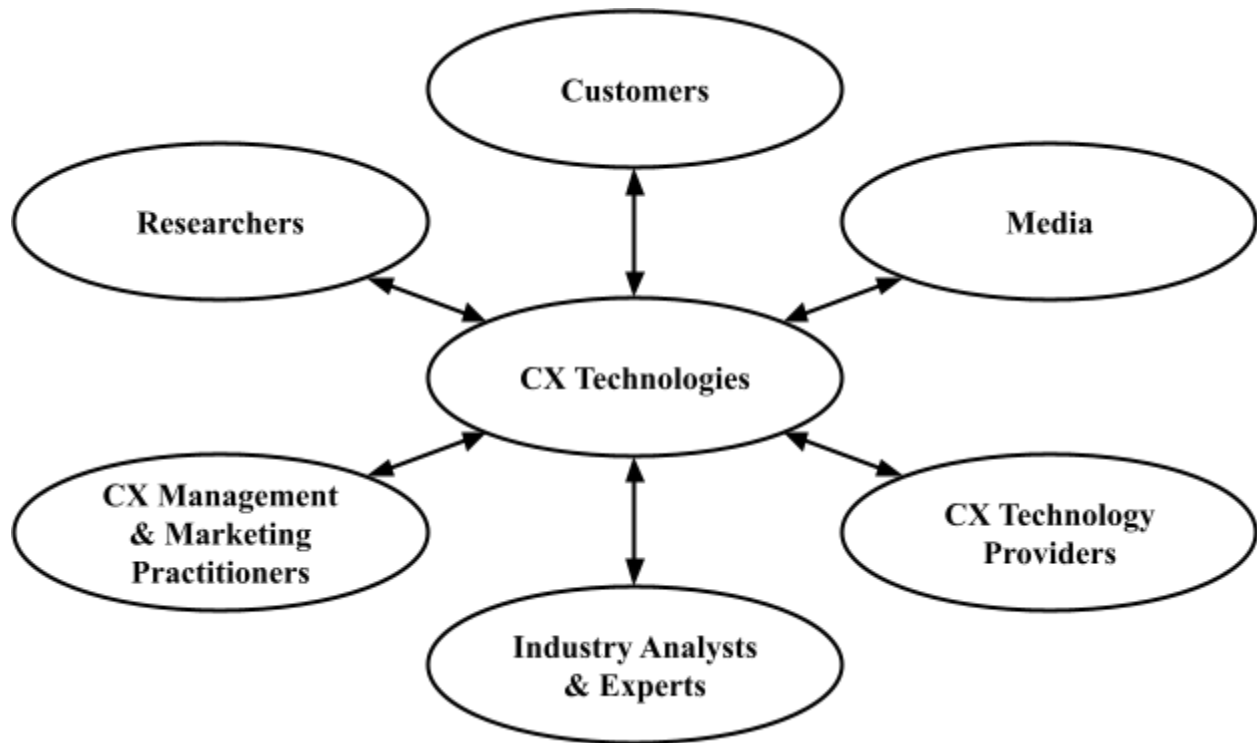


Figure 1: SCOT model of customer experience technologies. This figure shows the sociotechnical relationships between customer experience technologies and relevant social groups. (Houck, 2022)

### **OVERVIEW OF RELEVANT TECHNOLOGIES**

In order to properly discuss the development and impacts of AI technology within the field of Customer Experience, it is necessary to first understand some basic information and terminology regarding these technologies. Put simply, Artificial Intelligence (AI) aims to delegate everyday problem-solving tasks to computers with the hope of accomplishing these tasks more efficiently and effectively than their human counterparts, creating a sort of digital “intelligence.” Machine Learning (ML) is a subset of AI that focuses on the creation of algorithms, models, and computer systems that perform better at certain tasks when given more time, computational resources, and data to work with. Natural Language Processing (NLP) is yet

another subset of AI concerned with teaching computers to analyze and comprehend human language in all its forms.

There exist many applications of these technologies in the field of CX. Companies such as Harry Rosen have begun integrating AI chatbots into their CX lineup, allowing them to respond to tickets much more efficiently than before with ever-increasing levels of accuracy, improving the morale of service representatives and allowing them to focus on more complex issues that require human interaction (Barkho, 2022). Automated talent acquisition (TA) and applicant tracking systems (ATS) enable employers to quickly sort through thousands of resumes in order to pick the right candidates for the positions they advertise, cutting down on the otherwise intense overhead required to onboard new employees (Stone, 2022). Additionally, technological advancements in the field of Natural Language Processing have given way to systems that track employee performance in real time, with one study finding that 62% of companies are using these technologies to gain “actionable insights” into their employees, for better or for worse (Accenture, 2019, para. 3).

## **THE INTERSECTION OF AI TECHNOLOGIES AND SOCIETY**

The history of the development of Artificial Intelligence as a technological discipline has been hectic and nonlinear, shaped by the forces of war, public policy, public enthusiasm, market dynamics, and literary and journalistic critique. Over the years, the popularity of various approaches and techniques in AI and ML has ebbed and flowed, with areas of research once considered dead ends now in widespread use and considered common sense solutions to centuries-old problems. As one example outlined by Andrey Kurenkov (2020), it may seem to many today that designing intelligent systems to mimic the behavior of neurons and synapses in

the human brain is fairly intuitive, but there were periods when societal expectations seemed to exceed the true capabilities of these systems, leading computer scientists into one of several “AI Winters” (The Folly of False Promises section, para. 10). The development and eventual success of these neural networks was not at all predetermined, but rather the result of numerous different designs and architectures competing with and influencing one another, inspiration from the fields of biology and psychology, the writings of journalists and science fiction authors, and popular media (Rosenblatt, 1957; Werbos, 1994, pp. 307-314). In turn, the development and proliferation of AI technologies has drastically impacted society on many levels, raising questions surrounding human rights, discrimination, labor ethics, and the nature of consciousness. AI technologies in the field of Customer Experience have largely mirrored this multi-directional relationship with relevant social groups, as is discussed in the following sections. This analysis makes use of the STS framework known as the Social Construction of Technology (SCOT), developed by Wiebe Bijker and Trevor Pinch (1984) in order to best illustrate the nature of this interdependent relationship between CX technologies and society. The following two sections are structured to represent the different perspectives at which this analysis is done. The first section explores how the development of the aforementioned technologies is shaped by various groups and societal forces. The second section discusses how these technologies are reshaping the roles and expectations of these groups. Stated another way, the first section is largely the effects of the social on the technical, while the last section is primarily the effects of the technical on the social.

## **DRIVING FACTORS FOR AI DEVELOPMENT**

The following section focuses on some of the socioeconomic factors that guide the development of the AI technologies specified in this paper. These factors include the effect that popular media has had on the expectations of consumers, the ways in which industry analysts can influence the adoption of certain technologies or products, and of course, the various fiscal reasons companies have for implementing automated systems within their organizations.

### **Influences Within Popular Media**

In the past few decades, there has been no shortage of popular media depicting Artificial Intelligence in a number of varying forms and capabilities. Beginning with Isaac Asimov's foundational 1950 science fiction novel *I, Robot*, countless books, television shows, movies, and other media featuring AI have been produced, each with its own unique influence on culture and technological development. Some of them, such as *The Matrix*, *Westworld*, and the *Terminator* series, have stoked fears of the replacement of humans with advanced machines whose intelligence far surpasses our own, while other works such as *The Jetsons* and the *Star Wars* saga have provided examples of AI in service to or working alongside humanity.

One example in which popular media has influenced the development of Artificial Intelligence in Customer Experience is the *Halo* video game series, which features an AI voice assistant named Cortana, who provides information, guidance, and gameplay tips to the player, and is instrumental in achieving the central objectives of the series (Bungie Studios, 2001). Along with Cortana's status as one of the most iconic video game characters of the 21st century, she also heavily influenced the development of Microsoft's own personal voice assistant in the real world, which the developers eventually named after her (Webster, 2019).

An important thing to note about Microsoft's Cortana voice assistant, as well as its competitors such as Apple's Siri and Amazon's Alexa, is that the design of these technologies is the logical result of a long history of sexism within American culture and media, which has historically relegated women to roles in which they are subservient to men. Toward the end of the 19th century, for example, nearly every switchboard operator in the country was female, and the women in these positions were expected to be polite and accommodating to all customers, regardless of how the callers might treat them (Latson, 2015). In the 1950s, the most common occupation for women was secretary (Kurtz, 2013), while the U.S. Women's Bureau reports that this is still the third most common occupation for women (2019). Unsurprisingly, when the cultural biases that produced these trends made their way into the development of the aforementioned voice assistants, their passive, subservient programming made them a prime target for gendered insults and sexual harassment, leading activists to pressure companies to take measures to combat these injustices (Cosslett, 2019).

### **Industry Experts Setting Expectations**

In an article by Madan Batra, a professor of business at the Indiana University of Pennsylvania, the author notes that one major influential group within the CX industry is composed of industry experts such as analysts, bloggers, commenters, and researchers (Batra, 2019, p. 139). These are the individuals and groups that drive expectations and provide insight and recommendations to companies and other organizations looking to improve their existing CX infrastructure. One particularly influential research firm is Gartner, Inc., an S&P 500 company that provides market analysis, advises potential investors on industry leaders, and assists thousands of clients around the world in rectifying their CX shortcomings (Gartner,



2021). To illustrate the power of Gartner and similar industry experts in determining which companies and technologies are worth attention and funding, the following section briefly examines the effect of two key Gartner publications on the fundraising efforts of Talkdesk, a company providing Contact Center as a Service (CCaaS).

In October 2019, Gartner released a report that evaluated the customer service capabilities of thirty-two vendors, and labeled Talkdesk as the leader amongst them, citing a broad set of services provided (Harrison & Davies, 2019). In the same month, Gartner also released its 2019 “Magic Quadrant” analysis of key CCaaS logistics providers, naming Talkdesk as a leader in this field (Talkdesk, 2019). Before the publication of these reports, Talkdesk had raised about \$124 million in its first rounds of private fundraising, with an evaluation of just over \$1 billion (Clark, 2018). Following their release, this evaluation tripled to \$3 billion in 2020, and tripled again to \$10 billion in 2021, corresponding to an influx of an additional \$373 million in funding over the same period (Hall, 2021). The connection between the Gartner publications and the massive spike in fundraising experienced by Talkdesk can be found in quotes given by representatives from the investors that participated in the latter rounds of funding, several of which echo the language employed by Gartner (Talkdesk, 2020).

Clearly, industry experts are extremely influential in determining the success of certain CX logistics providers and the technologies they develop, both by recommending these products to various clients and encouraging financial backing from investors through favorable reviews and analyses. These funds in turn enable faster growth and spur technological innovation, with companies like Talkdesk announcing hundreds of patent submissions in the wake of this cash influx (Talkdesk, 2020).

## **Financial Incentives for Corporations**

In addition to the aforementioned massive sums being invested into new CX technologies by private capital management firms, there are numerous monetary incentives for companies, researchers, and organizations to pursue AI technologies, including those prevalent within the context of Customer Experience. One such motivator in the United States and many European nations is the existence of a tax system that treats human workers such as customer service representatives differently than it treats automated systems performing similar functions. As author Ryan Abbott (2020) writes in *The Reasonable Robot: Artificial Intelligence and the Law*, “the current tax system is designed to principally tax people, not AI. This creates a system in which businesses—with all else being equal—are incentivized to automate to save on taxes” (p. 46). Daron Acemoglu, a renowned professor of economics at the Massachusetts Institute of Technology, concurs with this viewpoint, adding that not only are AI technologies not subject to the same labor taxes as their human counterparts (roughly 25 percent), but many companies actually receive tax breaks on automation that bring their effective tax rates to near zero (Lohr, 2022a).

In addition to saving on taxes, companies are also driven towards automated solutions to their CX challenges through the pursuit of customer interactions that are more numerous, of higher quality, and that leave customers with a higher rate of satisfaction. Artificial Intelligence and Machine Learning technologies are designed to learn how to approach and solve repetitive problems and tasks, allowing service representatives to provide more nuanced assistance on more complex issues (Cardona-Smits & Jacobs, 2021; Birnbaum, 2019). Customers have been repeatedly shown to value personalized communication and empathy, and exhibit higher satisfaction rates when interacting with customer service representatives as opposed to

automated systems, thus many companies have been implementing tools like automated chatbots and Interactive Voice Response systems as a first line of support, freeing up these representatives to create more meaningful interactions with customers (Ayyagari & Parahoo, 2018; Bahadur et al., 2019).

## **EVOLVING ROLES AND EXPECTATIONS**

The following section explores the interactions between AI technologies in CX and relevant social groups, and how these interactions influence the roles, responsibilities, and expectations of the members of the aforementioned social groups. The first group examined is the consumers, who are poised to have a much greater say in how they interact with companies and the customer service agents (human or otherwise) that represent them (PWC, 2016; N'Goala et al., 2019). The second group consists of these service representatives themselves, who will need to adapt to the shifting responsibilities and challenges that have arisen with the addition of AI to the workplace. The final subsection discusses how algorithmic management in the workplace impacts the roles of workers and managers alike (Jarrahi et al., 2021).

### **The Growing Influence of Consumers**

For decades, researchers and business owners have understood the importance and benefits of customer participation in improving productivity and developing new products, services, and internal processes (Lovelock & Young, 1979). However, N'Goala et al. (2019) note that recent social and technological trends have drastically increased the power and autonomy possessed by consumers, both through enriching existing roles as well as creating new ones (p.

45). These trends have not been dictated solely by technological innovations, market dynamics, or the expectations of customers, but rather by a continuous interplay between all of these forces.

Perhaps the most important difference between the consumers of today and those of fifty years ago is the near-instantaneous availability of information and technological savvy possessed by modern buyers. The arrival of the Internet and, subsequently, the World Wide Web made information about product quality, prices, company practices, and other relevant data drastically more accessible to the average consumer, allowing them to make more informed purchases and engage with companies in a more meaningful way, though these changes also depended on whether the companies made the jump into this new digital space. One early example of this phenomenon taking place is mentioned in Malcolm Gladwell's 1999 essay "Clicks and Mortar," which discusses the digitization of Lands' End's catalog just a few years prior (p. 106). The choice of Lands' End to allow customers to fill out their orders online meant that customer interactions with the company shifted from a clerical undertaking to a more collaborative and thoughtful process (Gladwell, 1999). As the quality of these resources have continued to improve, Füller et al. (2009) note that this process of "virtual co-creation has become a suitable means of creating value and improving the overall success of new products" (p. 72). Another key element of the transition of consumers into a more active and assertive role has been the proliferation of technology access and education in public schools, due to funding at the state and national levels, though this funding has not always been consistent and varies widely from state to state (Starks, 2021).

In addition to expanding upon existing roles for customers, N'Goala et al. (2019) also highlight the ways in which consumers have been exercising new roles within the context of customer relations (p. 45). One such role involves the customer as a source of feedback and

inspiration for a company's products, services, and overall CX strategy (p. 47). For example, one consequence of the increased access to information enjoyed in recent years has been a subsequent rise in the desire for immediacy among consumers, with a recent survey showing that 53% of customers find long wait times to be the worst part of their experiences with a company (Rajnerowicz, 2021). The onset of the COVID-19 pandemic saw these wait times hit record highs, and widespread customer discontent, which led many companies and organizations to turn towards AI solutions such as chatbots and self-service technologies (Kelly, 2020; Lohr 2022b; Lerman, 2021). This shift toward a dynamic in which consumers are increasingly involved in value creation will only further increase their influence on these technologies in the years to come.

### **Challenges and Shifting Responsibilities for Service Representatives**

At the other end of the CX relationship between consumers and companies are the service representatives, who are witnessing seismic changes in the very nature of their work. The rise of automation in the workplace has caused some to fear that they are at risk of losing their jobs to AI technology, with many Americans believing this will happen within the next few years (Douglas, 2019; Fisher, 2019). However, despite frequent rumors that computers are already successfully passing as human beings, most computer scientists agree that our society has not yet progressed technologically to a point where AI, machine learning, and neural networks can fully replace human beings in any practical capacity, let alone in contexts where empathy and personalized service are highly valued (Mosendz, 2014; Johnson, 2021). Nevertheless, it is apparent that CSRs and other employees working in increasingly-automated environments will need to adapt to form a symbiotic relationship with their AI counterparts, focusing their efforts

on situations where human judgment still remains supreme. These include situations that are ambiguous, as well as those requiring more empathy and attention to detail (Jarrahi, 2018). By integrating technologies such as chatbots, IVR systems, and smart dashboards for customer-facing employees, CSRs will be able to create more value for both the customer and the company they work for, providing for a more fulfilling work experience.

While the proliferation of AI technologies in the field of Customer Experience has the potential to improve productivity, employee morale, and customer satisfaction, there also exists the possibility of these technologies being used in a manner that undermines service representatives and other employees. The ability of AI to handle highly complex and data-intensive tasks can be capitalized upon by CSRs to service customers more effectively, though this same ability has led to an increase in employee surveillance, affecting many professions including gig workers, delivery drivers, warehouse employees, and call center representatives, among many others (Cater & Heikkilä, 2021; Deighton, 2021). Ball (2010) asserts that this surveillance has numerous negative consequences, including “employee well-being, work culture, productivity, creativity and motivation,” and notes that although employers may implement surveillance measures in order to improve productivity and efficiency, it may actually end up doing the opposite (p. 95).

In their work outlining the Social Construction of Technology (SCOT) framework, Bijker & Pinch (1984) introduce the concept of interpretive flexibility, which they describe as “flexibility in how people think of, or interpret, artefacts,” as well as “flexibility in how artefacts are designed” (p. 421). Interpretive flexibility can be applied in this context, shown below in Figure 2, which focuses on the specific case of AI software being used to monitor employee performance in call centers. The three parties with a direct stake in any given service interaction

within this setting are the customer, the call center representative that assists the customer, and the manager of the call center, with each having varying attitudes toward call monitoring.

<b>Interpretive Flexibility of Call Center Monitoring with Artificial Intelligence</b>			
<b>Social Group</b>	<b>Call Center Managers</b>	<b>Call Center Representatives</b>	<b>Customers</b>
<b>Interpretation</b>	Allows managers to assess a far greater number of calls for quality assurance, improving efficiency and making sure representatives stay on task and on brand.	Puts representatives under a microscope, highly invasive, demeaning because representatives are no longer given the benefit of the doubt, always under suspicion, always being evaluated.	Makes very little difference to customers, as most are used to calls being monitored. Might even embolden customers to further assert themselves, knowing representatives are being scrutinized.

Figure 2: Interpretive flexibility of call center monitoring with Artificial Intelligence. This figure illustrates the various perceptions of workplace surveillance in the context of CX. (Houck, 2022)

From the customer perspective, the addition of new AI-powered call monitoring software to an interaction would likely be of little significance, as consumers have experienced call monitoring for decades. Additional monitoring may even embolden customers to further assert themselves, knowing representatives are being more closely scrutinized. Call center representatives on the other hand would likely view this technology as an invasion of privacy and yet another tool to shift power away from workers and towards employers, thereby impacting morale. Finally, it can be assumed that call center managers view this technology favorably, as they are likely the ones who implemented it in the first place, with the aim of improving the quality and quantity of calls and protecting against potential liabilities (Ball, 2010, p. 93).

As has been discussed, AI technologies such as chatbots and sophisticated employee monitoring systems have significant consequences for the roles of service representatives in the years to come. Makarius et al. (2020) note that successful incorporation of AI technologies into a company’s workflow requires a sense of trust and teamwork among all parties involved, but the

recent trends in AI-powered workplace surveillance may serve as a detriment to these efforts. Additionally, Jarrahi et al. (2021) note that employees that work alongside algorithmic systems, such as CSRs with chatbots and customer dashboards, will need to be well-versed in how these systems work, noting that “a lack of competency with the tools of work can reduce workers’ sense of autonomy over their work as well as their ability to make informed decisions and self-reflect” (p. 6). The overall impact of these technologies on the nature of work for customer-facing employees remains to be seen, but trends resulting in the diminishing power of these workers coupled with the relative silence of labor unions on this matter renders the position of service representatives in the years to come somewhat precarious.

### **The Rise of Algorithmic Management**

While the roles of customers and service representatives are heavily influenced by the adoption of AI technologies in the field of CX, as mentioned in the previous sections, an additional area of interest is how algorithmic management will transform the responsibilities of the managers who oversee the CX operations of a company. Jarrahi et al. (2021) describe the concept of algorithmic management as “the delegation of managerial functions to algorithms” (p. 1), a sociotechnical phenomenon that “reflects and redefines pre-existing roles, relationships, power dynamics, and information exchanges” (p. 2). Current literature suggests that these changes serve to increase agency for managers within the already unbalanced dynamic between employers and employees, though this increased agency is also likely to introduce new moral and ethical dilemmas that managers must reckon with, with potential abuses such as the workplace surveillance discussed previously far easier to commit (Jarrahi et al., 2021). By involving automated systems in decision-making within an organization, members of upper



management may attempt to distance themselves from unpopular policies by using the algorithms employed by these systems as a sort of black box scapegoat, a practice known as “agency laundering” (Rubel et al., 2019). Automated systems designed for transparency and interpretability, otherwise known as Explainable AI (XAI), can act as a counter to this temptation and increase trust within an organization by allowing employees to audit these decisions for fairness (Hagrass, 2018). Still, the decision to implement these types of systems is made by management itself, leaving one to wonder how much impact XAI technologies can really have in this context.

### **THE FUTURE OF CUSTOMER EXPERIENCE**

As society progresses further into the “Fourth Industrial Revolution” (Schwab, 2016, p. 7), AI technologies are primed to serve an increasingly critical role in the field of Customer Experience (Capgemini Research Institute, 2019). In many cases, these technologies have taken certain forms as a direct response to influences within pop culture, such as Microsoft’s Cortana AI voice assistant (Webster, 2019). Additionally, market forces and financial incentives have played a large role in determining which companies and technologies receive funding, thus guiding the direction of technological development and serving as a mechanism to achieve closure, the second stage in SCOT methodology (Bijker & Pinch, 1984). In addition to these societal influences upon the progression of AI and ML technologies in CX, there are also several ways in which these systems have brought about social change, redefining the roles of many relevant social groups, including customers, service representatives, and managers. In light of the increasing shift of power and influence away from workers and towards employers, it is entirely possible to imagine a resurgence of protests and conflicts surrounding issues of collective

bargaining and privacy rights in the workplace, though the declining influence and membership of labor unions renders this outcome somewhat implausible (Dmitrieva, 2022). Although transparent and explainable AI systems can help restore some of the balance between employees and employers, Kahn (2022) notes that several experts in the field of computer science have found current XAI solutions seriously lacking, indicating this as an area where future research is desperately needed. Additionally, while the literature on customer perspectives is quite extensive, research from the point of view of service representatives and other customer-facing employees is few and far between, mirroring and perhaps playing a role in the disproportionate weight that these two social groups have in the development and adoption of CX technologies. While the trends discussed in this paper may ultimately result in economic growth centered around more empowered consumers, the future of workers and labor rights is far more uncertain.

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