Evolution of voice technology

The next revolution in user interaction

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pwc

IAMAI
Internet And Mobile Association Of India

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Evolution of voice technologies

Voice has always been the most commonly used medium of communication amongst humans. Verbal communication has been preferred over other forms like writing as it's more spontaneous and natural mode of interaction. The tone of verbal communication distinguishes it from textual/written communication, ensuring that the former is more conversational and easier to comprehend on most occasions

Advancements in artificial intelligence (AI) and speech recognition technologies have provided companies with huge opportunities and allowed them to gain significant advantages in meeting the ever-growing customer expectations. This is evident from the huge growth in voice technologies in the last few years. Voice has become a significant part of technology-driven apps which are becoming increasingly better at communicating in a human-like manner.

Voice evolution

1952

Recogniser circuit

Davis, Biddulph and Balashek at Bell Laboratories built Audrey, a speech recogniser for strings of digits.

1962

Shoebox

At the Seattle World's Fair in 1962, IBM presented a tool called Shoebox that could perform mathematical functions and recognise 16 spoken words as well as digits 0–9.

1970s

Harpy

Scientists at Carnegie Mellon University in Pittsburgh, Pennsylvania, created Harpy. It could recognise 1,011 words, which is roughly the vocabulary of a three-year-old.

1980s

Hidden Markov model

An AI speech synthesis program which assumed the role of a psychologist while interacting with humans.

1994

Speechworks

Founded by speech recognition pioneer Mike Phillips and Bill O'Farrell, the Boston-based company developed and supported speech-related computer software.

1996

IBM MedSpeak

IBM launched MedSpeak, the first commercial product capable of recognising continuous speech.

2006

Speech analysis

The National Security Agency begins using speech recognition to isolate keywords when analysing recorded conversations.

2011

Siri

Siri is an intelligent personal assistant. It uses voice queries and an NLU interface to answer questions.

2012

Google Now

Developed by Google for the Google Search mobile app to make recommendations and perform actions by employing NLP.

2014

Alexa

A virtual assistant developed by Amazon. It is capable of voice interaction by using NLP algorithms.

2014

Cortana

It can set reminders, recognise natural voice and answer questions.

2016

Google Assistant

It offers voice commands, voice searching and voice-activated device control.

2019

Alexa in Hindi

Regional language capabilities introduced in Alexa.

Source: PwC

Increase in present-day usage

With more and more enterprises and industries adopting a customer-centric approach instead of a business-centric one, organisations need to remain agile and create winning customer strategies, Digital technologies can be leveraged to engage customers, increase customer stickiness and achieve profitable growth. Customers today demand an 'experience' along with products, services and interactions. Voice technologies pave the way for organisations to reimagine customer experience and offer unprecedented opportunities to enhance customer experience and strengthen customer loyalty.

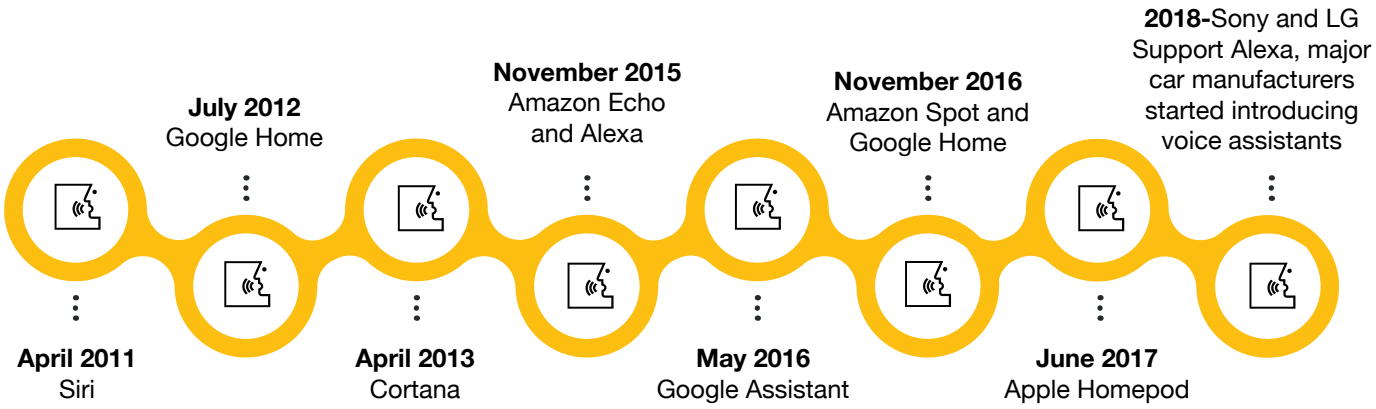
Customer focus is a strategic imperative for all enterprises and leveraging digital technologies gives significant competitive advantage in the face of ever-increasing customer expectations. There has been considerable progress in the development of AI-enabled speech-to-text and text-to-speech hosted services, making seamless voice-driven customer experience a reality. This opens up a wide range of opportunities for voice to become a crucial part of businesses in the future. "All enterprises must have a strategy for harnessing voice, which is set to be the next big revolution" says Sumit Srivastav, Intelligent Automation Leader, PwC India.

Earlier, consumers of voice technology preferred using it for simpler and instructional tasks such as setting alarms, making phone calls and conducting voice-based searches for movies and news updates. The development of more mature and advanced voice technology is enabling machines to handle complex tasks by simply conversing with users. This provides organisations with multiple opportunities to voice technology. Some of the factors behind the growing popularity of voice technology are discussed below:

Technology maturity

Research and development (R&D) in speech technology began to expand during the 2010s. The decade began with IBM's Watson, a natural language understanding computer response system, winning over Jeopardy! champion Ken Jennings on TV. Apple launched Siri on all its mobile devices later that year.

The use of natural language voice recognition technology across all organisations and devices took off once Siri was released. In 2013, Microsoft announced Cortana, a virtual assistant available on all Windows devices and comparable to Siri. Amazon launched Alexa in 2015 which is only available to Prime subscribers.
Google Home was launched next year.

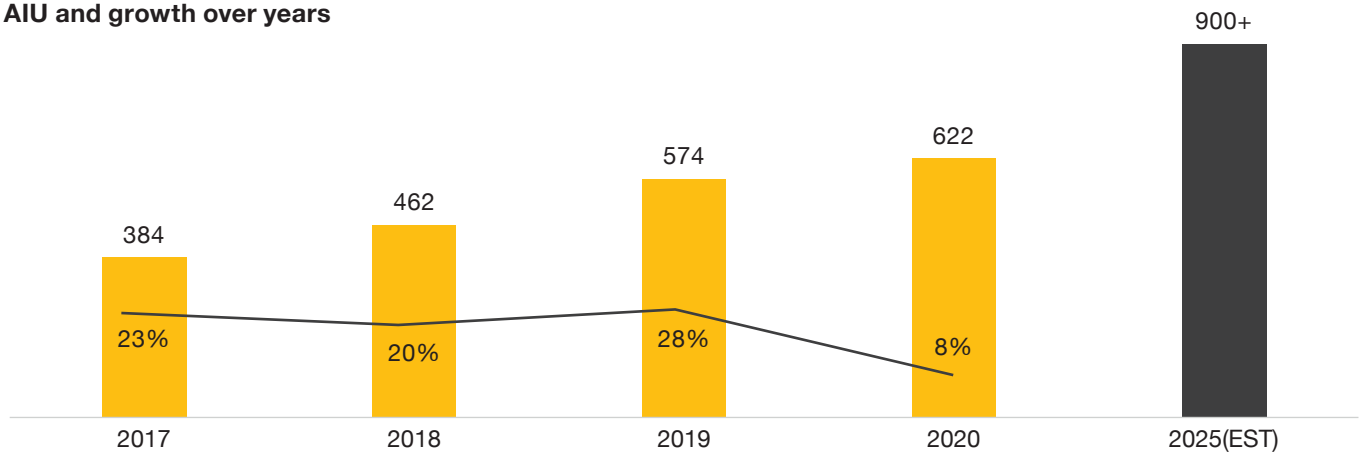


Source: PwC

Advancements in automated speech recognition (ASR), machine learning (ML) and natural language understanding (NLU), along with massive amounts of training data and better-tuned AI algorithms, have led to an exponential increase in capabilities to process voice at scale with greater accuracy. This, in turn, has allowed voice technology to become mainstream.

Internet reach

AIU and growth over years



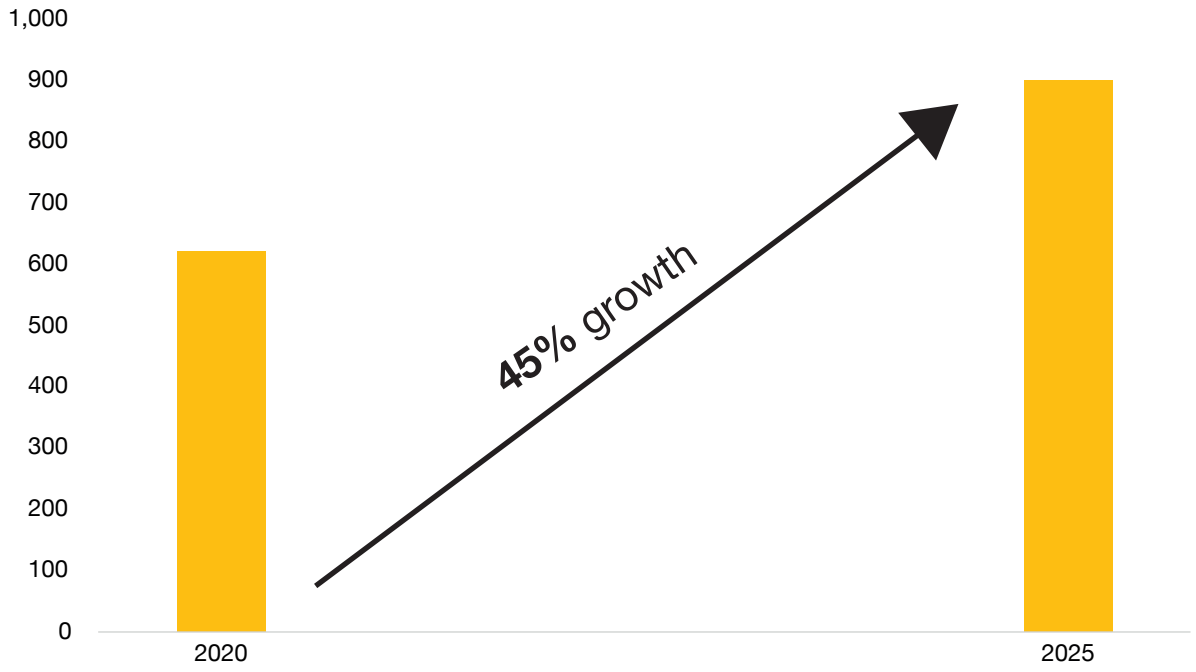
Note: Kantar ICUBE 2020; all India population, the 1,433 million number in bracket indicates internet penetration.

Internet penetration in India

Source: Kantar ICUBE 2020 report

The number of active internet users will continue to grow, and Kantar estimates that by 2025, there will be 900+ million active internet users in India.[1] An expanding affordable smartphone market, cheap mobile data rates and Government initiatives like Digital India and Make in India are the main reasons for such consistent growth in internet usage.

Active internet users in India



Source: IAMAI-Kantar ICUBE

As per the IAMAI-Kantar ICUBE 2020 report, in India, the number of active Internet users is projected to grow by 45% over the next five years, from about 622 million in 2020 to 900 million by 2025.[2]

1 https://www.afaqs.com/news/mktg/indias-active-internet-population-likely-to-touch-900-million-by-2025-iamai-kantar-icube-2020-report#:~:text=According%20to%20the%20new%20IAMAI,in%20the%20next%20five%20years.

2 https://economictimes.indiatimes.com/tech/technology/india-to-have-900-million-active-internet-users-by-2025-says-report/articleshow/83200683.cms?from=mdr

People adoption

Use cases such as smart speakers in homes and voice control in automobiles have made voice technology a part of everyday life. The COVID-19 pandemic also resulted in voice technology being adopted across various devices.

The usage of speech recognition technology increased in 2020 as the COVID-19 pandemic compelled people to mostly stay at home and explore new technologies that are convenient. As the vaccination drive gains momentum worldwide, people are gradually resuming their pre-pandemic lives. However, organisations have realised that customers are unwilling to give up the convenience provided by voice technology. For example, many automakers are incorporating voice solutions into their global position system (GPS), navigation and safety technologies which may be used for interacting with the driver. A variety of industries, including retail, travel and hospitality, have started to understand the benefits of voice technology and are customising voice applications based on specific consumer needs and to deliver tailored customer experiences.

Voice-assistant technology is being improved to make it more realistic and human like. AI speech and translation models are rapidly being used by businesses to automate contact centre enquiries, create intelligent voice assistants and provide voice interfaces for smart devices and apps. They are also using neural text-to-speech systems to enable more natural-sounding speech during interactions with voice assistants. Brands are putting a lot of emphasis on the voice of voice assistants.

Impact of COVID

The pandemic has changed human behaviour in multiple ways. Contactless transactions have increased resulting in the rising demand for speech technologies.

Despite issues with accuracy and discomfort when using voice technology in public, 77% of users intend to use it more frequently in the coming years.

“2020 brought more changes than anyone anticipated and as a result, expedited progress in tech and innovation. Certain tools have emerged as unexpected solutions – in particular, voice technology,” Mark Webster, the Director of Product at Adobe, wrote about the survey.[3]

Voice search inquiries in India are increasing at the rate of 270% each year.[4] The country is currently a major video-first internet market and smartphone growth will transform it into the world’s largest voice-first internet market due to demographics and scale.

3 https://xd.adobe.com/ideas/principles/emerging-technology/voice-technologys-role-in-rapidly-changing-world/

4 https://www.businessinsider.in/advertising/ad-agencies/article/voice-search-queries-in-india-are-growing-at-270-per-year-mma-and-isobar-report/articleshow/82212039.cms

Benefits for businesses

Voice technology has been transforming several industries and business units like contact centres, mobile phones, web search, commerce and automobile in various ways. One of the possible reasons why businesses today are keen on adopting this technology is growing demand for it amongst end users. The other reason is significant business value. The benefits of voice technology can be divided into the following:

Cost benefits

Voice bots are highly efficient in customer service centres because of their 24x7 availability and omnichannel capabilities. The return on investment (RoI) is very high is most cases and the initial cost is typically recovered within the first few months of implementation. On the other hand, the cost of hiring a human support agent is constantly increasing.

Revenue growth

Businesses in India have been implementing voice solutions due to the opportunities they provide in functions like sales, promotions, marketing and e-commerce to boost revenue and attract new customers. Businesses trying to grow in India need to adopt a lower cost to-serve model which voice-enabled bots can help deliver. Chatbots, on the other hand, mostly provide voice-first services and are incapable of being similarly helpful to Indian businesses.

Utility of voice assistant applications

Voice search or voice-enabled apps are interactive applications that allow people to use voice-based commands to execute a variety of tasks on the internet. Such applications have automatic speech recognition and adaptation capabilities, and utilise them to systematically search the internet, websites, or apps by conducting regular text searches and returning with desirable results. Depending on the device they are being used in, the results are either displayed or text-to-speech technology is leveraged to narrate the results to the user.

The advent of AI-powered voice-controlled personal assistants on mobile devices and smart speakers in the last decade has altered the way individuals execute a variety of tasks. The trend of using personal voice assistants in electronic gadgets started with individuals using such devices with voice commands. Automobile manufacturers see this development as an opportunity to improve driving experiences. They are creating and incorporating sophisticated voice-enabled devices into their vehicles. Some of the world's leading automobile manufacturers were among the first to create voice-enabled assistants to manage the infotainment systems in their vehicles. Smart and Wi-Fi enabled appliances such as washing machines are gaining popularity as they can be remotely controlled using voice assistants or an app on a smartphone.

Voice assistant applications

There are a few specific commands or wake words that can be used to activate digital assistant applications that are equipped with the capabilities to perform tasks based on voice or text input. These assistants are already being used across households in multiple voice-supported devices like smartphones and smart speakers. From scheduling a meeting, creating an agenda, placing orders online and performing voice searching to simply answering questions and providing solutions, these assistants are making lives easier by anticipating needs and performing a plethora of functions.

Voice assistants are now customised to deliver contextual and highly personalised responses, thus increasing their usefulness to consumers.

Accessibility applications

Over 5% of the global population suffer from profound hearing loss.[5] Automatic speech recognition technology translates speech into text, thereby can enabling the hearing impaired to become an active part of conversations. There are apps that provide live transcription during phone calls transcribe speech into text during conferences, lectures and regular face-to-face conversations and provide live captions during group conversations or conference calls.

People suffering from loss or impairment of voluntary muscle power experience difficulties in navigating smartphones. Voice-enabled apps have been developed that can help such people control/command smartphones.

Language learning applications

The rapid growth of speech recognition technology and its usage in a diverse set of applications has also helped in supporting the Voice Interactive Language Training System (VILTS) that is used to improve speaking and comprehension skills. With the help of speech recognition and pronunciation scoring technologies, many apps are making it easier for people to understand foreign languages.

5 https://www.who.int/news-room/fact-sheets/detail/deafness-and-hearing-loss#:~:text=Over%205%25%20of%20the%20world's,will%20have%20disabling%20hearing%20loss.

Voice-enabled devices

Voice-activated assistants

The rapid rise in the popularity of voice assistants equipped with speech recognition technology has made smart speakers and voice-activated assistant devices almost ubiquitous. Their highly convenient and hands-free functionalities such as reading the news, turning on lights and voice searching, have made people dependent on these devices.

Smart home devices

The conceptualisation and implementation of the internet of things (IoT) enabled voice assistants have provided a fillip to the smart home industry. A smart home makes it possible to control devices and appliances with voice commands or text messages. From smart bulbs or lamps to smart refrigerators and ovens, decision making at smart homes is becoming easier.

Smart assistants equipped with speech recognition technology can be connected with smart devices and appliances, thereby allowing users to control them in a convenient and hands-free manner.

Connected cars

Embedded voice assistants in cars help drivers to focus solely on driving while having hands-free control over other functionalities. In-car speech recognition systems, at the utterance of voice commands, can send text messages or read received messages aloud, make a call, control music, convey the weather report and even schedule appointments. In-car voice assistants enhance the safety and make the overall experience more convenient.

Voice-enabled security devices

Voice-enabled security devices for homes and workplaces employ voice biometrics technology for protecting the security and privacy of people. They recognise and rely on the unique phonetic patterns of a person's voice to determine any fraudulent input by comparing it with the voice samples stored in the device. Compared to other biometric methods such as iris scanning, fingerprints, personal identification numbers and passwords, highly accurate voice recognition technology makes these devices more secure. The demand for voice-enabled security devices is increasing rapidly as they not only strengthen security but also provide better accessibility to those with visual impairments or any other disabilities.

How businesses are leveraging voice (B2C and B2B use cases)

Voice-enabled apps

Voice commerce

An increasing number of businesses are capitalising on voice search. They are leveraging the power of voice assistants so that customers can use voice commands to place orders. Such convenience paves the way for the growth of e-commerce platforms. Voice assistants sort out all the suitable listings of items for customers and cater to them across all time zones. The data received in the form of voice from the user can be used for producing better listings and search results for end users, thereby making the process more fruitful for businesses and customers. Voice based technology captures our data to learn from them and provide better output. But this has also raised concerns over privacy by many users and businesses.

Digital voice assistants

Voice solutions have the potential to disrupt a variety of industries and workplaces, and voice assistants have already made inroads into B2C. While Amazon's Alexa, Apple's Siri, Microsoft's Cortana, Samsung's Bixby and Google Assistant are the most well-known voice assistants which are mainly being used for customer engagement. These assistants, applications or bots are being used by a lot of e-commerce platforms, which has reduced the dependence on actual human staff. These applications can answer and resolve queries, eliminating the need for human intervention and reducing the load on support staff. However, the biggest advantage from a business point of view is 24/7 availability of voice assistants. They can provide support to customers in different time zones and hence increase customer's trust in the brand. The websites of these e-commerce platforms have also deployed voice solutions. But voice assistants have not seen similar levels of adoption in the B2B sector. A few B2B-focused companies are slowly making the leap to voice search. Many technology companies that first started providing voice solutions for end customers are now coming up with specialised solutions for workplaces. A few of the popular solutions are discussed below:

1 Amazon Alexa for Business

After a huge demand for voice-based solutions for businesses, Amazon introduced Alexa for Business. Amazon has also partnered with companies like Crestron, Polycom and Cisco for office control, automation and communication applications to provide voice-based experience to multiple industries.

2 IBM Watson VA

Watson Assistant is IBM's AI product which mimics human interactions and can be used to train and deploy conversational interactions to deliver cognitive assistance as an IVR.

3 Salesforce Einstein Voice Assistant

Using Einstein, voice users could update Salesforce records and create tasks using natural language This solution makes several Salesforce features accessible by voice.

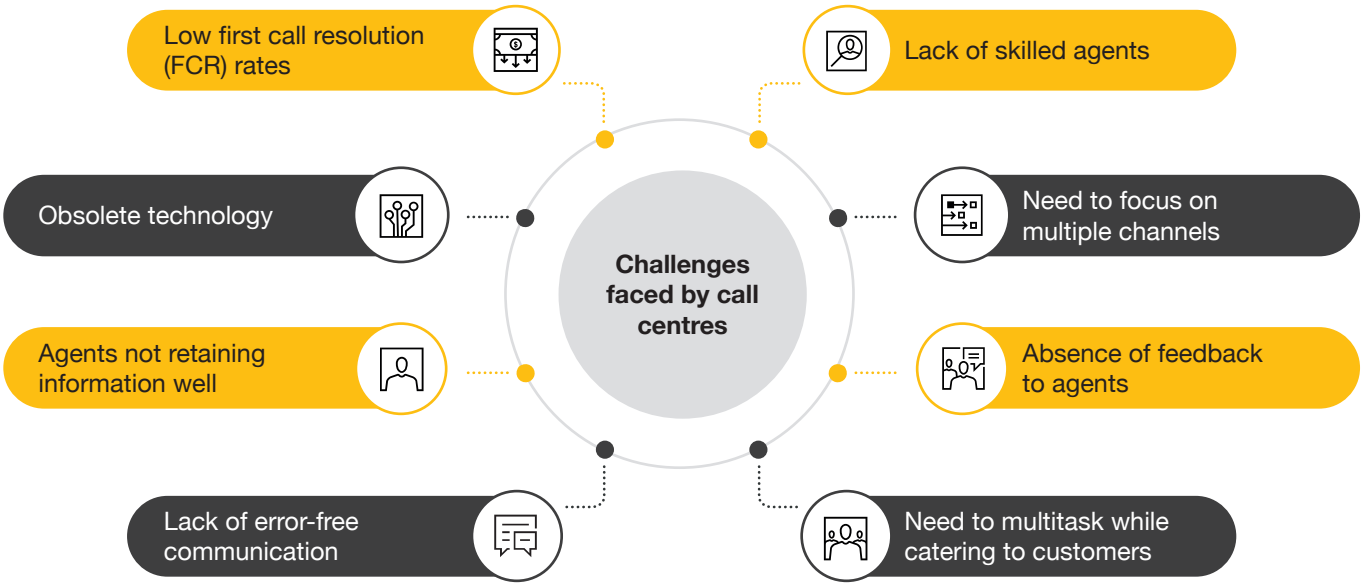
4 SAP Business ByDesign (ByD)

SAP Business ByDesign enables integration with NLP-enabled devices like Alexa using OData services. It enables users to handle SAP transactions using voice-based assistants.

Note: The above list is not exhaustive in nature and just a representation of some of the voice-led solutions available in the market from a B2B perspective. PwC does not endorse or propagate any of the above solutions specifically.

Use case: Call centre automation

Contact centres are centralised facilities that handle large volumes of enquiries between organisations and customers or prospective customers. Challenges faced by contact centres have a direct impact on customer experience and subsequently on business performance.

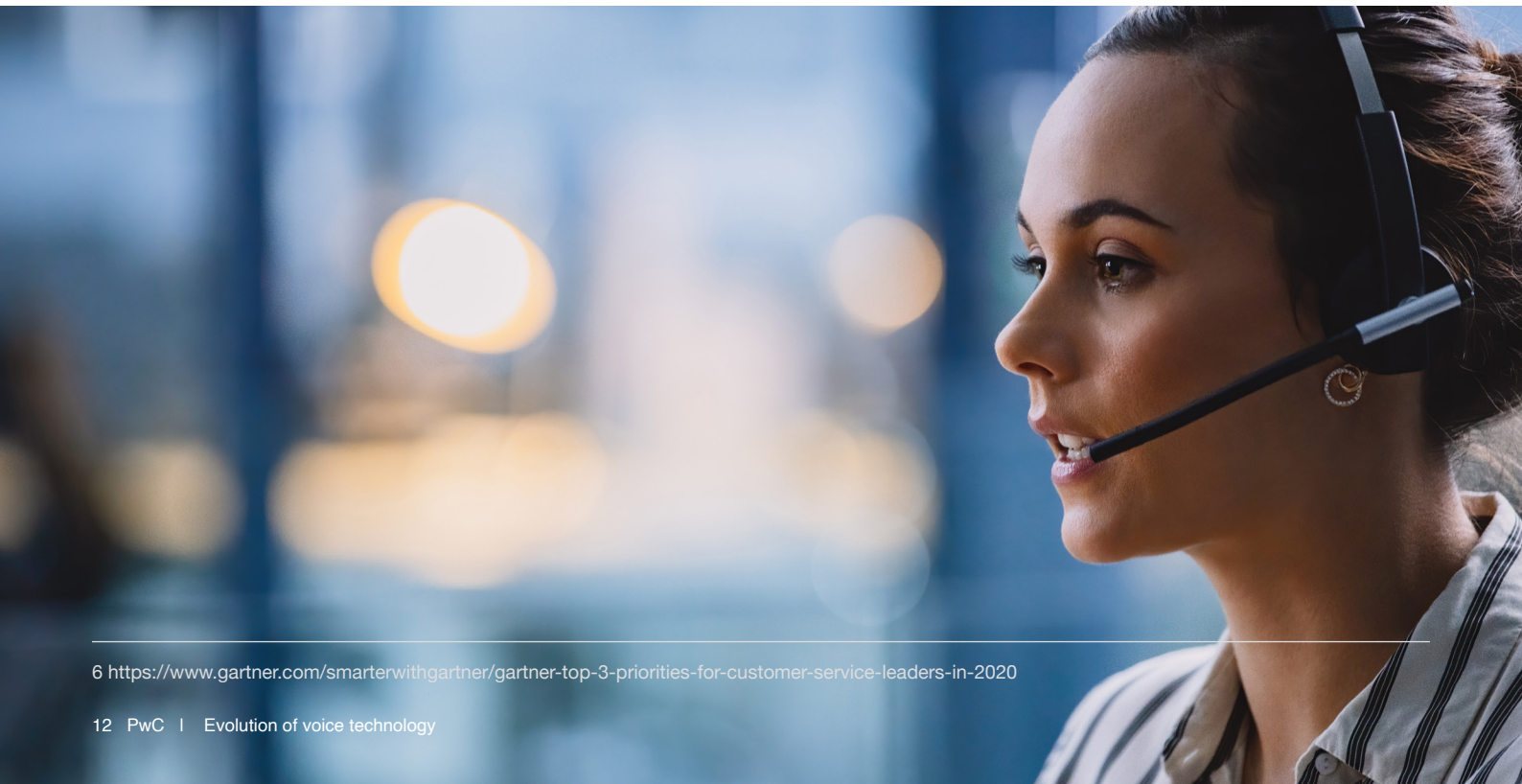


Source: PwC analysis

To address these problems, businesses have started incorporating technology solutions like voice bots, chatbots, AI and data analytics. According to a poll conducted by an industry analyst, leading customer service executives feel investment in digital channels and infrastructure is their top priority for 2020.[6]

A large proportion of customer queries can be solved via voice based IVR solutions. These channels are backed by voice-enabled bots which get in contact with users instead of real agents. They can be used to solve problems like registering a complaint, providing the status of an order, feedbacks and FAQs. Solving customer queries via IVR and all transmitting all previously captured information to the contact centre agent can drastically reduce the strain on the centre. It also allows for more efficient reallocation of critical resources within the contact centre.

Hybrid bots which are capable of providing seamless handoffs between bots and humans to improve customer satisfaction through faster resolution are also being used.



6 https://www.gartner.com/smarterwithgartner/gartner-top-3-priorities-for-customer-service-leaders-in-2020

Voice ads

With a growing number of consumers adopting voice technology and getting accustomed to using their voice to interact with devices, businesses are leveraging this trend to upgrade their advertising and marketing strategy. Businesses are increasingly turning to voice ads that enable real-time two-way dialogue with consumers in a screen-free environment.

With voice ads:

- advertisers can speak directly to consumers and engage them in a dialogue that can continue over several ads
- brands build rapport, understanding how their consumers are responding to voice ads and measuring insights into purchase intent
- consumers have an opportunity to choose whether to engage with an ad and, by speaking directly to it, receive a customised response that provides them with a relevant target action in real time.

Due to the interactivity element, voice ads can drive a higher recall rate of 24% compared to traditional display advertisements.[7]

As these ads are delivered in an environment where no screen is involved, the risk of accidental or fraudulent clicks is non-existent.

As per a 2020 study by Mindshare on the effectiveness of voice-enabled ads, voice ads boost purchase intent scores up to 27% and stimulate a 10–20 times increase over digital banner click through rate (CTR).

7 https://digiday.com/wp-content/uploads/2017/02/ThePowerOfAudio_collated_v3.pdf

Case studies

Pizza Hut: Voice ads increase order volumes

Pizza Hut India partnered with Xaxis, IGroupM's Outcome Media Company and Gaana music app to run an Instreamatic-powered voice ad campaign. The objective of the campaign was to engage listeners in a dialogue to drive awareness of Pizza Hut's buy one, get one (BOGO) offer and increase conversion rates. The campaign delivered customer engagement rates of 8.29% and amplified order volumes. It also illustrated the power of voice by identifying those users that responded a certain way and re-messaging them with a different creative the next day.[8]

Mercedes-Benz: Continuous voice ad technology impacts engagement and awareness

Using Instreamatic's voice AI marketing platform, Mercedes ran a continuous voice ad campaign to promote its GLE Coupe launch.

The first ad asked listeners if they wanted to experience the power of the new Mercedes GLE Coupe. Those who responded positively were redirected to the landing page. Those who did not express any interest received a follow-on ad with a different target action (e.g. offering a test drive). Each subsequent ad touchpoint delivered to consumers corresponded with their history of previous responses, thus building a continuous conversation between the brand and the consumer.

The campaign run by Mercedes delivered tailored ads with a more relevant target action and resulted in:

- a voice ad engagement rate of **9.81%**
- **39.08%** of users expressing interest in learning more about the new car
- **6.31%** of users changing their response from 'not interested' to 'interested' when they heard the second ad.[9]

IKEA: Engaging consumers through a voice-enabled lullaby

IKEA and media agency Wavemaker turned to Instreamatic to launch a new voice-enabled ad campaign that could leverage AI-powered dialogue advertising. The campaign objective sought to promote IKEA's new line of bedding products. To do so, the campaign used an audio ad creative that prompted listeners to interact in a dialogue with the brand, browse a list of new products and hear a catchy jingle about the products selected. The ads were played on music apps in mid-roll and on digital radio apps in pre-roll positions.

The campaign resulted in:

- **7.68%** engagement rate
- **4.28%** interest rate
- **58.3%** measured reach (far surpassing the 25-35% that is the historic norm for audio-only advertising).[10]

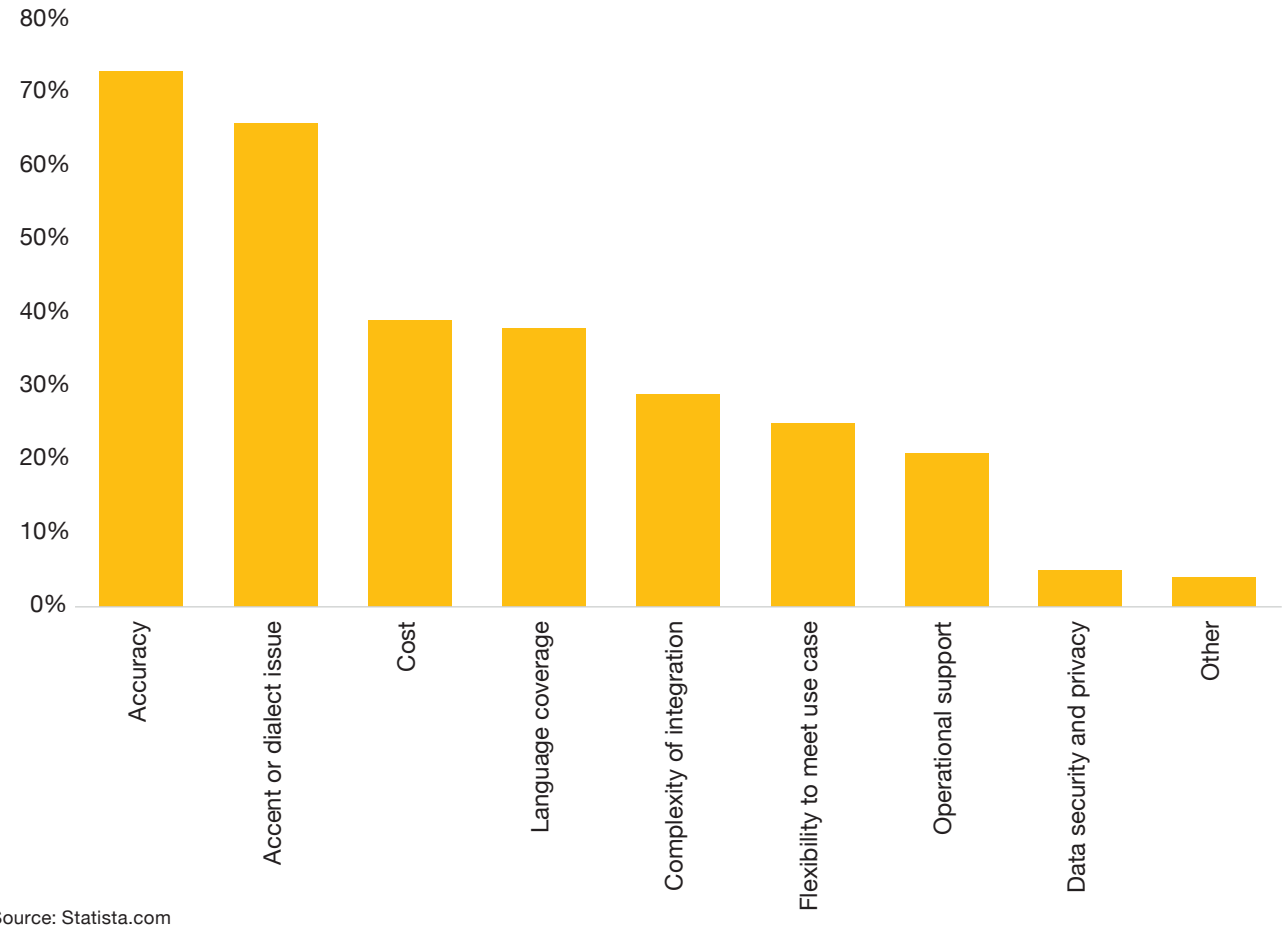
8 http://bwmarketingworld.businessworld.in/article/Pizza-Hut-s-Voice-Activated-Campaign-Leads-To-Surge-In-Order-Volumes/29-07-2021-398425/

9 https://instreamatic.medium.com/mercedes-continuous-voice-ads-generate-traffic-and-drive-engagement-90c5056ab2e8

10 https://instreamatic.com/ikea/

Barriers to voice technology adoption

Barriers to voice tech adoption worldwide



Source: Statista.com

Quality of user experience: As interpretation of words and comprehension of the contextual relationship of words remain challenges for voice technology, users cannot engage in 'real-life' discussions with these systems. Any task assigned to the software may be disrupted along the way. Nevertheless, first-generation voice-based systems which are now being used have been able to provide extra value to consumers, particularly in the processing of repetitive activities. Voice technology is yet to be fully adapted by corporates for handling complex systems. A few use cases have been developed for voice technology. Voice-enabled systems need ongoing investment and fine-tuning using technology such as machine learning. As technology advances, these systems will be able to accurately understand natural language and communicate in a much smarter way.

As per a 2020 survey by Statista, 73% of the respondents considered 'accuracy' to be a major obstacle to speech technology adoption.[11] Accuracy is dependent on several factors, and the results vary from person to person and depend on the environment.

These factors, which are frequently unique to a use case or a specific business requirement, include:

- background noise
- punctuation
- accent
- fluency
- speaker identification
- technical words/jargon.

11 https://www.statista.com/statistics/1134244/barriers-to-voice-technology-adoption-worldwide/

Business benefits: Many respondents also cited cost as one of the main issues for the deployment of such systems. The initial cost of set-up and installation may be huge if installation of such systems requires upgrading of existing legacy systems. The benefits derived in such cases do not compensate for the huge initial costs. Unplanned implementation and underutilisation of voice bots can also increase the pay-off time.

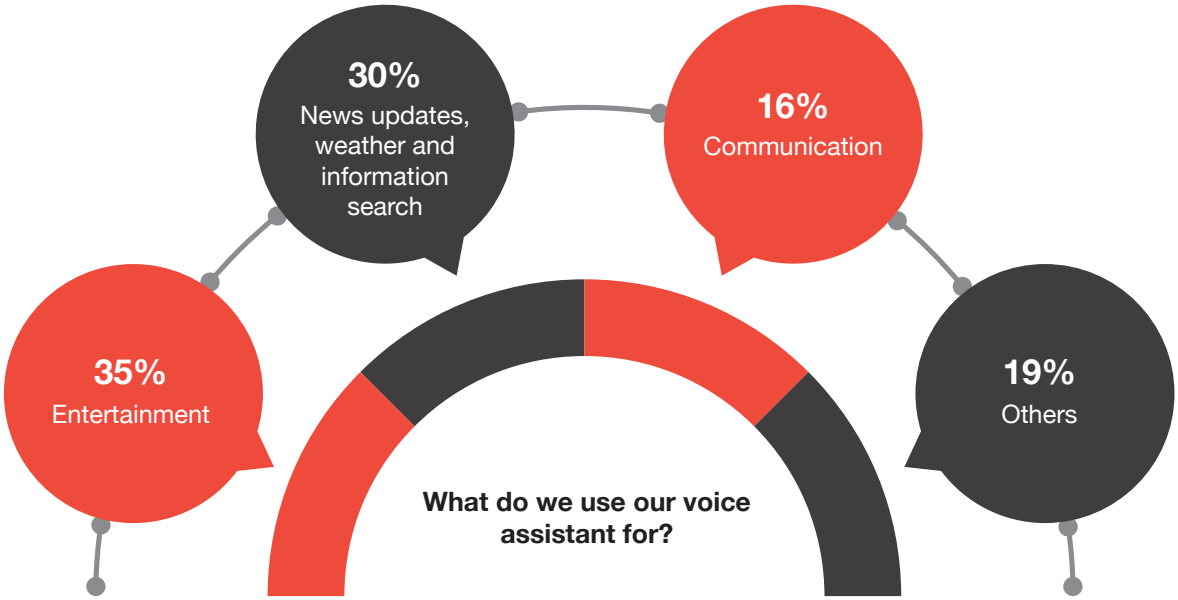
Deployment: The complexity of implementing and integrating voice technology is a barrier to adoption for many of the respondents. Whether deployment is on premise or in the cloud, integration must be simple and safe. Integrating speech technologies may be time-consuming and costly without proper assistance or documentation. Further, there are a variety of privacy and security compliance responsibilities to consider for organisations that wish to implement speech recognition technology, whether for use by their workers to access systems or for producing a smart device for customers. Technology providers must address these challenges to acceptance by making installation and integration seamless as well as feasible.

Lack of trust: While the convenience and effectiveness of voice recognition technology are undeniable, the privacy and security duties connected with this technology must not be disregarded. Voice recognition is a biometric technique that permits the identification of a unique human characteristic. However, with increasing adoption of voice solutions, people and businesses have started trusting these solutions. This is evident from the growing utilisation of voice in several areas.

Voice technology in India – key considerations

According to a joint study by the Mobile Marketing Association (MMA) and the digital firm Isobar, India is poised to become a major market for voice technologies due to high smartphone and internet adoption. In India, voice search inquiries are increasing at the rate of 270% annually.[12]

Smartphone growth will make India the world's largest voice-first internet market due to demographics and scale. Following the pandemic, human behaviour has shifted towards more contactless encounters, increasing the demand for speech technologies in terms of both speed and popularity. Consumers may soon be able to use their voices at self-checkout stations, cars, ATMs, cash tellers, elevators, and all other touchpoints where voice is currently being used.



Source: MMA Webinar series, 21 July 2020

With 82% of smartphone users utilising speech-activated technologies, voice technology has begun to play a critical role in driving assisted commerce development.

India is quickly digitising, and consumer use of smart gadgets like set-top boxes, video streaming devices, and smart speakers has been gradually increasing in recent years. On the business front, a growing number of companies are relying on cloud-based solutions to boost productivity and enhance security features.

Growth in network coverage and demand from the population have provided an enormous opportunity for smartphone manufacturers in India. In 2017, Reliance launched the Jio Phone and sold more than 100 million affordable feature phones. The device costs around USD 20 and is equipped with rich features like LTE and voice assistants. Mostly elderlies or lower middle-class people who cannot afford high-end devices purchase these phones. One-click voice assistant is a prominent feature in these phones and hence, the product has been hugely successful in India's in rural markets. A single dedicated button is present on these feature phones which, when clicked, triggers the voice assistants, allowing them to execute tasks like calling, sending messages and typing. This helps people who can't afford high-end phones or aren't very well-versed with technology. In July 2021, Reliance partnered with Google to announce JioPhone Next which is priced at USD 50.

12 https://www.businessinsider.in/advertising/ad-agencies/article/voice-search-queries-in-india-are-growing-at-270-per-year-mma-and-isobar-report/articleshow/82212039.cms

Conclusion

Voice everywhere

Voice technology is omnipresent and used in different scenarios by people of all ages. It does not have to depend on a specific device and can handle complex processes to deliver exceptional user experiences.

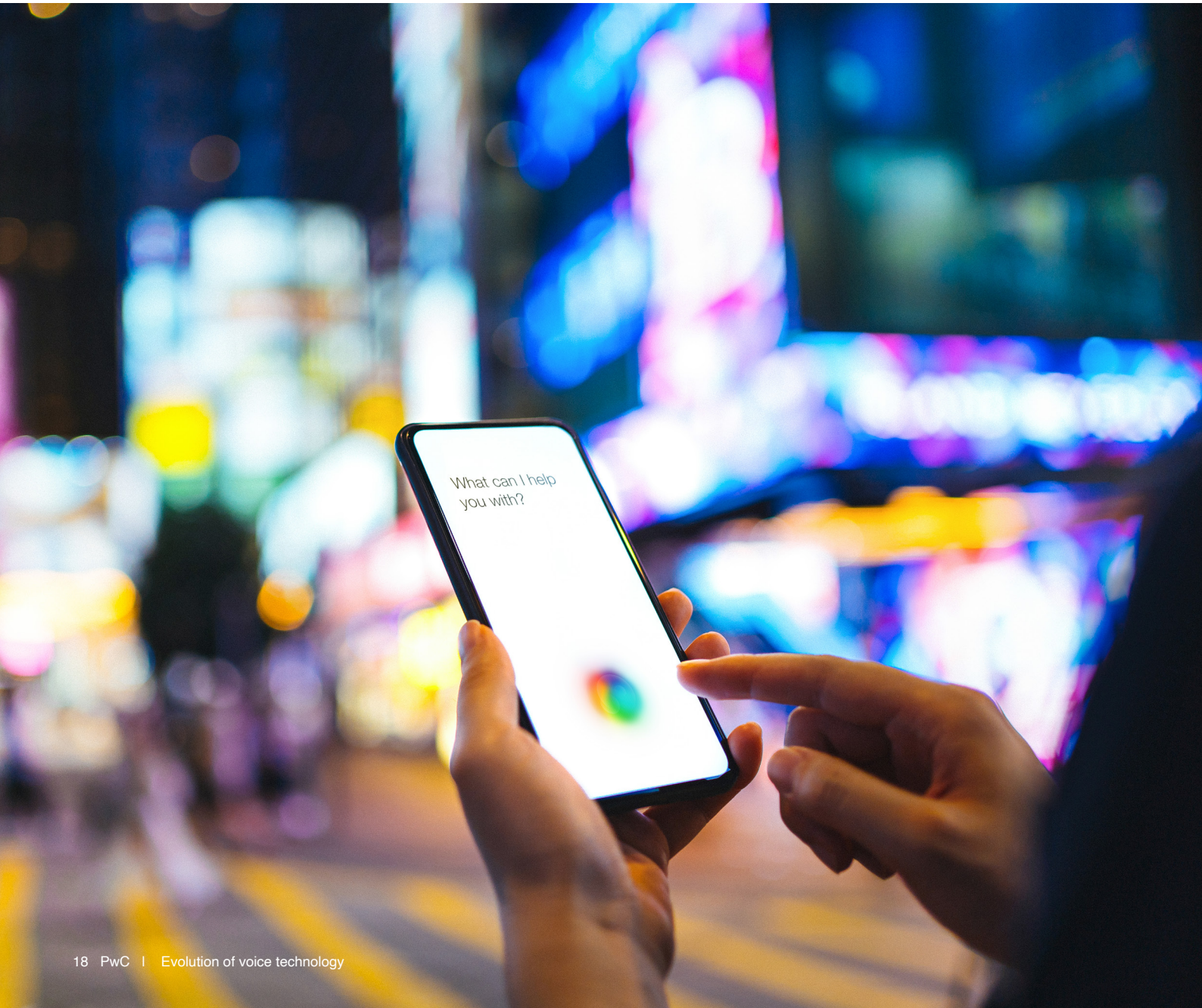
Voice localisation

Localisation is a key component of voice design, especially in a country like India where people converse in multiple languages. Voice technology can now incorporate local languages like Hindi, Marathi, Tamil, Bengali and Gujarati, reaching customers in rural areas and increasing adoption of voice technology across regions. With a focus on vernacular languages, voice technology enables India to stay connected as users can now use it in their preferred language.

Voice strategy and design

An increasing number of companies are adopting new-age technologies to transform their customer service and voice is an important lever in this transformation. Organisations must have a strategy to harness the power of voice which is expected to be the next big revolution.

With the evolution of the developer ecosystem, voice design experts will become more relevant and play a critical role in creating personalised voice journeys. With the right voice design comes the right voice user experience (VUX) which will drive the adoption of voice technology and improve customer stickiness.



About IAMAI

The Internet and Mobile Association of India [IAMAI] is a young and vibrant association with ambitions of representing the entire gamut of digital businesses in India. It was established in 2004 by the leading online publishers, and in the last 17 years has come to effectively address the challenges facing the digital and online industry including mobile content and services, online publishing, mobile advertising, online advertising, digital entertainment, ecommerce and mobile & digital payments among others.

Sixteen years after its establishment, the association is still the only professional industry body representing the online industry in India. The association is registered under the Societies Act and is a recognized charity in Maharashtra. With a membership of over 300 Indian and overseas companies, and with offices in Delhi and Mumbai, the association is well placed to work towards charting a growth path for the digital industry in India.

Contact details: Dr. Amitayu Sengupta, Assistant Vice President, IAMAI, amitayu@iamai.in

About Intelligent Automation

PwC India's IA practice assists clients in their automation journey from strategy through execution. Conversational AI is a critical lever in this strategy and voice plays a major role in it. PwC's IA practice has its Voice CoE that caters to the rising need of voice solutions in both business-to-customer (B2C) and business-to-business (B2B) market segments.

Our Voice CoE comprises both domain and technology professionals.

- Domain analysts include VUX designers, voice architects and linguistic experts
- Technology analysts include certified solution architects, automated speech recognition (ASR) and natural language understanding (NLU) specialists

Our team has extensive experience in performing various activities such as:

- building strategic roadmaps to help adopt voice
- identifying and conducting feasibility assessment of various voice platforms
- creating best practices to build scalable voice solutions and accelerators for rapid development and deployments.

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About PwC

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