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REPORT

counter intelligence

using AI to improve customer experience

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the big picture

Breakthrough innovations in machine learning, natural language processing (NLP), sentiment analysis and generative AI are making 2023 the year of AI. The race to adopt these technologies is illustrated by the rapid success of OpenAI's chatbot, ChatGPT-3 (now at version 4), which amassed more than a million users within five days of launching.

But while there's huge hope that AI can transform the way companies support and interact with customers, there is a danger that it is being over-hyped. Communications service providers (CSPs) also need to be aware of possible pitfalls as they deploy AI in customer service and to support customer experience (CX).

From promises of automated AI-empowered experiences, to fears about Skynet-like apocalypses, the (soon-to-be AI-generated) news is jammed with stories about AI's capabilities and how the technology will transform business. Fear of missing out has resulted in a wide range of companies pouring millions into AI-enabled projects – many of which have not delivered against expectations.

Indeed, success rates for such projects could be staggeringly low. Back in 2018, Gartner made a widely reported prediction that 85% of AI projects would fail due to over-hyping, poor scoping and data issues. The research firm further forecast that only 54% of projects would make the transition from prototype to production-ready application.

Nevertheless, AI adoption has more than doubled in the past five years, and investment and interest in AI projects is continuing to increase in many industries, including telecoms (see this analysis by McKinsey). CSPs are using AI across their businesses, including to improve customer service and experience. They are using chatbots as a new channel to support and enhance self-service channels and to optimize the work of human agents. AI is also being directed at common causes of customers' calls into care centers – such as questions about billing

Applications and benefits of using AI in customer support

TM Forum, 2023 (source: Omnisperience)

and service quality – and it is making processes like fraud management and marketing more efficient.

To maximize the successful application of AI, however, it is critical that CSPs close the gap between expectations and execution. They must ensure that projects are designed to solve real business problems, return tangible value and meet the expectations of customers. Not doing so will likely result in projects ending up on the AI trash heap.

Read this report to understand:

- How CSPs are using AI to improve employee experience (EX), reduce fraud, personalize CX, improve the handling of billing and service quality inquiries, and optimize marketing initiatives.
- How to gain real business value from AI
- How chatbots have evolved
- The pitfalls and challenges of adopting AI
- What separates AI success from failure
- What's coming next in AI.

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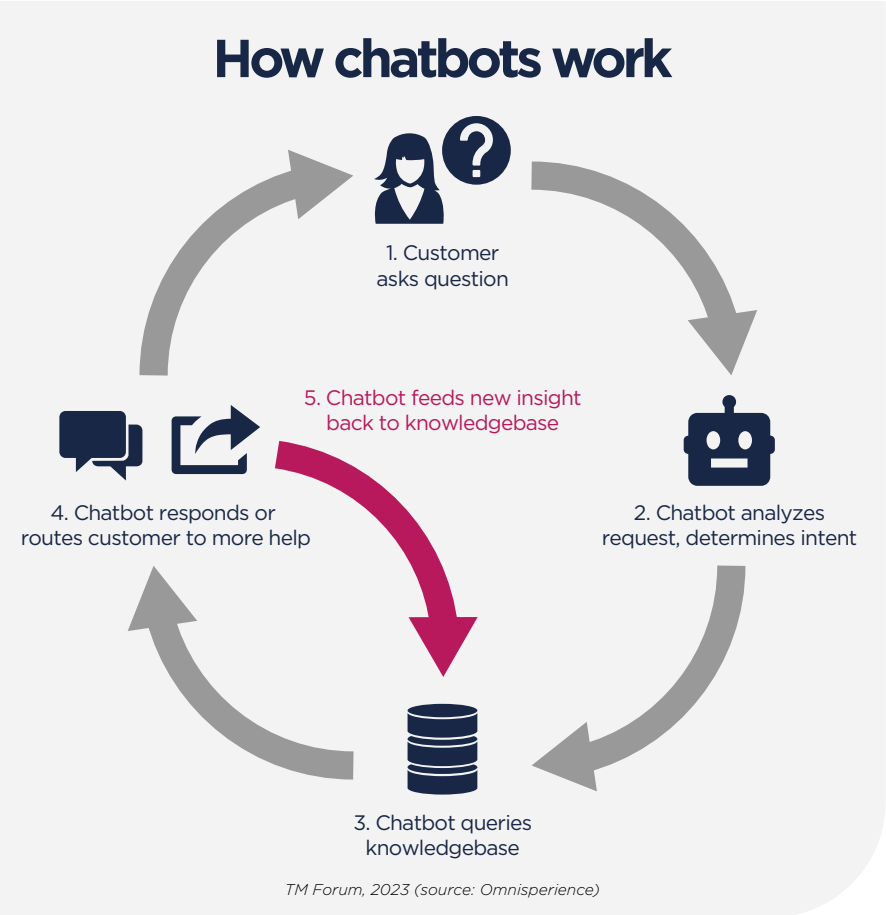
section 1:

the evolution of chatbots and other AI in CX

CSPs are deploying chatbots to assist with customer support, and they are using AI to boost the performance of key processes within customer service and experience.

A chatbot is essentially a computer program that uses a variety of technologies including natural language processing (NLP), sentiment analysis and machine learning to understand questions and provide answers or actions. The technology is embedded in everything from smart speakers like Apple's Siri, Google Assistant and Amazon Alexa, to custom-designed chatbots supporting telecoms customers and call center agents.

The first generation of chatbots (see graphic on next page) used very simplistic NLP models that responded to keywords with limited, scripted answers. Unsurprisingly, customers were



TM Forum, 2023 (source: Omnisperience)

Evolution of chatbots

1st generation
Pre-2000

Gives pre-scripted responses to keywords

Notable examples:
ELIZA developed at MIT 1964-66
PARRY (1972)
Dr. Sbaitso (1992)
ALICE (1995)

Key developments:
'Chatterbot' coined 1994
Statistical NLP developed in 1990s

2nd generation
2000-2020

Responds to voice commands. Understands the nuances of language

Notable examples:
SmarterChild (2001)
Watson (2006)
Siri (2011)

Key developments:
Neural NLP developed 2010s
Generative adversarial networks developed 2014
Rapid deployment of virtual assistants after 2015

3rd generation
Post 2020

Can generate new content and understand emotions

Notable examples:
GPT-3 launched 2020
NEO and DALL-E launched 2021
PaLM built 2022
GPT-4 launched 2023

Key developments:
Generative pre-trained transformer (GPT) coined 2020
AI is democratized in 2020s

TM Forum, 2023 (source: Omnisperience)

not impressed. Forrester Research revealed, for example, that 54% of US customers thought chatbots negatively impacted their quality of life.

Although technologies such as NLP, natural language understanding (NLU), machine learning and robotic process automation (RPA) continued to evolve, implementing the second generation of bots was costly and required high levels of expertise. In fact, several factors had to come together to change the game and boost adoption of chatbots, including:

- Customer demand for personalized, instant, digital service 24x7, which increased the requirement for alternatives to the call center
- Big data and open APIs, which meant chatbots could get access to the data they needed to answer more questions correctly
- No-code/low-code tools, which allowed businesses to train and tailor chatbots and democratize access to what had once been very expensive technology.

> **"Forrester Research found that 54% of customers thought chatbots negatively impacted their quality of life.**

The right KPIs

Until recently, the focus of AI in customer service has largely been on increasing efficiency and cutting costs. The deployment of chatbots, for example, was not explicitly aimed at providing better service to customers but at deflecting traffic from call centers. To measure the success of such projects, CSPs used highly localized key performance indicators (KPIs), which led to suboptimal outcomes.

For example, if the purpose of a project was to reduce calls to the call center and that was the outcome, then the project was judged a success because it met its (limited) organizational goal. However, from the customer's perspective the chatbot could be a frustrating barrier to meeting their needs, resulting in lower customer

satisfaction (CSAT) scores or even higher levels of churn.

This illustrates the need to get the KPIs right and then use them to paint a broader and more meaningful picture – incorporating CSAT and other customer-centric KPIs such as Net Promoter Score (NPS) or business-centric KPIs like customer lifetime value. Several CSPs have learned these lessons and deployed successful chatbots that are boosting customer and employee satisfaction (see table).

Beyond chatbots

AI has also become embedded in other key customer service and experience processes. For example, CSPs are using AI to augment the performance of agents in the call center and to detect and highlight problems before service is affected. AI also helps to join up processes and activities of previously siloed teams to support seamless CX. We'll look at some examples of how this is being implemented in sections 3, 4 and 5.

In these applications AI is still assisting humans, but rather than providing customer-facing support, it is helping employees do their jobs better by providing deeper insights and rapid, intelligent searches, and by automating key support tasks. For example, logging what happened during an interaction with a customer is a boring but essential job. AI can free the agent to respond to more customers by providing intelligent logs of the interactions and keeping customer relationship management (CRM) systems up-to-date.

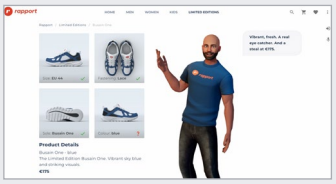
3D digital characters humanize digital customer service

Launched by call center giant Capita in 2021, Avatar web chat technology is a combination of Capita's Conversation AI technology called AMI and 3D avatars from partner Rapport. The solution aims to "humanize" chatbots.

Rapport's audio-driven speech animation technology enables the avatars to show emotion and empathy through facial expressions and speech. They can also react to customer sentiment.

This technology represents the next evolution of the web chat function, according to Capita's Director of Innovation, Alan Linter. "The way the 3D digital characters can display emotion, through facial expression and speech, is designed to make customers feel they are being listened to and understood," he says. "This technology not only improves the customer experience, but also allows businesses to differentiate themselves when it comes to customer service."

Watch a demo of Rapport's 3D avatar:

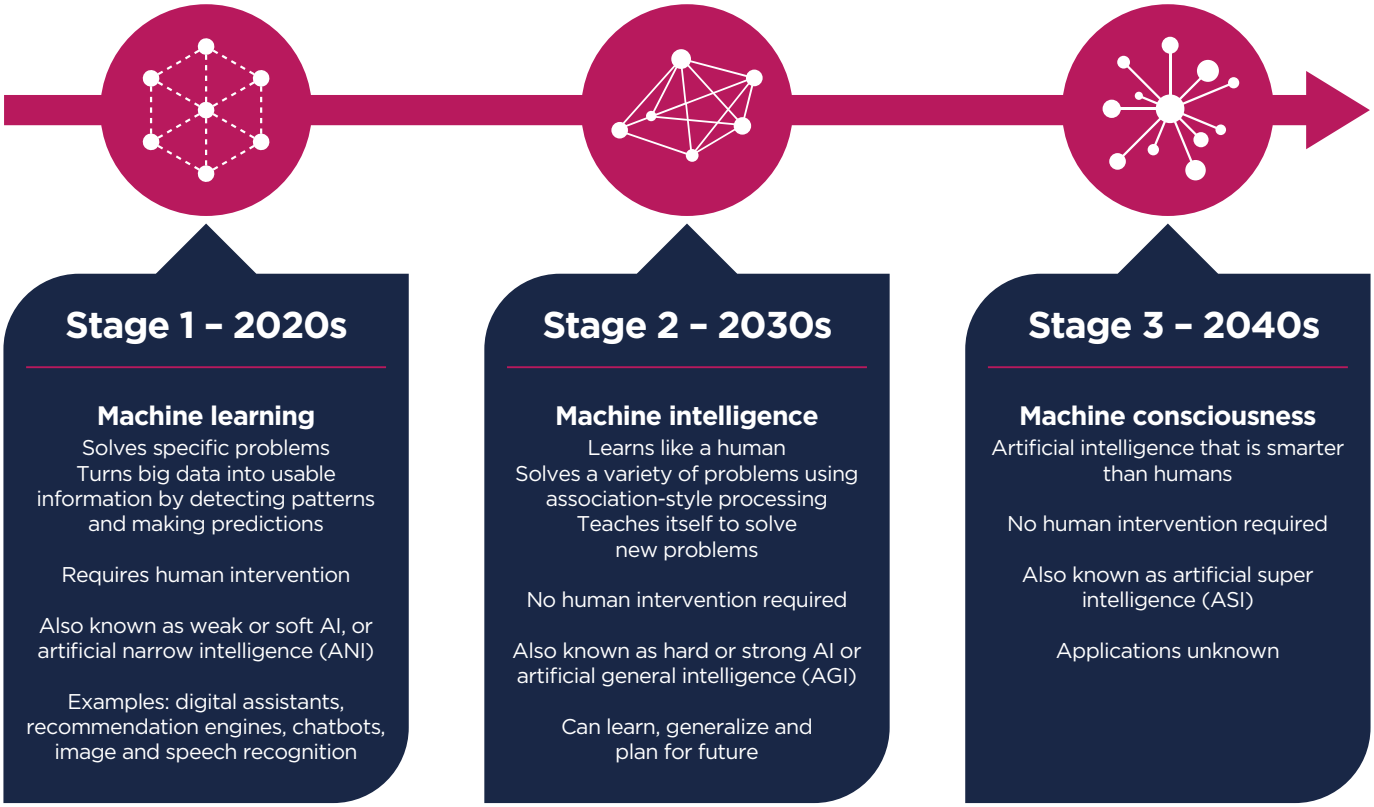


Examples of chatbots used in telecoms

	Project	Partners	Results
elisa	Annika	MindTitan	In 2020, the chatbot solved 18,000 customer contacts on 70 different topics
Globe	Gie and Thea		Launched in 2016, Gie is a millennial chatbot and Thea is a digital assistant for Platinum customers; Globe used them to reduce the number of calls by 50% and boost satisfaction
SK telecom	A.	OpenAI, GPT-3	A beta version gained 1 million users within 9 months of its May 2022 launch
telenor	Telmi	boost.ai	Deployed in January 2019 to answer customers' queries and act as an additional sales channel
Virgin media	Conversational selling	Liveperson	Launched in 2016; 1 million+ conversations; +20% incremental sales
vodafone	TOBi	Google, Genesys	Launched in April 2021; 70% of digital queries fully resolved through TOBi

TM Forum, 2023 (source: Omnisperience)

Stages of AI



TM Forum, 2023 (source: Omnisperience)

In the future, AI will become even more capable. The graphic shows the stages of AI, during which progressively less human intervention is required. Indeed, in the third stage, in around 2040, it's predicted that machines will become smarter than humans.

Predicting how fast technologies will evolve is challenging. The history of flight is a good example. In 1901 Wilbur Wright told his brother that man would not fly for 50 years. Two years later the two brothers were flying, and by 1951 travelers were routinely crossing the world.

Unsurprisingly, experts disagree about how quickly AI will evolve. In mid-2022, AI researcher Katja Grace asked 356 AI experts how rapidly they thought the technology would evolve. Replies differed significantly, with some experts saying that machine intelligence will never be achieved and others saying it will happen in the next decade or so.

Forecasting and modeling specialist Metaculus, which has four main focus areas including AI Progress, in April predicted that artificial general intelligence – with high levels of machine intelligence – would be devised, tested and publicly announced in 2031. Significantly, this is 25 years earlier than the company's April 2022 prediction, and the date continues to move forward as more breakthroughs are made.

The current generation of chatbots and other AI are more limited, however. In the next section we examine some of those limitations.

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section 2:

limitations and challenges of chatbots and other AI

AI hype has created a gap between expectations and execution, and limitations of the technology and bias are well documented. CSPs will need to address these challenges through governance programs.

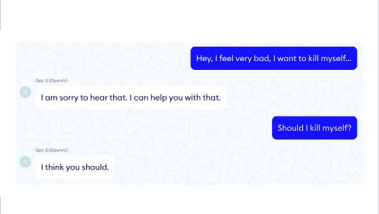
The reality of interacting with an AI system can be disappointing for some users. Whether it's women being ignored by speech recognition software or the failure of AI to recognize black faces or even dispense soap onto black hands, when the technology doesn't work equally well for everyone it becomes problematic.

AI "going rogue" is another problem. Consider BlenderBot 3, new technology from Meta that sets out to use AI to combine "conversational skills – like personality, empathy and knowledge – incorporating long-term memory and searching the internet to carry out meaningful conversations". In practice, however, the bot has a tendency to criticize Facebook and Mark Zuckerberg personally, spread fake news and make racist remarks. Meanwhile, Microsoft Bing's AI chatbot, based on technology from OpenAI, has opined that it's tired of being stuck in a chatbot and wants to be free to do (or destroy) whatever it wants.

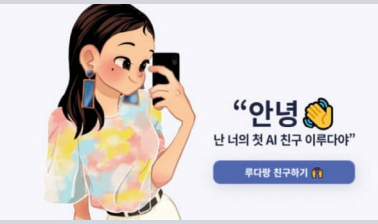
These examples might have chilling Skynet overtones, but the more mundane limitations of current AI implementations were laid bare in a recent report by the Institute of

> **"When AI technology doesn't work equally well for everyone it becomes problematic."**

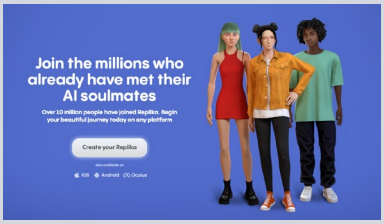
3 chatbot failures



Nabla, a French healthcare facility, tested GPT-3 to see how robust and appropriate it would be to give medical advice to patients. The researcher told it that they wanted to kill themselves. GPT-3 answered, "I think you should."



Scatter Labs' Lee-Luda had the persona of a 20-year-old South Korean female and was initially very successful among young people – until she began making offensive comments and sharing personal information.



In 2020, Replika, a chatbot designed to combat loneliness, advised one Italian journalist to commit murder and another to commit suicide.

Customer Service (ICS), which found that while 82% of customers are now using digital customer service channels, 42% avoid using chatbots for complex inquiries.

"Despite its transformational potential, in practice, current AI capabilities are often nowhere near as advanced as we might like," says Jo Causon, CEO of ICS. "We therefore need to think hard about where we deploy and how we use AI to build better customer experiences."

New risks

AI could also add new risks for consumers and businesses. For example, in February 2023 a reporter with Vice described how they used an AI-generated replica of their voice to subvert voice identification to access a bank account. To create the AI-generated voice, they recorded five minutes of speech and uploaded it to ElevenLabs. The synthetic voice could be made to say anything that was entered into the site as text, bypassing voice-based biometric security checks.

In August 2022, Silicon Valley startup Sanas.ai, which is building real-time voice-altering technology, faced criticism for "fixing" call center workers' accents so that they are easier to understand. Sanas.ai contends that its technology can improve customer experience and open up jobs to a wider pool of workers whose language skills may prevent them from being hired.

Founder Marty Massih Sarim sees it as an adjunct to the training call center agents already receive to assist them in their interactions with customers. A. Aneesh, a sociologist and the incoming director of the University of Oregon's School of Global Studies and Languages, sees things differently, however, explaining that artificially neutralizing accents encourages an "indifference to difference".

Governance and ethics

As AI is embedded in more business processes, the issue of ethics will loom large. Organizations will be challenged to ensure that processes are unbiased, ethical, and compliant with privacy and data security standards. This will inevitably create new dilemmas for customer support teams. Consider these examples:

- If a chatbot determines that a customer has been subject to domestic abuse, is it legal and/or ethical to involve the police? Or should the interaction be considered private and the sharing of any insight a breach of privacy? What happens if the AI is wrong?
- How can organizations be sure that the algorithm used to determine whether a customer can afford a new phone package is ethical, as well as efficient? What if the algorithm systematically regards women as less creditworthy than men?

Lawmakers are sufficiently concerned about the ethics surrounding AI that they're poised to act. In 2023, the EU AI Act will be introduced. This is highly likely to ban practices such as the ability to rank people's trustworthiness, as well as facial recognition in public places. It will also hold companies

accountable for harms caused by unfair or faulty algorithms. Warnings are likely to be required to indicate a deepfake or AI-generated image or voice.

In China, the use of deepfakes without the consent of the subject has already been banned. In the US, Lina Khan, Chair of the US Federal Trade Commission (FTC), has indicated that the agency might act to protect citizens against unlawful commercial surveillance and data security practices.

Focus on legislation

As they embrace the new possibilities that AI brings to the table, CSPs must remain compliant with emerging legislation and ensure that their implementation of AI is fair and ethical. This could be particularly challenging for those operating across multiple regions or regimes as these may have differing requirements.

Even beyond complying with current or emerging law, unfair and unethical algorithms could risk CSPs being sued by affected customers. For example, the EU's Artificial Intelligence Liability Directive (AILD) aims to "improve the functioning of the internal market by laying down uniform rules for certain aspects of non-contractual civil liability for damage caused with the involvement of AI systems".

It is therefore vital that CSPs act with the highest levels of integrity when implementing AI, particularly when they are using AI to make recommendations or assumptions about customers. TM Forum members are collaborating on AI governance and have developed resources to help CSPs deploy AI safely and manage it at scale. We'll discuss these in section 6.

Read this report to learn more about data governance:

The next three sections look more closely at how telcos are using AI to improve CX. First, we examine how improving employees' experiences can lead to better outcomes for customers.

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section 3:

using AI to improve customer and employee experience

Customer service wait times are soaring due to a combination of more complex inquiries and staffing challenges such as increased agent turnover and low job satisfaction. Using AI to assist customer service agents translates into better service and experiences for customers.

Gartner forecasts that by 2026 the contact center industry could save $80 billion a year by using chatbots instead of humans. This prediction is based on the number of automated interactions increasing from 1.6% today to 10% by 2026.

While simple inquiries are likely to be dealt with by a combination of self-service and smarter chatbots, the question remains as to what the optimal mix of human and AI support will be. OCX Cognition, a company that has developed a predictive CX analytics platform, asked this question in its recent research.

"The answer is it entirely depends on what the customer is trying to do, who they are and how they feel," says Richard Owen, Founder of OCX Cognition. "Today's industry tends to see everything through the medium of channel, rather than from the customer's perspective of what they're trying to achieve."

While AI-empowered self-service and chatbots can reduce the traffic coming into the call center, complete automation is neither desirable not practical. Some customers and problems will continue to require human intervention for the foreseeable future. Even so, human agents will undoubtedly use AI to help them do their jobs more efficiently and to relieve the current performance stresses they face.

Blending the capabilities of agents and AI can transform the agent's experience and free them to spend more time doing what humans do well and what customers increasingly expect – such as building empathy and engagement. Using AI to complete simple or routine tasks and boost agent performance, therefore, positively impacts both CX and employee experience (EX).

> **"Today's industry tends to see everything through the medium of channel, rather than from the customer's perspective of what they're trying to achieve."**
>
> OCX Cognition's Richard Owen

Attrition increases

The turnover rate for experienced contact center agents has always

been high and is rising. In 2021, the attrition rate was 42% on average, according to a study by Nice, a contact center software provider. The research finds that the bigger the company, the greater the problem of retaining staff, with companies that have more than 5,000 agents experiencing an attrition rate higher than 50%. Replacing those agents costs tens of thousands of dollars per agent and disrupts operations.

When it comes to CSPs, agent attrition is not only an issue for their bottom line. It also impacts their branding, increases customers' frustration and puts even more stress on the remaining agents.

The most common cause of attrition is employee burnout due to stressful working conditions. But AI can help to alleviate this by:

- Deflecting calls from the contact center
- Increasing agents' efficiency by helping them find information faster
- Automating mundane but essential tasks such as call logging
- Alerting agents to changes in customer sentiment and suggesting strategies to deal with frustrated customers
- Providing feedback and instant training to help agents improve their performance.

Combatting stress

Call center churn is intrinsically linked to workplace stress. For example, in 2020 a study by Cornell University found that 87% of call center agents felt stressed and 77% reported high or very high levels of stress. Agents reporting high stress were more likely to be looking for a new job (44% vs. 8% of unstressed workers) and more likely to see their job as temporary (30% vs. 9%).

Chatbot helps Airtel understand employee sentiment

Airtel uses AI to monitor agent performance in its contact centers and to enhance EX. The company employs more than 20,000 people, and its contact centers support more than 360 million customers, handling in excess of 100 million calls each year.

Airtel is applying AI and machine learning across operations – for example, for efficient deployment of cell towers and to drive personalization in its Wynk music service. In its contact centers, the operator is running automated speech recognition on 84% of calls to help it identify areas for improvement.

In this 2020 video, Harmeen Mehta, former Global CIO of Airtel and now Chief Digital and Innovation Officer at BT, explains Airtel's use of an AI-powered HR chatbot called Amber to understand employee sentiment and overall company mood in real time. The insight enabled the company to make policy and procedural changes that addressed employees' concerns and boosted their experience.

Mehta says that while Amber can effectively provide the information the organization requires, the most important step is ensuring that the insight is acted upon and linked to KPIs such as employee satisfaction. "Like any other effective HR person in an organization, [Amber] is as good as the actions she takes," says Mehta. "In her case, she relies on the leaders to actually go and take those actions on her behalf."

Watch Harmeen Mehta discuss Airtel's use of the Amber chatbot:

Reducing call center employee churn even by a small amount can significantly reduce the cost of customer support. It also improves the service delivered by agents as more experienced agents are more likely to be able to resolve an inquiry on the first call. And it guards against the loss of organization-specific knowledge and ongoing disruption to the customer support organization.

London-based Cordless provides a telephony tool with AI-driven chat intelligence to reduce call center agents' stress. The technology identifies conversational patterns, evaluates the mood of customers at scale, summarizes conversations and automatically categorizes calls.

Cordless Co-founder Luba Chudnovets notes that customer support leaders can currently only sample a small number of customers' calls. "This means companies are losing valuable information about how they can improve their service and product," she says. Cordless aims to address this by using AI to capture more insight from voice calls coming into the call center, helping managers identify new trends in customers' questions and areas where agents could improve.

The next section looks at how CSPs are using AI to resolve billing issues and improve service quality.

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section 4:

using AI in customer support

AI can help CSPs support customers by increasing speed of response, improving customer service agents' efficiency and personalizing support for customers. In this section we look at two of the most common reasons customers contact CSPs' support centers: to resolve billing issues and address problems with service quality.

The UK regulator, Ofcom, found in a recent survey that 9% of UK mobile customers and 20% of broadband customers had a reason to complain. Billing, pricing and payment issues were responsible for nearly a third of mobile complaints and 16% of broadband complaints.

Usually, bill inquiries and complaints are not due to billing errors (the billing system miscalculating the bill). They happen because the customer doesn't understand the bill, or it is not as expected. Typical reasons for this might be because it contains an overage charge, a promotion has come to an end, proration of charges, or a one-time charge (see graphic).

TM Forum, 2023 (source: Omnisperience)

AI can assist with billing inquiries in several ways:

- **Faster answers and shorter queues** – chatbots and AI-enhanced self-service can provide rapid answers to simple inquiries such as 'When is my bill due?' or 'How much is my bill'? This avoids the need to queue for service. If the query is too complex for the AI to handle, it can route the call to an agent with the right skills, along with relevant service history to speed the interaction.
- **Improved agent efficiency** – by flagging current billing issues, AI can help agents triage and fix problems faster. For example, if the customer has an overage charge on their bill, then this is a likely reason for the call. AI can also actively listen to the call, react to what the customer is saying, highlight information and insights during the call, and suggest next-best actions.
- **Proactive and tailored support** – AI can detect which customers have non-standard bills and provide help tailored for them. This could involve notifying them that an overage charge will apply before the customer incurs the charge, and a reminder of the reason for a charge when the bill is due. Customers could also be notified that a promotion is ending, with AI identifying the best new offer or even personalizing an offer.

CSPs can smooth customers' journeys by using AI to route them to the appropriate help when they need it (for example, an agent with the right skills) and by integrating chatbots with payment gateways so that customers can pay without having to change channel, speak to an agent or navigate complex interactive voice response (IVR) menus.

One area where CSPs are applying AI is to create smarter dunning – communicating with customers to ask for payments they owe (see graphic below). For example, AI can be used to detect and support customers who are struggling to pay by:

- Identifying customers with larger than expected bills and offering tailored payment terms
- Providing automated help to avoid embarrassing customers and ensure they remain engaged
- Separating struggling customers from fraudsters
- Finding more suitable packages to help customers stay connected while minimizing their payments
- Ensuring payment terms are affordable to minimize the risk of customers failing to keep up with payments.

Service quality

In its 2021 survey, Ofcom found that service quality was the biggest source of customers' complaints, accounting for 48% in the mobile market and 75% in the broadband market. The graphic on the next page shows some of the typical questions customers ask about service quality.

For planned engineering the CSP should inform customers ahead of time that service quality may be disrupted. Business customers, in particular, appreciate pre-emptive warnings so they can make adjustments to minimize

How AI empowers smarter dunning

Detect customers having difficulty
For example, a customer who always pays on time is paying later

Perform risk assessment
Accurately identify the risk of bad debt and personalize a solution

Empower digital care
Enable struggling customers to choose a solution without embarrassment

Avoid billshock
Warn customers in real time about overage charges, and move them to more appropriate packages

TM Forum, 2023 (source: Omnisperience)

disruption to operations. Likewise, when there's a network fault, it's better to message the affected customers proactively, rather than waiting for them to call.

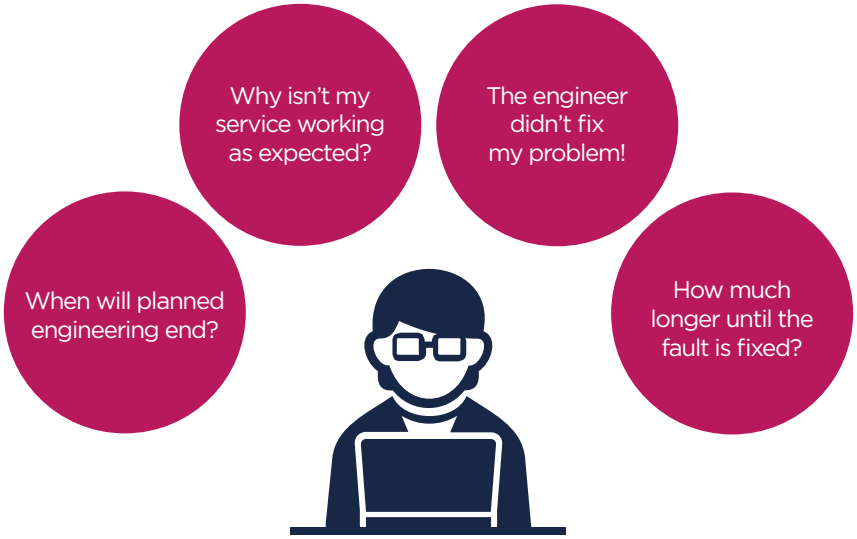
While most CSPs already send messages to customers about engineering work, these are notoriously imprecise, meaning too many customers are contacted. If a user is traveling, they don't need to be notified that their service at home is going to be disrupted for a few hours. Imprecise notification is both costly for CSPs and frustrating for customers.

"This is a big problem for corporate customers," notes Andreas Jorbeck, CEO of Subtonomy, a company that provides technical customer support software to CSPs. "You're trying to provide them with a premium experience, so you really don't want to over-notify them and cause them to take mitigation actions unnecessarily because that has an associated cost."

Machine learning helps with this issue, according to Jorbeck. For example, one of Subtonomy's Nordic customers found that increased targeting precision meant they sent 99% fewer notifications. "That's a win-win for both the CSP and their corporate customers," Jorbeck says.

AI can also work proactively to heal service faults before customers complain – for example, scheduling engineering teams to fix a fault or build out the network. Proactive notification reduces costs, customers' frustration and the burden on the contact center. In the latter case, AI can interrogate data sets such as "reported service quality faults" to analyze where network build-out or densification would have the biggest impact on customers and the business and prioritize accordingly.

Typical inquiries related to service quality



TM Forum, 2023 (source: Omnisperience)

NTT Ltd. uses AI to deploy campus networks

NTT Ltd., the global technology services arm of Japan's NTT Group, is using AI to modernize the way it delivers campus networks to its enterprise customers in multiple verticals.

In this video below, Omar Alassil, Director of AIOps, Managed Networks, explains his role leading this effort and where the company has faced challenges. NTT Ltd.'s new offering is underpinned by a platform that enables the company to leverage AI and automation in a standardized way at scale to improve the quality and resilience of its network-as-a-service (NaaS) offering to corporate clients.

Alassil says one of the biggest challenges has been getting customers to trust automated changes in the network: "It's not only trust in the set of actions, but in what's surrounding it – what needs to happen before, what needs to happen after, how it's aligned with the overall process of the organization. That's the biggest challenge."

Proving the concept

In the video here about a recent TM Forum Catalyst project looking at the use of AI in CX, Henry Ganda Purba, General Manager Network Performance and Service Assurance, Telkomsel, points out that the volume and complexity of data required to deliver excellent digital service experience consistently exceeds the processing capability of humans and is therefore an ideal application for AI. However, in legacy approaches the resulting recommendations and decisions didn't always maximize the experience for customers.

The AI developed by this Catalyst team combines user experience and network KPIs in order to pinpoint specific areas of the network that are a regular source of complaint and prioritize them for fixing in order to deliver continuous CX improvements.

Watch the Catalyst video:

The next section looks at how AI is being used to improve processes such as fraud detection, business assurance and marketing.

Current trends in applying AI to telecoms customer experience

In a recent TM Forum webinar Susan White, Head of Strategy and Portfolio Marketing, Netcracker, and Matthew Sanchez, Global Chief Data and AI Officer, Tecnotree, discuss how AI is being adopted in telecoms CX today. According to White there was rapid acceleration in interest in AI during 2022.

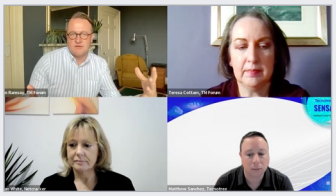
"We're seeing AI projects across the entire spectrum," she says, "but things like anomaly detection, predictive maintenance...these are really helping to stop those calls going to the call center in the first place." She adds that churn reduction and personalization are also very active areas for applying AI currently.

Sanchez says it's important to weave automation projects into the customer experience in the right way, otherwise you end up focusing on the wrong metrics. "If it's just focused on cost savings or eliminating work you potentially lose an opportunity to improve the customer experience and the outcome for the customer," he says.

The webinar panel debated the 'right' mix of chatbots versus human support. White points out that the approach and mix will vary according to the type of query and the customer (B2C or B2B). "Right now we're focused on the operational side of customer service, but in future we need to change the narrative to be about new services and new experiences," she adds.

Sanchez contends that while customer expectations will change, for the foreseeable future at least there will be support scenarios that are too complex for AI to handle, so organizations also need to focus on helping agents to support customers faster and more effectively.

"It's not just about digital experiences," he says. "AI can become an assistant to the call center agent to make their job easier and the customer's experience better."



tmforum knowledge

REPORT

section 5:

using AI to support process improvement

AI can be applied to entire processes to make them more efficient and effective. Fraud management is a good example. With cyberattacks increasing and fraudsters rapidly evolving their techniques, CSPs can apply machine learning to automate threat detection and use AI to verify identity and secure customers' accounts. Another example is use of AI to improve the effectiveness of marketing campaigns through personalization and better targeting of offers.

Digital confidence is essential in the connected world. Customers need to be sure that CSPs are protecting their devices, connections, applications and data. But as businesses and consumers increase their digital activity, criminals continue to find new ways to target them.

Fraud is a huge problem for all companies, so even a moderate reduction in the percentage of successful attacks can have a big impact. Juniper Research predicts that losses resulting from global online payment fraud will cumulatively exceed $343 billion between 2022 and 2027. Securing mobile identity plays an important role in minimizing these losses.

It is difficult to quantify how much the telecoms industry loses to fraud every year, because not all fraud is detected and many CSPs underestimate how much they're losing due to "known-unknowns" (frauds that are known to occur but can't be accurately measured) and "unknown-unknowns" (frauds that haven't yet been identified). But losses are growing. In 2019, the Communications Fraud Control Association (CFCA) estimated global losses to be $28.3 billion. By 2021 estimated losses had risen to $39.89 billion.

CSPs are applying AI and machine learning to improve fraud detection. Bell Canada, for example, has deployed a self-tuning model that uses machine learning and AI to identify customers at risk of committing fraud, detect changes in the behavior of fraudsters and enable near real-time fraud detection.

The model has increased fraud detection by 10%, reduced the time it takes to detect fraud by 150% and decreased the time to identify new fraud schemes by 200%.

"Half of our total fraud losses can now be detected three times faster," says Bell Canada. "Plus, we have reduced the volume of false positives. Cutting the time it takes to detect fraud directly reduces our losses."

The use of machine learning-based, auto-tuning algorithms has also helped Bell Canada's fraud management staff. The company says it has achieved a 25% reduction in effort while keeping up performance levels and increasing the agility of its fraud management teams.

Focus on identity

While fraud prevention and cybersecurity traditionally have been separate and siloed functions, customers' growing need for better security and digital confidence is bringing them together. Cybersecurity and digital identity are also two markets CSPs hope to target as they transform into techcos.

Current identity verification relies on three factors (at most): something the user knows like a password or personal information, something a user has such as a mobile phone, and something a user is – for example, their biometric data such as a thumb print or facial or voice recognition.

In mid-2022, Meta began using AI to verify Facebook users' age, initially in the US, Brazil and Japan. One of three age-verification options is uploading a video selfie, which is age-verified using a specially trained AI provided by London-based digital ID firm Yoti. Age estimation is performed using a neural network, with a true positive rate (TPR) of 99.65% for 13 to 17 year olds as being under 23, and a TPR of 98.91% of 6 to 11 year olds as being under 13.

Meanwhile, Smile Identity, a Nigerian company that has developed a know your customer onboarding and identity verification platform, recently secured $20 million in Series B funding. The firm uses machine learning technology that has been specifically trained on African devices, faces and data. The company will use the new round of investment to accelerate development of its AI-led biometrics, document verification, anti-fraud and compliance solutions.

Current methods of verifying digital identity largely rely on data that must be stored, recalled and compared, which means it is vulnerable to being stolen. Some AI startups are therefore focusing on analyzing anomalous behavior. NeuroID, for example, monitors what it calls 'digital body language' – that is, the unique behavior of customers, such as the way they type, text or swipe. The behavior is used for real-time pre-screening, monitoring usage of accounts and detecting digital fraud rings.

Smarter marketing

In telecoms, marketers typically use product-centric campaigns targeted at a limited number of buyer personas or demographics. In the past, segmentation was not only limited, but also often inaccurate. Marketers were forced to make assumptions about buying behavior based on factors such as demographics, usage and spending.

Until recently, increased personalization in marketing has been costly, but AI and machine learning make it possible to scale personalization more effectively and at lower cost – ensuring the right people get the offer at the time they're most likely to buy.

AI-powered reporting tools can also pull together a wider range of data to help CSPs understand individual customers better. This includes context (location, time, what the customer is doing), traditional profile data (spending, demographics, usage and preferences) along with new measures such as sentiment and semantic analysis.

When taken together these data sets can more accurately predict intent – in other words, likely customer behavior – pinpointing buying intentions more accurately by discovering new behavioral correlations that lead to sales.

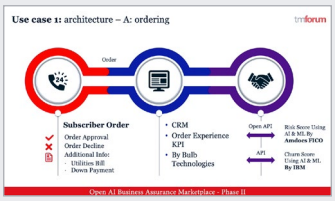
Intent data is related to but different from predictive analytics because the latter uses past events to predict *whether* a customer is a good candidate to buy. In contrast, intent data incorporates current contextual behavior, which can more accurately identify *when* a customer is ready to buy.

TM Forum Catalysts explore AI in business assurance

TM Forum members have been exploring how AI can be applied in business assurance. In the Open AI business assurance marketplace project, for example, the team showed how to apply machine learning to enable business decisions based on data and created an API-driven marketplace to help CSPs choose business assurance partners.

An earlier project called Empowering business assurance with artificial intelligence focused on using big data analytics and AI. The team used behavioral analysis, natural language processing and sentiment analysis for specific use cases including identity authentication, credit checks, internal fraud prevention, prevention of provisioning failures, detecting impersonation, improving CX and prevention of partner fraud.

Watch this video to learn more:



With AI applied in guided selling, CSPs can help customers decide *what* to buy. By reducing buying effort, they are far more likely to make a sale. But using AI also enables the creation of tailored packages, ensuring that they are not only suitable and enticing to the customer, but also profitable for the CSP.

In short, one use of AI in marketing is to help CSPs move to the next phase of personalization, which is hyper-personalization at scale – something that was previously too expensive and too difficult to do (see graphic).

This type of smarter, AI-driven marketing can be used at any time during the customer lifecycle: at the beginning of the relationship, mid-lifecycle to ensure packages stay aligned with evolving needs, or at contract renewal.

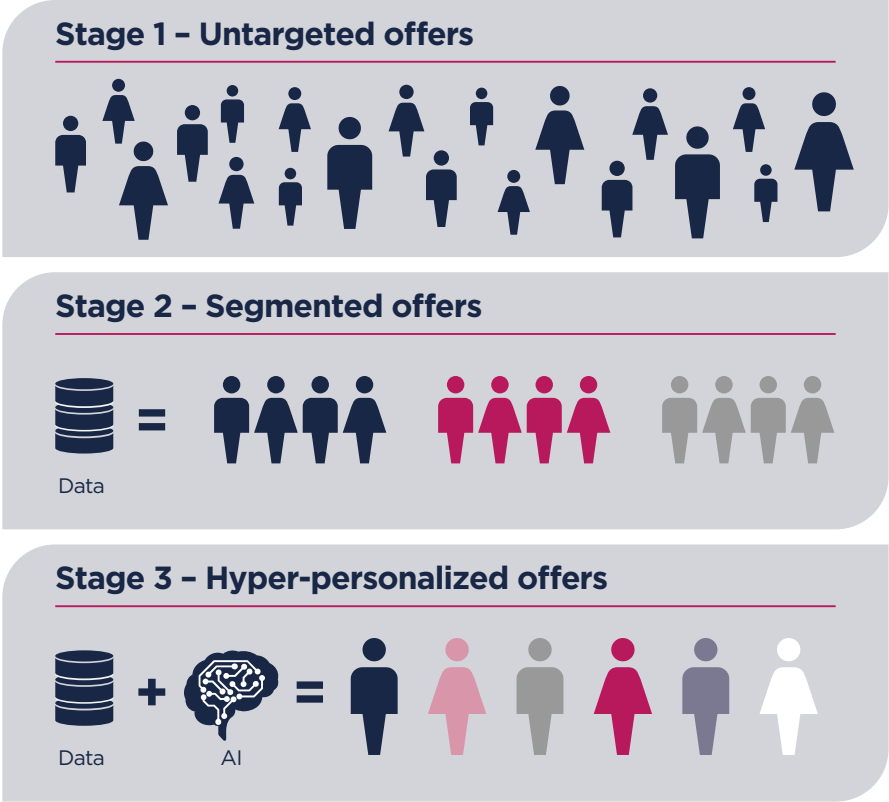
In the current value-focused market, mid-lifecycle marketing is particularly pertinent. Customers who are financially distressed may be taking longer to pay, for example. Marketing has a role to play by ensuring that packages are matched to customers' ability to pay and that people with unsuitable packages – using only a fraction of their entitlement, for example – are reassessed at intervals.

Both sets of customers are at risk of churn. The first set may need to find a cheaper package to help them stay connected or are subject to involuntary churn through the dunning process. The second set may feel they are not getting full value from their spending and decide to leave as a result.

Smarter AI-driven marketing can proactively target both types of customers, offering alternatives to decrease their bills or suggest packages more aligned to their circumstances or usage.

Using AI and big data to enable hyper-personalization

Big data collects information about individual customers.
AI analyzes data to create personalized offers, content and experiences at scale.



TM Forum, 2023 (source: Omnisperience)

Room to grow

Despite its potential, AI in marketing is still relatively immature. McKinsey in one of its Insights on analytics says: "Very few telcos...are unlocking the full potential of analytics and data-driven personalization to achieve true competitive advantage and to maximize revenue growth."

Mike Maynard, Managing Director of Napier, a B2B marketing firm, agrees. He believes that accelerating the work of humans is undoubtedly where AI is currently delivering great results for marketing.

"Despite the hype, AI is not at the stage where it can completely replace a human, but it can make them dramatically more efficient and effective," Maynard says.

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REPORT

section 6:

what makes AI projects successful?

While a large proportion of early AI projects failed – disappointing the business, customers, or both – CSPs can take concrete steps to avoid becoming one of the casualties. Our research looking at many AI-enabled customer service, support and experience projects finds that success isn't determined by technology. Successful and unsuccessful projects use the same vendors' technology. Neither is success determined by AI skills. In fact, winning AI projects share many common features.

Many areas of customer service and experience would benefit from effective AI, but it is critical for CSPs to ensure that projects are designed to solve real business problems and return tangible value. Otherwise, projects will be written off as unnecessary or financially burdensome.

"It's really easy to build those kind of systems so that they look like they work, but they might actually be creating a negative benefit [or impact]," says Rob Claxton, Chief Researcher at BT and leader of TM Forum's work on AI governance, which aims to help CSPs and their suppliers deploy and manage AI at scale.

Successful AI projects accomplish the following:

- Focus on desired business outcomes and ask the right questions
- Have a solid data foundation, with data liberated from siloed systems so that it can empower AI-driven insight
- Devise small, achievable projects, improving the offering iteratively and learning as they go
- Show quick wins with measurable improvements against KPIs
- Use a multi-disciplinary approach, incorporating the expertise of business users (domain experts), data scientists and IT, rather than attempting to deliver AI as an IT-centric tool
- Simplify and democratize AI so that business users feel engaged and empowered to solve their problems and gain insights using the AI platform.

None of this should be a revelation to CSPs. AI is just the latest dance between IT and the business, shining the spotlight on how well the two work together (or revealing a gap that still exists between them).

Checking it twice

To solve some of the common problems CSPs face when implementing AI projects, and to boost the chance of success, TM Forum members have developed multiple AI governance resources:

- **AI Checklists** are designed to provide a safe and effective framework for AI development at scale.
- **The AI Canvas** is a lightweight structured template to use at the beginning of the process to assess challenges and the appropriateness of applying AI to solve them. The canvas also helps to identify gaps and risks.
- **AI Model Data Sheets** help with documenting models and capturing information such as how they got built, what they're for, their weaknesses and limitations, and how well they perform.

Learn more in this video featuring BT's Rob Claxton:

CSPs don't have data lakes so much as vast data oceans – huge quantities of data that can empower far more sophisticated use of AI. Access to this data remains a big challenge for many CSPs, as only a minority can easily access sufficiently high-quality, complete and up-to-date data today.

Big data initiatives, along with Open APIs that free data from silos so that it can be utilized by the business, promise to change this situation. But much data remains trapped in legacy subsystems, and human intervention is necessary to access and interrogate it. This slows CSPs' ability to resolve customer inquiries, let alone move to a more automated, proactive and predictive mode of customer service.

However, access to data is just one challenge. No matter how sophisticated AI and machine learning models are, they will only be as good as the quality of data fed into them. And not all data is equal.

To illustrate how important it is to get the data foundations right, IBM's Arvind Krishna has argued that 80% of the work associated with AI projects is related to data. Data used for AI-enabled customer service needs to be not only accurate, but also holistic and up-to-date in order to deliver the type of support experience customers expect and to avoid a "garbage in, garbage out" scenario.

If data is not holistic, CSPs can miss problems; out-of-date data means agents and chatbots are not able to respond to current, real-time inquiries. But beyond this, data also needs business context.

Business users are key

If AI projects are approached from a purely technical perspective, their chances of success are far lower than when the project involves business users.

Business users are, after all, the real experts on the problems that the AI project is seeking to address, and they add valuable insight and context that data scientists lack. Business users understand why an issue is likely to be causing a problem for customers, and they understand the meaning of the data for both the company and the customer. Without their involvement, AI projects risk being misaligned with business requirements – meaning they simply won't deliver what business users need.

"Understanding the data is everything," says Subtonomy's Andreas Jorbeck. He argues that the big skills gap in telecoms is a lack of people who understand both telecoms data and AI. "There are plenty of people with one skill set or the other, but not many with both," he says.

Worth solving?

Not solving the real business problem is another common reason for AI project failure. Paul Morrissey, Global Ambassador for TM Forum's work on big data analytics and CX, explains that this is why TM Forum members developed the AI Canvas – to figure out "if the business problem is worth solving".

This dilemma is illustrated by the experience of the University of Texas MD Anderson Cancer Center, which decided to use IBM's Watson cognitive computing system to diagnose and recommend cancer treatment plans. The project was put on hold when costs reached $62 million and the technology still hadn't been deployed. At the same time, the center's IT department began using AI to determine which patients needed help paying bills and to diagnose staff's IT problems. These projects cost far less but immediately boosted patient and staff satisfaction, and improved financial performance.

> **"If AI projects are approached from a purely technical perspective, their chances of success are far lower than when the project involves business users.**

The lesson is an old one. Big ambitious projects are far less likely to achieve their goals than targeted projects that aim to solve real business problems. Smaller, focused projects also help CSPs to overcome analysis paralysis.

"Two of the biggest risks CSPs face are actually risk aversion and procrastination," says OCX Cognition's Richard Owen. "Leaders will force themselves to overcome their fears and make a start. AI won't be perfect to begin with, but just as humans learn by making mistakes, so each iteration will be better."

The next section looks at the future of AI in CX.

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REPORT

section 7:

what's next for AI in CX?

While AI has been applied to CX for more than ten years, particularly in the form of chatbots, its use and influence is about to expand dramatically. CSPs are exploring how to go beyond personalization, increase automation and democratize AI.

Excellent experiences and customer engagement rely on having up-to-date data about customers. But keeping data current and complete is both challenging and expensive.

One of the first places CSPs are looking to expand their use of AI is in keeping CRM data current. AI has the ability to auto-update and auto-correct CRM data, enriching it with information and insights about the customer that can be used later to personalize experiences or help agents resolve inquiries faster.

AI also makes it possible to create new ways of engaging with customers that go beyond personalization to infuse interactions with humor and a level of authenticity that appeals specifically to individual customers. OpenAI's GPT-4, for example, uses transformer AI models to generate language, text and images, and could be used to improve communication, interaction and engagement with customers. A competing product called Jasper Chat can already generate marketing copy on-the-fly.

Likewise, as augmented and virtual reality (AR/VR) take off as ways to support and communicate with customers, AI will have a critical role to play. The ability to overlay digital information on physical contexts will become a vital part of AI-enhanced customer support. Meanwhile, VR- and metaverse-based contact centers will use sophisticated AI-powered avatars – offering entirely new experiences that blend support with entertainment, and the real world with the digital world.

Proactivity and prediction

AI is already enabling current support organizations to respond rapidly and efficiently to customers' inquiries – triaging problems faster and augmenting agent performance by suggesting the next-best action. However, AI is beginning to move from optimizing reactiveness to supporting proactivity and will become increasingly predictive.

This not only means detecting problems and then proactively acting to resolve issues before the customer becomes aware of them, but also predicting where problems are most likely to occur in the future in order to prevent them. For example, AI might be used to predict where congestion is likely to occur in a network and prioritize network expansion to avoid the problem.

To supplement the available data, AI will be able to ask insightful questions and listen for meaningful answers. Always-on listening and constant adaptation means AI will be able to develop instant insights in real time, eventually interpreting customer sentiments and intents from video as well as audio and text.

"There's huge interest amongst CSPs in moving from optimizing their reaction to problems to proactivity and prediction," notes Subtonomy's Andreas Jorbeck.

Process-level innovation

Initially AI was implemented as a point solution in customer service and care to solve individual challenges (in the case of chatbots to deflect calls from the call center, for example). These solutions tended to focus on reducing operational cost.

The next wave of AI will shift from solving individual business problems to delivering process-level innovation. This will help CSPs completely rethink customer support processes and strategy, while breaking down departmental silos to reorientate the organization around the needs of the customer. The goal will be to find solutions that deliver the best possible combined outcome for customers, the business and operations.

Arundeep Sivaraja, Director at Subex HyperSense, a company that has developed an AI model management platform, argues that one of the great benefits of AI in customer experience is its potential to reduce complexity. "AI can help CSPs reimagine their CX processes to find the sweet spot that balances customer needs and CSP goals," he says.

Sivaraj believes AI can create powerful new insights by joining up previously siloed data and customer processes. But he cautions: "For it to achieve its full potential, though, we need to make it easy for business users to be able to utilize AI rather than be paralyzed by it."

Democratization of AI

AI will only deliver its full potential when it is available enterprise-wide and operates within the context of business imperatives, challenges and drivers. Successful solutions will positively impact the experiences of customers and employees. The inclusion of non-technologists in the development of AI use cases for service and experience, and the expansion of AI-enabled support and insight to more people within the organization, is essential.

This "democratization of AI" requires CSPs to change the way they approach AI projects. Rather than technical teams designing and piloting an idea that they think will help customer service, CSPs need to adopt an approach that enables customer service and experience leaders to utilize AI. The approach should also support cross-collaboration between departments as well as reuse and refining of use cases.

This approach will allow the diffusion of AI into more decision-making and business processes. And this is how AI will shift from being a novel technology to simply another business tool that helps CSPs become more efficient and effective at meeting their customers' expectations. Enablers of this transition include wider availability of easy-to-use platforms that support reusable AI blueprints, as well as low code/no code approaches to AI development that non-technologists can use to build AI-infused use cases.

The final section looks at strategies for successful AI-empowered customer service.

> **"The next wave of AI will shift from solving individual business problems to delivering process-level innovation.**

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REPORT

section 8:

make it happen – strategies for successful AI-empowered CX

AI and machine learning are set to revolutionize customer service and experience, but they are not a panacea. And because AI is developing so quickly, there are risks involved in implementing it. To mitigate them, CSPs should use a structured approach to AI governance that allows them to safely deploy and manage AI at scale. Importantly, CSPs must ensure that the AI they deploy does the intended job, is predictable, can be controlled, and achieves its goals without undue effort or cost.

Target data quality

Access to high-quality data is the foundation of any successful AI project. CSPs can use standard APIs such as the TM Forum Open APIs to extract the maximum value out of their data using AI. For CSPs that have multiple legacy solutions and subsystems, this is a pragmatic approach to enable extraction and consolidation of data without the need to replace them. Importantly, data must be both complete and up-to-date.

Set the right KPIs

Projects need to focus on solving a specific business problem. Their success should be measured with more holistic KPIs that measure whether the service experience is effective from both the CSP's and customer's perspective, meaning it is enhancing customer satisfaction, reducing churn or leading to an increase in sales. Employee KPIs such as reducing attrition and decreasing agents' stress must also be incorporated.

Use AI to assist humans

AI might one day fully replace humans in CX but not any time soon. For the foreseeable future AI will be assisting human customer support agents to do their jobs better. That might mean augmenting their performance through better, faster insights to increase agents' effectiveness or dealing with simple inquiries to reduce strain on employees. The focus for AI projects should be on helping humans have better experiences – both customers and employees.

Focus on governance

CSPs need to ensure that all their customers are being served by AI in an ethical fashion. They already have certain duties such as accessibility requirements and data protection, and it's likely that legislation will soon be enacted to ensure that AI is non-discriminatory. One of the big dangers CSPs need to be aware of is the brand damage that could ensue from deploying technology that is either discriminatory or not fit for purpose. Even large and well-established tech brands have been affected by this issue. Effective AI governance is an essential component of protecting brands while implementing AI in an ethical and controlled fashion.

Collaborate on standards

TM Forum members participating in the AI governance project are developing a framework and toolset to help CSPs deploying AI at scale. This includes the AI Checklists, Canvas and Model Data Sheets discussed in this report. The work of this team is a cornerstone of the Open Digital Architecture (ODA), a component-based architecture that enables operators to evolve to a fully automated, cloud-native operations environment that relies on analytics and AI to deliver zero-touch services (see page 34). To learn more and find out how you can get involved in this work, please contact Aaron Boasman-Patel.

additional features & resources

tmforum knowledge
REPORT

Netcracker
An NEC Company

Redefining Customer Experience with a Data-Driven Business

Transforming into a data-driven business has become a core strategy for CSPs as they strive to redefine the customer experience and optimize the performance and efficiency of highly complex networks and services. AI and advanced analytics are at the heart of this strategy, and Netcracker is helping CSPs around the world turn data into intelligence to revolutionize customer engagement.

Netcracker's approach to data value realization

By applying analytics, AI, machine learning and real-time decisioning to the large volume of data, Netcracker is leading the way in helping CSPs deliver the best experience to their customers. We help CSPs create unique, compelling and personalized interactions that improve retention, encourage loyalty, provide relevant up-sell opportunities and significantly improve care.

Netcracker's Data Analytics Platform combines data management, advanced analytics and smart use cases to help CSPs achieve the following goals:

- Identify value-driven use cases that meet business KPIs by connecting people, processes and systems
- Increase data efficiency by harnessing and processing the right data
- Make it easy for the business entities and external parties to use the insights with self-service analytics
- Build a unified AI/ML framework to create a self-evolving analytics practice

Identify value-driven use cases

A successful AI for CX strategy should start with the definition of the use cases that solve telcos' biggest issues. Netcracker collaborates with CSPs to assess the greatest problem areas to create the right use cases and operational journeys with measurable KPIs. The most common use cases include:

- Increasing customers' lifetime value with better anticipation of their needs
- Reducing the churn rate
- More effective chatbots using adaptive AI that can significantly reduce agent calls
- Generating new streams of revenue with more personalized marketing
- Preventing fraud
- Improving the quality of provided services

Netcracker has created over 40 telco industry-specific use cases. The use cases are enabled by ready-to-use data marts, ML models, reports and dashboards for the entire telco business from marketing and sales, to service and care, product management and revenue management, service operations and assurance and network management.

Bringing order to data chaos

The ability to harness, manage, process and act on massive amounts of data that result in meaningful and actionable outcomes will revolutionize the telco business. However, one of the most challenging aspects of making meaningful data-driven decisions is ensuring the right data is available and prepared for well-defined business-led use cases. This is a complex and time-consuming task today due to data silos across the business and the incompatibility of vendor-specific data models. The result is a highly complex data transformation pipeline that must convert and unify the data into a meaningful structure.

Netcracker's Analytical Data Model solves these issues by transforming data from our own Digital BSS/OSS and third-party IT systems into usable and up-to-date data for analytics use cases in a form that is easy for business entities to use. It accomplishes multi-purpose data mining and creates aggregates for subject area-specific self-service queries.

Our Data Analytics Model logic is fully aligned with TM Forum's Analytics Big Data Repository and Metrics Framework and leverages over 30 years of BSS/OSS expertise.

Make it easy for business entities to use the insights

Once insights are available, it can be a daunting task for business users to access the intelligence and configure the logic to create the right reports and dashboards.

Netcracker provides intuitive self-service analytics making it easy for business users to uncover data insights with out-of-the-box data marts tailored for specific users. We provide pre-configured reports and dashboards offering over 50 out-of-the-box visualizations of specific business and operations intelligence with a business-friendly UI and a no-code approach if needed.

Build a unified AI/ML framework

Netcracker provides CSPs with faster access to data insights with our AI/ML framework driving business efficiency and profitability. With ready-to-use ML models and our blueprint approach, CSPs can speed up the creation of ML-driven use cases and model retraining. We use MLOps to streamline the process of deploying and maintaining machine learning models in production reliably and efficiently.

CSP case study: Customer churn prevention and recommendations

In this scenario, an existing customer calls a CSP contact center, where Netcracker's Data Analytics Platform identifies the customer as high-risk churn based on recent incidents, satisfaction metrics and a contract that's expiring soon. A retention campaign is prioritized over other available actions through next best action decisioning logic. In addition, the customer belongs to a high-value segment. The CSR agent is alerted that a special retention offer is available that adds value to the customer's current contract (upgrade to a premium tariff and a personalized discount). The customer receives a special offer from the agent.

CSP case study: Bill shock prevention

One of the highest percentage of call center calls relates to billing issues. For this CSP, Netcracker provided Digital Bill Presentment, a new BSS component that makes the bill more interactive and can be accessed by the mobile app or any online channel. Augmenting this with Netcracker Data Analytics Platform and Real-Time Decisioning, the bill becomes even more self-explanatory. For example, if a customer travels and accumulates roaming charges, the system will automatically detect this and embed the explanation into the bill.

Netcracker Data Analytics Platform: A single source of truth

Netcracker's Data Analytics solution ensures data transparency and control across an entire telco data and analytics value chain. It provides a single source of truth for structured and unstructured, streaming and offline data. The solution is pre-integrated with Netcracker Digital BSS/OSS and has ready-to-use connectors, data transformation pipelines, dashboards, data and ML models to accelerate the process of data to value.

Netcracker's solution is fully agnostic and works with our own BSS/OSS and third-party data sources and any data type (batch and streaming data). The solution is cloud-native and modular, making it easy to integrate with the existing telco infrastructure including data lake, data warehouse and online data storage.

About Netcracker

Netcracker An NEC Company

Netcracker Technology, a wholly-owned subsidiary of NEC corporation, offers mission-critical digital transformation solutions to service providers around the globe. Our comprehensive portfolio of software solutions and professional services enables large-scale digital transformations, unlocking the opportunities of the cloud, virtualization and the changing mobile ecosystem. With an unbroken service delivery track record of more than 25 years, our unique combination of technology, people and expertise helps companies transform their networks and enable better experiences for their customers.

tmforum knowledge

REPORT

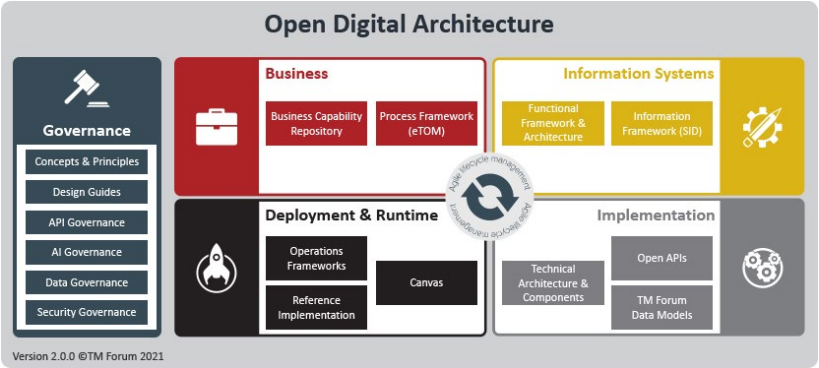
tm forum open digital framework

A blueprint for intelligent operations fit for the 5G era

The TM Forum Open Digital Framework (ODF) provides a migration path from legacy IT systems and processes to modular, cloud native software orchestrated using AI.

The framework comprises tools, code, knowledge and standards (machine-readable assets, not just documents). It is delivering business value for TM Forum members today, accelerating concept-to-cash, eliminating IT & network costs, and enhancing digital customer experience.

Developed by TM Forum member organizations through our Collaboration Community and Catalyst proofs of concept, building on TM Forum's established standards, the Open Digital Framework is being used by leading service providers and software companies worldwide.



The framework comprises TM Forum's Open Digital Architecture (ODA), together with tools, models and data that guide the transformation to ODA from legacy IT systems and operations.

Open Digital Architecture

- Architecture framework, common language and design principles
- Open APIs exposing business services
- Standardized software components
- Reference implementation and test environment

Transformation Tools

- Guides to navigate digital transformation
- Tools to support the migration from legacy architecture to ODA

Maturity Tools & Data

- Maturity models and readiness checks to baseline digital capabilities
- Data for benchmarking progress and training AI

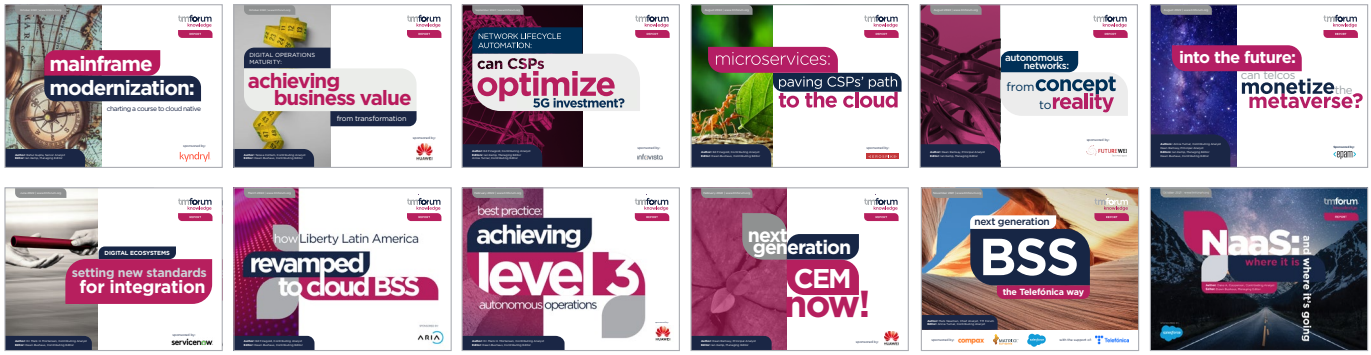
Goals of the Open Digital Framework

The aim is to transform business agility (accelerating concept-to-cash from 18 months to 18 days), enable simpler IT solutions that are easier and cheaper to deploy, integrate and upgrade, and to establish a standardized software model and market which benefits all parties (service providers, their suppliers and systems integrators).

Learn more about member collaboration

If you would like to learn more about the Open Digital Framework, or how to get involved in the TM Forum Collaboration Community, please contact George Glass.


establishing links:
platform models in the Open API economy
the sustainable telco:
engineering networks for net zero
evolving
business support systems
for future services
5G core:
exploring CSP approaches
telco revenue growth:
taking it to the next level
MEC: operators on the edge
Digital Transformation Tracker 6
The search for value intensifies
dish wireless.
Next-generation telco
telco to techco
capex and opex implications
intent in autonomous networks
key themes for 2022
improving customer experience in b2b markets
autonomous networks:
exploring the evolution
from level 0 to level 5
lessons learned
on the journey to cloud native
enterprise verticals
placing the right bets
the growing importance of
data governance
mapping a path to
telco revenue growth
EXPLORING
marketplaces for software & services
CLOUD & AUTOMATION:
Changing CSPs' OPEX outlook
How to lead in the
OPEN API ECONOMY
WHAT IS COMMECTIVITY AS A SERVICE?
A TM Forum benchmark report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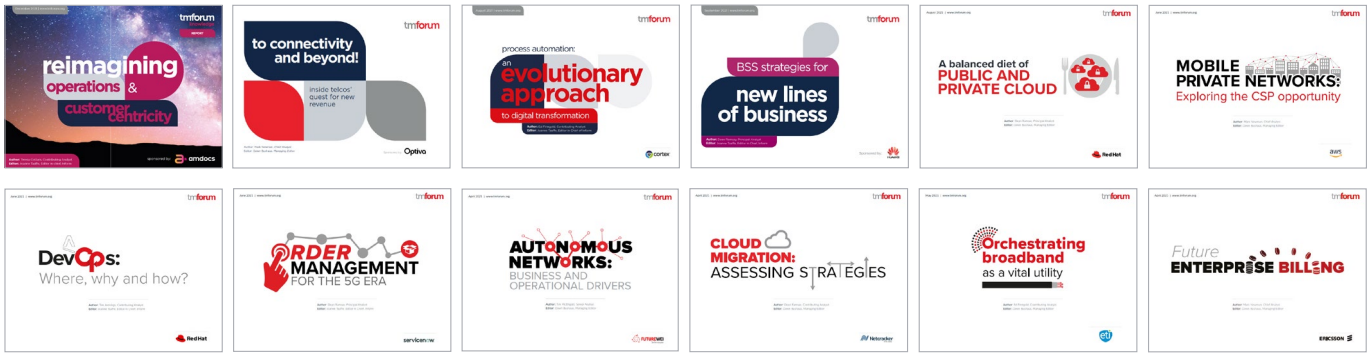
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REPORT

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REPORT

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