

IBM Institute for
Business Value

Scaling Conversational AI

How telecom companies are boosting
efficiency with Virtual Agent Technology

Experts on this topic



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Key takeaways

Communications Service Providers (CSPs) should accelerate investments¹

in Conversational AI—including the use of Virtual Agent Technology (VAT)—based on data from a recent IBM Institute for Business Value global survey showing that CSPs have achieved significant benefits that can scale.²

CSPs can increase VAT's benefits

by scaling strategically as part of an enterprise-wide strategy that considers both vertical and horizontal implementations, with decisions driven by data analysis.

CSPs can shorten time to value and reduce implementation costs through machine learning-driven analytics, simplified integrations, and pre-configured industry content.

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Expanding VAT's reach—and benefits

Conversational AI has evolved beyond the domain of mere question-and-answer systems to deliver complete business outcomes, even improving customer satisfaction while lowering cost and increasing revenue (see “Definitions: Conversational AI, virtual agents and chatbots”).

A recent Forrester Consulting study estimated that a large organization implementing Virtual Agent Technology (VAT) can achieve \$5.50 cost savings per contained conversation.³ And the IBM Institute for Business Value (IBV) found in a recent global survey an average improvement of 9 percentage points in customer satisfaction across all CSPs surveyed.⁴

This certainly suggests there are real reasons for further investment in VAT. But an even more compelling case can be made for CSPs that increased VAT investment can broaden these benefits.

CSPs are a fertile ground for VAT because they experience pain points resulting from high volumes and diversity of customer interactions, including:

- A large number of customers, many of whom have low-value contracts that make the cost of interaction a critical factor for profitability
- A history of human-to-human interactions, either call center or storefront, that are hard to manage with consistent quality when done manually
- A broad portfolio of products with a diversity of business interactions that can be automated through self-service and tuned through frequent monitoring and analysis

Definitions: Conversational AI, virtual agents, and chatbots

Artificial intelligence (AI) has many possible uses, but one of its most commonly experienced incarnations is to improve interactions with people—customers, consumers, constituents, and the like. Generally, this overarching concept and use of AI to converse with and assist people is referred to as **Conversational AI (CAI)**.

CAI uses **Virtual Agent Technology (VAT)** to serve end users. It includes the automation of dialogue and back-end processes and can tap a range of AI technologies: machine learning, natural language processing, natural language generation, sentiment analysis, language translation, speech-to-text, robotic process automation (RPA,) and optical character recognition (OCR).

A **Virtual Agent** or **Chatbot** describes a specific instantiation of VAT.

Perspective: Cross-industry global Virtual Agent Technology (VAT) survey⁵

In 2020, the IBM Institute for Business Value (IBV) conducted a cross-industry global VAT benchmarking survey. This Expert Insights (EI) draws upon survey results, including those from 178 CSP respondents, to offer insights specific to CSPs seeking to deploy and expand VAT's benefits across their businesses.

Given the alignment of these pain points with VAT's ability to help assuage them, it should come as little surprise that CSPs are early adopters and had the longest average implemented time of all 12 industries surveyed, at two years and one month (see sidebar, "Cross-industry global VAT benchmarking survey").

CSPs were early adopters of VAT—and with success—and are enjoying above-average attainment of their anticipated ROI for VAT investments. 67% of CSP respondents have already achieved their ROI with 17% of these exceeding it.⁶

Despite their success, our survey suggested that CSPs may not be deploying VAT as widely as they might, which could allow them to expand and optimize ROI attainment and further increase business outcomes. CSPs were nearly tied statistically for the lead across all other industries surveyed on the percentage of respondents whose organizations had implemented VAT for use by external customers. But CSPs had implemented it less to assist internal agents and users—and came in last among other industries on implementations for use by internal customers (see Figure 1).

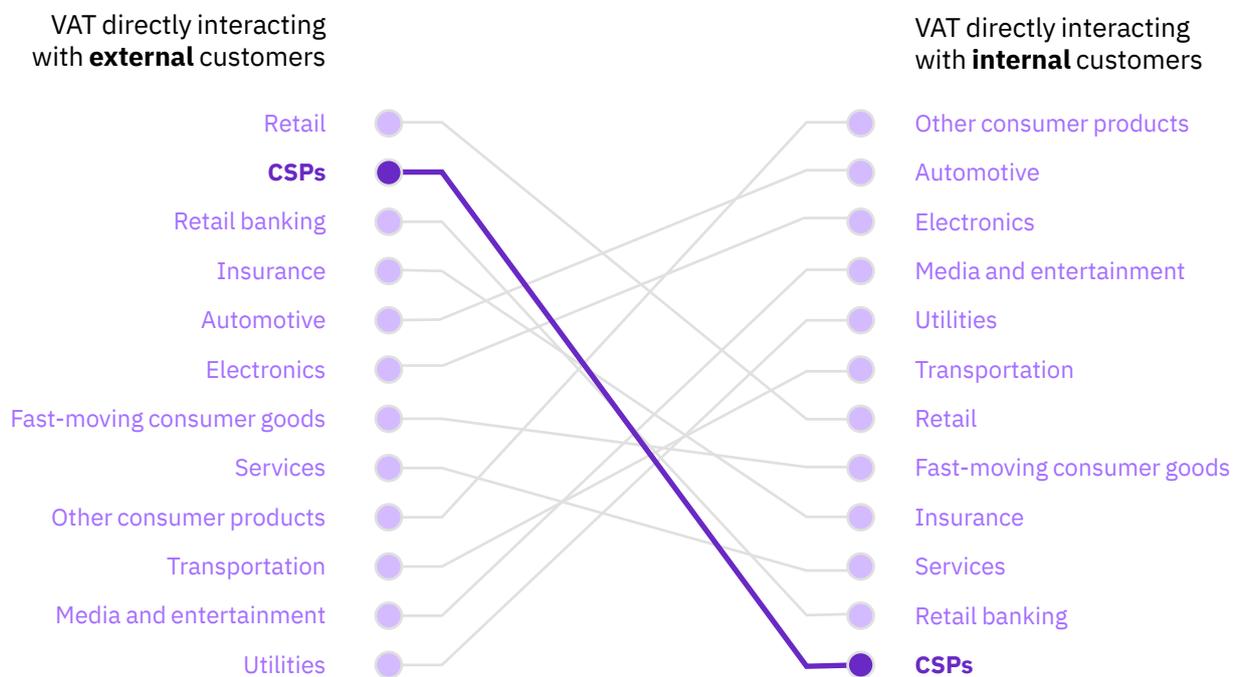
If conversational AI is working so well, why the restraint?

If conversational AI is working so well, why the restraint?

Figure 1

Room for expansion

Where CSPs lead—and lag—in VAT implementation



Despite limited implementation types, for most metrics surveyed, a Virtual Agent serving internal users performs the same as or better than one serving external customers. These metrics include intent recognition accuracy, impact on customer and agent satisfaction, and reduction in cost per contact.

Though this compelling evidence shows that CSPs are likely to achieve positive outcomes by expanding toward internally focused use cases, Conversational AI is also portable across other use cases and business domains where CSPs might also expect the benefits to scale. This begs for the formation of enterprise-wide strategies that further apply existing investments, integrations, and experience.

Three important concepts should guide CSPs in their assessments and decisions for where, when, and how to deploy Conversational AI.

First, as an overarching approach, CSPs should consider embracing a concept we call “Shift left,” a vision to move capabilities from being locked in enterprise systems to putting them in the hands of customers (see Figure 2).

Second, CSPs should consider forming an enterprise-wide strategy that prioritizes both horizontal and vertical implementations. Vertical deployments add capability within a domain. For example, support for additional products, customer intents, technology, and channels. Horizontal deployments add entirely new domains, replicating VAT’s benefits across lines of business including field service, network operations, HR, finance, IT, operations, supply chain, marketing, and sales.

Third, for each implementation, CSPs should consider forming roadmaps that balance depth and breadth. Depth is the completeness by which VAT supports any of hundreds of specific interactions such as outage reporting, password reset, or bill inquiry. These can be described as the “short tail” of specific queries that tend to make up high volumes of interactions. Breadth is the scope of perhaps thousands of “long-tail” queries that may together compose less overall volume, but which are important to meeting customer expectations when they are seeking specific knowledge or resolution of a less frequently encountered issue.

Figure 2

Shift left

Putting more capabilities into the hands of customers



A CSP may be meeting its customer's basic needs, but could it also wow them?

Shifting left

The stakeholders in a customer care transaction extend well beyond the contact center, highlighting the possibility for VAT to deliver significant customer and organizational benefits.

CSPs seeking to evaluate VAT's benefits should adopt a mindset that, over time, capabilities will be removed from compartmentalized enterprise systems and shifted left into the hands of customers. Giving customers this ability can prove more efficient, and so shift left becomes an obvious strategy to employ.

But how should a CSP decide which use cases to shift left, and in what order? Guided by the volume of each interaction being evaluated, investigate three dimensions to qualify use case potential:

1. *Costs*: Can automating the interaction meaningfully lower cost per interaction?
2. *Revenue*: Can revenue associated with the interaction be increased by improving the consistency, insight, quality, or other aspect of the interaction?
3. *Customer satisfaction*: Will automating the interaction contribute meaningfully to a positive customer experience?

These filters will help shape whether—and, if so, to what degree—to implement VAT for external customers, agent assist, or for internal customers, such as employees and suppliers. From here, deeper analysis can be performed to estimate and compare outcomes and ROI.

Implementing VAT for the first time

Across all industries, higher performance and greater benefits have accrued to VAT Leaders—organizations that meet three conditions: they adopted VAT early, they have a large proportion of inbound contacts within the scope of their VAT, and they have a high degree of integration between their VAT and back-end systems.

Due to the high volumes and costs involved, CSPs typically begin their VAT journey with customer care, with initiatives primarily driven by the needs to improve customer experience and reduce the cost to serve.

Globally, the use of VAT by CSPs for customer care is particularly mature and successful. Of the twelve industries surveyed, CSP respondents reported the greatest positive impact on customer satisfaction across all implementations—especially those with external customers, with 97% of CSPs reporting a positive impact on customer satisfaction.

To begin applying VAT to customer care, CSPs should first analyze data, looking carefully at contact reasons, volumes, and costs. From there, categorize interactions into customer intents that can be discretely learned, understood, and automated. This analysis is best done using AI technology where possible, as there are likely to be significant volumes of interactions which may take many months to evaluate manually. Often, CSPs will find that a small number of intents—say in the dozens—are responsible for a high volume of contacts, perhaps as much as 80%, based on our experience.

Vodafone TOBi: A multi-channel global chatbot platform⁷

As part of its customer experience and digital transformation strategy, Vodafone became one of the world's first telecommunications companies to adopt virtual chatbot technology in customer care using the IBM Watson platform.

TOBi, Vodafone's AI-based digital assistant, was first launched in the UK in 2017 where each month it now handles hundreds of thousands of complex customer journeys that require full integration with back-end systems of record, in addition to thousands of simple FAQ queries.

Vodafone moved forward to create a global, integrated, and interoperable chatbot platform that supports the needs of their individual country markets with the flexibility to tailor the chatbot to specific local market customer needs, products, and language—while at the same time creating a consistent global brand and personality for TOBi.

In order to better meet the local country preferences and needs of its customers, Vodafone has deployed TOBi across a breadth of channels in its markets, including SMS, the My Vodafone app, the local Vodafone homepage, and a number of social media channels.

Building on the success of TOBi for customer care, Vodafone has extended its use of IBM's Virtual Agent Technology into other lines of business—with chatbots launched in finance to improve the experience of Vodafone's suppliers, and in retail to improve the customer experience.

It might seem logical that expanding the ability to field the most common questions would yield optimal results. While to an extent this may be true, it's not always that simple.

Sequencing and prioritizing which customer interactions to target relies on striking a balance between maximizing depth—comprehensively addressing incidents and service requests—and accommodating breadth—targeting a broad range of interactions to become relevant across the greatest volume of customer needs.

Imagine a search engine that addressed only the most commonly searched queries. It would certainly be valuable. But compare that with one that knows you so well it auto-fills your detailed and highly specific question. The latter builds affinity and loyalty. A CSP may be meeting its customer's basic needs, but could it also wow them?

If depth is selected as a starting point, a CSP must be careful not to alienate the many consumers whose questions will not be able to be answered. To align VAT with customers, the technology must deeply understand varying customer personas and their preferred channels.

Ideally, an effective program will evolve from reactively offering information and general help, to proactively building a trusted relationship where the user is authenticated and asked qualifying questions to provide higher orders of service. This will involve a conversational experience that meets users on their preferred channel and understands context, as well as various paths toward resolution (see "Vodafone TOBi: A multi-channel global chatbot platform"). The best VAT systems continue to evolve to anticipate customer needs, make decisions, and present information—and even personalized recommendations—proactively.

Like other worthwhile endeavors, applying VAT successfully takes time and improves with experience. By regularly analyzing results, logs, and retraining bots, CSPs can expect performance to improve over time. An agile continual improvement program based on analytics will allow the CSP to learn what works for its business and what its customers will actually use.

Each addition to the VAT should be designed to improve its maturity. CSPs should aim to continually delight their customers, which, in turn, can drive brand and service affinity.

Vertical expansion adds capability, can reduce cost per interaction—even improve Average Revenue per User (ARPU).

Scaling benefits vertically

Once a CSP has enjoyed initial benefits from VAT, it's natural to seek to continue expanding the depth and breadth, and with them, the ROI.

Vertical expansion adds capability in the current domain. It might add support for additional products, technology, or channels, while simultaneously improving the completeness of each interaction with a broad corpus of contextually presented information. Each of these steps continues to reduce the cost per interaction and, in cases that directly influence sales-related interactions, there's the potential to improve Average Revenue per User (ARPU).

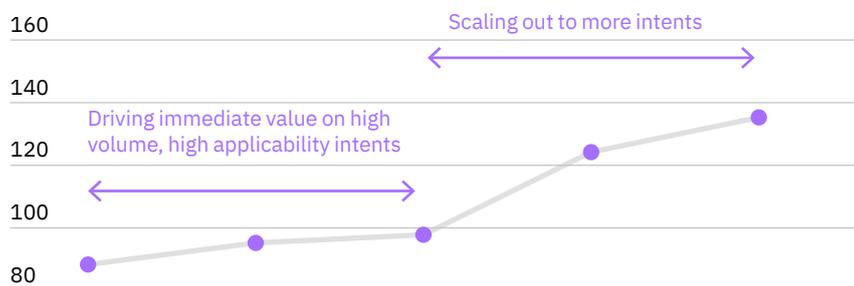
The choice to support breadth can be especially challenging for a CSP that has many hundreds of similar products across differing lines of business. To keep customers invested, the CSP may need to be able to use existing knowledge sources to answer long-tail questions.

Our survey provides benchmarks for a range of intents that CSPs typically support. On the high end, 8% of CSP respondents reported already training their VAT on 200 or more intents. Because of the potentially broad scope, many VAT implementations begin with industry content pre-built by vendors, including responses to thousands of common utterances in multiple languages, reducing time-to-value by allowing rapid expansion.

It is normal for CSPs to linearly expand the intents they support. For CSP respondents using VAT for one year or less, the average number of intents in scope is already 87, and this rises to an average of 138 for respondents using VAT for more than 2.5 years (see Figure 3). CSP survey respondents using VAT for customer care have trained their VAT on an average of 114 intents.

Figure 3
Expanding VAT's benefits
Scaling vertically over time

Mean average # intents in VAT scope versus duration VAT in use (CSPs only)



	1yr or less	>1yr-1.5yrs	>1.5yrs-2yrs	>2yrs-2.5yrs	>2.5yrs
Mean average VAT duration in use	10mths	1.5yrs	1yr 10mths	2.5yrs	3yrs 2mths
Mean average # intents in VAT scope	87	97	99	123	138
Number of respondents	n18	n34	n42	n41	n43

Are you agile enough to adapt to your customers' ever-changing needs?

Our survey revealed that, at least to a degree, more intents equaled improved results. CSPs that train their VAT on more intents not only report higher intent recognition accuracy and containment rates, but also higher customer satisfaction, and more of them have achieved or exceeded their ROI (see Figure 4). These are strong arguments to accelerate VAT's scope to embrace both depth and breadth.

The ROI anticipated with each new intent should be weighed against the costs to achieve results, including integrations with related systems, other value-adding services, and troubleshooting processes.

Despite the best efforts to group and prioritize intents, things change. For example, a CSP reported that a problem with a particular piece of in-home equipment led to a sudden need to address returns. Analytics of customer interactions identified the change, leading to this intent being prioritized to the top of the list.

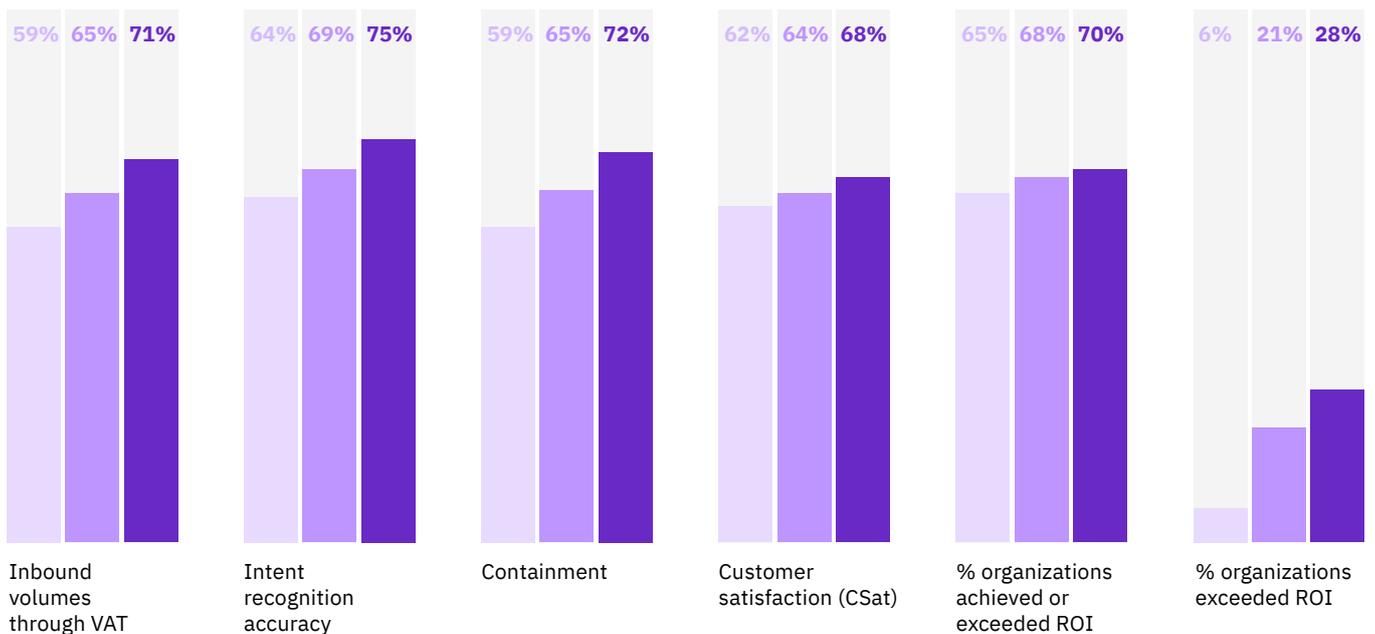
Agility, then, becomes a critical capability for a CSP—is it agile enough to adapt to customers' ever-changing needs?

Becoming agile often requires cultural and operational changes that support continuous assessment and improvement. To the degree that a CSP wishes to scale benefits, it should also put data, systems, process, and governance in place to remain connected with what customers care about.

Figure 4

Increasing returns

Benefits scale as VAT scope grows



Telco VAT implementations trained on:

- up to 80 intents (n68)
- >80-120 intents (n56)
- >120 intents (n54)

Assessment of new capabilities need not be limited to interactions on digital channels. For example, CSPs may integrate AI-powered VAT with complementary technologies—including speech-to-text and text-to-speech—through Interactive Voice Response (IVR) to provide direct customer interactions, or to actively listen to voice calls and provide real-time advice to call center agents as they interact with the customer (see sidebar, “TIM Brazil deploys VAT for customer care”).

Scaling benefits horizontally

VAT should be considered both for its ability to contain contacts and lower costs, and more holistically for its ability to improve integrated business processes and business outcomes. CSPs that understand this best experience success beyond customer care. They also know how to make the work of integrating and learning what works really pay off: expanding the use of VAT across lines of business (see sidebar, “Multinational CSP: Horizontal VAT expansion follows success in customer care”).

CSPs that are most effective at doing this make it part of an enterprise-level strategy that includes top-down executive sponsorship, cultural and operational changes, formation of horizontal and vertical roadmaps, and programs for continuous evaluation and improvement. Many CSPs establish a Center of Excellence (CoE) for these purposes, which may also lead to consolidated skill requirements and better planning by helping to establish well-defined metrics to measure the performance, value, and ROI of VAT.

TIM Brazil deploys VAT for customer care⁸

TIM Brazil is a leading Brazilian “quad play” operator and subsidiary of Telecom Italia. With over 61 million customers, it needed an innovative way to boost call center productivity relating to millions of monthly voice calls that start with traditional IVR.

Within four months of swapping customer care human agents with a system that allows customers to interact with natural language, TIM’s containment rate increased to 75% and first-call resolution increased by 84%.

Today, after expanding vertically to more intents, the AI-powered call center handles 3.5 million calls monthly. Subscribers can update or deactivate value-added services, obtain assistance in determining what type of technical difficulties are occurring on the phone line, check the account balance, get details about the use of voice and data, understand the terms and conditions of prepaid and postpaid mobile plans, obtain the barcode number for bill payment, and more.

Not only has VAT been able to reduce costs substantially, but surveys conducted post call for those calls fielded by VAT yielded customer satisfaction levels similar to human agents.

Vertical expansion and training of AI has allowed the company to review a customer’s history, predict the likely reason for the call, and proactively recommend a resolution.

HR, IT, marketing, finance, procurement, and supply chain functions offer significant room for expansion of VAT.

Multinational CSP: Horizontal VAT expansion follows success in customer care⁹

Driven by the need to reduce costs, a leading multinational CSP deployed VAT four years ago, starting with billing and account management. The company has since increased Customer Satisfaction while resolving 33% of all customer care-related in-bound contacts and is on course to reach 50% next year. Where VAT has been trained, it contains about 90% of contacts.

Seeking to replicate its successes in customer care, the company first expanded from its Consumer to its Small and Medium Sized Business unit, replicating similar interactions. From there, word spread to executives across business units.

The company now deploys VAT across HR for answering employee benefits and policy questions; Repair, for self-service troubleshooting; and Field Services, for onsite troubleshooting by technicians. The CSP has also integrated long-tail semantic search into both its website and VAT bots.

Specific examples of how VAT is being utilized across lines of business include:

Network Operations: Assists operators with troubleshooting and to resolve complex incidents, in part by training VAT with agent chat transcripts, documentation, and Methods and Procedures (MOPs.)

Network Operations Center/Field Services: Improves technician efficiency by automating interactions related to authenticating and granting access to facilities. It automates the check in/check out process, test, and diagnostics during maintenance activities, and addresses inquiries about incidents and their expected time of resolution. In many cases, VAT is being integrated with analytics and machine-learning models to provide insights to recommend resolutions and support adherence to best practices, based on insight from historical data.

HR, IT, marketing, finance, procurement, and supply chain functions offer significant room for expansion of VAT within the enterprise to improve operational efficiency, consistency, and employee and customer satisfaction.

In particular, VAT for HR can help CSPs to address many inquiries on payroll, support for medical enrollment, and company policies, among others. During the COVID-19 pandemic, VAT provided much needed relief for many CSPs. It helped handle the surge in inquiries about new policies, such as support for working from home. These inquiries, in turn, introduced totally new intents and generated significantly higher volumes. VAT for HR is now a strategic differentiation for employee satisfaction. Most employees now expect an external customer-grade experience when they seek internal enterprise services, such as 24x7 access to HR.

Integration is essential to the success of VAT programs. Depending on the use case, many integrations may be needed between VAT and both back-end and front-end systems, and with APIs providing specialist capabilities like Speech-to-Text (STT) and Text-to-Speech (TTS), when required. A VAT that is able to personalize customer interactions and take actions on their behalf is more likely to achieve higher customer satisfaction and help build a trusted relationship.

Since these integrations are so important, CSPs may choose to evaluate vendors based on their ability to help achieve these integrations. CSPs should also evaluate vendors based on technology assets, experience, and their ability to help navigate change.

To reduce risk, some CSPs may also consider vendors that are willing to guarantee results by pricing VAT based on outcomes, while others may find it beneficial to adopt a Contact Center-as-a-Service (CCaaS) model to tie payments directly to successful execution of complete VAT programs.

28% of CSPs using VAT for external customers have already achieved substantial or full integration between VAT and back-end systems—a significantly higher proportion than other industries. Once these integrations are in place, it makes sense to put them to use for other value-adding use cases.

Action guide

Scaling Conversational AI

Expand VAT's reach and benefits.

Move capabilities from enterprise systems into the hands of customers where they can add value and increase efficiency. Form an enterprise-wide strategy that prioritizes both horizontal and vertical VAT implementations. Assess the utility of depth against the experience of breadth in order to delight customers and build loyalty.

Embrace the necessary organizational and operational change.

Put data, systems, and programs in place to evaluate and then continuously improve VAT implementations. Optimize economic results by actively using and expanding existing integrations and experience. Consider forming a VAT Center of Excellence to help with planning and execution throughout the enterprise.

Seek experienced vendors with mature technology assets.

Evaluate vendors based on experience delivering successful end-to-end VAT programs. Consider the value of pre-trained industry content, pre-integrations, outcome-based pricing, and Contact Center as a Service (CCaaS) for their potential to reduce risk and time-to-value.

Notes and sources

- 1 We use the term CSP as a proxy for “Telecommunications operator”
- 2 “The value of virtual agent technology: Improve customer service and boost financial results with AI-enabled systems.” <https://www.ibm.com/thought-leadership/institute-business-value/report/virtual-agent-technology>
- 3 “The Total Economic Impact™ Of IBM Watson Assistant—A Forrester Total Economic Impact Study Commissioned by IBM.” Forrester Consulting. March 2020. Note: This study estimates benefits for a composite organization based on four companies Forrester Consulting interviewed. The composite organization has attributes including \$10 billion revenue, 40,000 employees, 1 million customer conversations monthly, and implementation of three types of VAT over three years. https://www.ibm.com/watson/assets/duo/pdf/watson_assistant/The_Total_Economic_Impact_of_IBM_Watson_Assistant-March_2020_v3.pdf
- 4 This study surveyed 1,005 organizations using VAT across 12 industries, 33 countries and 3 types of VAT implementation: VAT directly interacting with external customers; VAT directly interacting with internal customers e.g., employees, contractors, suppliers; and VAT supporting service desk agents, commonly known as “agent assist technology.” 178 telco respondents (“CSPs”) participated in the study globally.
- 5 “The value of virtual agent technology: Improve customer service and boost financial results with AI-enabled systems.” <https://www.ibm.com/thought-leadership/institute-business-value/report/virtual-agent-technology>
- 6 The average of all non-CSP respondents is significantly lower at 48% (40% achieved and 8% exceeded).
- 7 Based on IBM client experience.
- 8 Ibid.
- 9 Ibid.

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