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The value of virtual agent technology

Improve customer service and boost financial results with AI-enabled systems

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By Joe Petrone,
Gillian Orrell, and
Carolyn Heller Baird

Key takeways

Significant financial benefits

99% of study respondents report reduction in cost per contact as a result of using virtual agent technology (VAT). A recent Forrester Consulting study estimated that a large organization that implements VAT can achieve $5.50 cost savings per contained conversation.[1] Our analysis reveals an average containment rate of 64% with a 38 percentage-point swing from highest to lowest. 94% of VAT Leaders have already achieved or exceeded their business case.

Satisfaction scores increase

Some organizations fear VAT could cause significant decreases in customer and employee satisfaction. However, we found average improvements of 8 and 7 percentage points in customer and agent satisfaction, respectively. Average human agent handle time dropped by 12%. VAT Leaders achieve even more: average improvements of 12 and 9 percentage points in customer and agent satisfaction and a 15% reduction in handle time. Leaders implemented early, integrated VAT with backend systems, and trained it on high volumes of contacts.

Rising to the challenge

When COVID-19 struck, organizations with mature VAT capabilities rapidly expanded operations to support business continuity. The majority of these organizations saw an increase in customer satisfaction.

Far beyond experimentation

Virtual agent technology (VAT) is having its moment. If you've recently called a company's customer care number or conducted an online chat about a service, product, or payment, there is a good chance you were interacting with virtual agent technology. VAT's popularity is surging because of the technology's seeming ability to do everything: better serve customers, enhance employee experience, reduce costs, and increase revenue.

The COVID-19 pandemic has rocketed VAT adoption into hyperdrive. For emergency situations, when speed and simplicity are mission critical, out-of-the-box implementations can go live in a matter of hours. However, companies that thoughtfully design, develop, and deploy VAT have the potential to unlock even more value for their organizations and their users, be they customers, employees, or human agents.

Until now, actual data about VAT performance has been limited to individual case studies, making it difficult for organizations to derive meaningful comparisons. As we embarked on this research, we knew organizations needed answers to four key questions:

– How efficient is AI-enabled VAT?

– What are the key attributes and practices that drive value from VAT?

– What is the impact of AI-enabled VAT on customers, end users, and human agents?

– What impact does VAT have on organizations' financial performance?

99%

of respondents report an increase in customer satisfaction as a result of using virtual agent technology.

20%

is the average contribution to human agent satisfaction attributed to virtual agent technology.

96%

exceeded, achieved, or expect to achieve their anticipated return on investment for their virtual agent technology implementation.

Our analysis revealed that VAT is having a positive impact on nearly every measure, including customer satisfaction, employee satisfaction, and revenue, and a remarkably high proportion of respondents (96%) have exceeded, achieved, or expect to achieve their anticipated ROI.

Armed with detailed metrics and benchmarks, decision makers can now assess their current and proposed VAT initiatives with far greater specificity and relevancy. They can use this information to determine the right enhancements for their customer care or service desk solutions, no matter where they may be on their digital journey.

Our study approach

The IBM Institute for Business Value (IBV), in cooperation with Oxford Economics, surveyed 1,005 respondents, across 12 industries and 33 countries, to gather performance data from organizations employing VAT daily, in live situations, for periods from six months to just over four years.[2]

We gathered data for three types of VAT implementation:

1. VAT directly interacting with external customers
2. VAT directly interacting with internal customers such as employees, contractors, and suppliers
– VAT supporting service desk agents, commonly known as "agent assist technology."

(See the *Study methodology* section on page 15 for more information.)

Measuring VAT performance

VAT performance is measured by a combination of new metrics, unique to the way the technology works (see Figure 1), and traditional contact center metrics impacted by the technology.

1. Intent recognition

Intent is the customer's purpose when making contact and during the contact, for example, questioning a charge or asking about a product. Intent is distinct from contact because customers may have more than one intent per contact. VAT is trained to recognize and respond to each intent separately, making it vastly more sophisticated than a traditional keyword search.

Customers might say, "How do I settle my account?" when their intent—from VAT's perspective—is "Pay my bill." Training VAT to recognize true customer intent behind the many ways customers express their intent is critical for successful implementation and maintenance. The skill required to program VAT to ask good clarification questions should not be underestimated (see "Insight: Conversational user experience (UX) design" on page 4).

Average intent recognition for all survey respondents across all three types of VAT implementations is 68%. For situations in which VAT directly interacts with external customers, the average is 70%. And for intelligent agent assist implementations, the average intent recognition is 65%. This could be a reflection of organizations making larger investments in VAT systems aimed at external customers.

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Figure 1

The new contact center performance measures
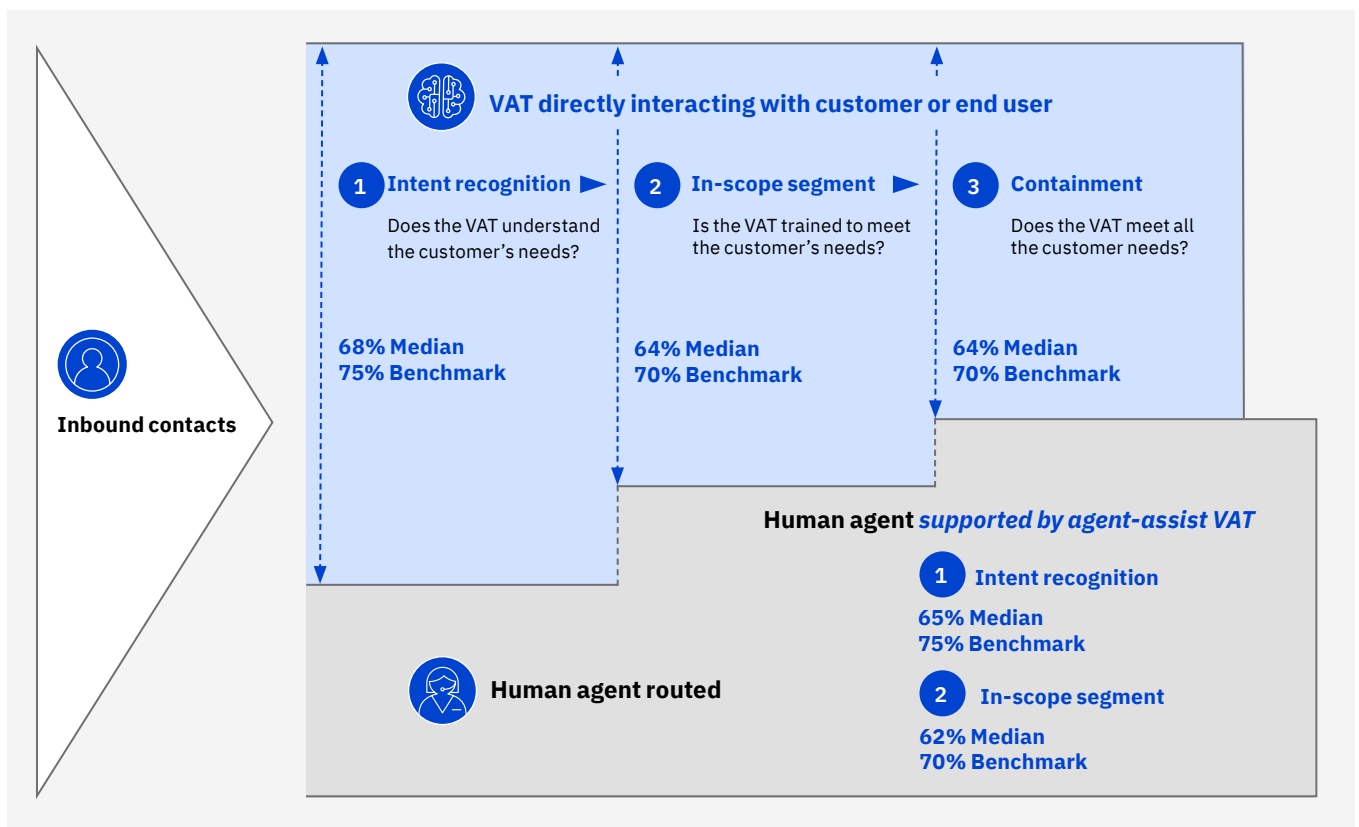
2. In-scope segment

Once virtual agent technology recognizes customer intent, it should also know if it has been trained to support that intent. Across all survey respondents, the average proportion of inbound contacts with intents that fall within the scope of the VAT is 63%. The difference between the lowest and highest in-scope segment is 36 percentage points.

3. Containment

Not all companies measure containment the same way. Some define containment as the percentage of *all* contacts fully handled by the VAT. This can result in low containment percentages when the VAT does not yet—or will never— handle certain types of contact.

In this study, containment is the portion of total contacts the VAT *has been trained to handle* that it resolves without any escalation to—or involvement from—a human agent.

Measuring containment at contact level is pragmatic, though it can under-report the achievement of VAT when some—but not all—of a customer's intents are resolved by VAT. The use of sophisticated and automated analytics to measure containment fairly is important for future development.

Average containment across relevant respondents is 64% The difference between the lowest and highest reported containment is 38 percentage points. This is a wide range, and the financial implications can be significant. Every contact contained by VAT means no human agent time. Based on IBV analysis of human handle time across all contacts, an average of four minutes of human agent handle time is saved when a contact is contained by VAT.

Performance for containment is strongly linked with machine learning and systems integration factors (see "North American grocery chain: Outsourcing to AI" on page 6). For example, 66% of respondents in the top quartile for containment report that their VAT can execute complex actions on behalf of customers, compared with only 23% in the bottom quartile.

Insight: What we mean by virtual agent technology

Virtual agent technology refers to the deployment of automation that uses a combination of artificial intelligence (AI) technologies or capabilities like machine learning, natural language processing, natural language generation, sentiment analysis, language translation, speech-to-text, robotic process automation (RPA), and optical character recognition (OCR) to automate dialogue, and in some cases backend process steps, to serve end users.

– This may or may not take the form of a chatbot. Some chatbots qualify as VAT because they incorporate machine learning as well as natural language processing.

– Integrated voice response (IVR) systems only qualify as VAT when they use AI to power a conversational experience and the user is not limited to uttering a set of specific key words.

Insight: Conversational user experience (UX) design

Conversational user experience (UX) is a nascent area within design that focuses on creating systems that can engage in natural conversation. User interaction works through the words alone, whether voice or text. This requires formal knowledge, adapted from social science, of how human conversation works.

While some chatbots and voice assistants are limited to answering questions or following commands, virtual agent technology using natural conversation can engage in a wider range of activities, from hellos to goodbyes. The goal is mutual understanding, and it includes many natural mechanics for displaying and repairing misunderstandings. On top of this foundation, designers can create experiences that reflect the organization's brand qualities.[3]

Influencing VAT performance

Many factors have the potential to influence VAT performance, from levels of strategic intent and investment to the skills of the people maintaining it and the choice of specific technologies implemented, such as the standard of parsers used for natural language processing. A large pharmacy store chain in the US implemented sentiment analysis for contacts that are escalated by the VAT to human agents so agents can quickly prioritize customers at risk of becoming dissatisfied. This enables agents to directly influence their most important metric: customer satisfaction.

Some factors influence individual metrics and others have the potential to influence broader performance across multiple metrics (see Figure 2). Machine learning and systems integration factors have the greatest impact on levels of relative performance and are interrelated.

Machine learning factors: The longer the VAT is in use, the more content it has been trained to handle, and the more it does, the better it should perform.

Systems integration factors: The greater the level of integration between the VAT and other systems and the more complex actions the VAT is enabled to take, the better the results.

Organizational factors: Specific circumstances such as the emphasis placed on tracking results and industry-related aspects such as complexity of customer contacts and digital uptake can influence performance.

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Figure 2
Factors influencing VAT performance

Machine learning factors	Systems integration factors	Organizational factors
Duration in use	Degree of integration between VAT and other systems	Type(s) of VAT implemented
Number of separate intents in scope	Complexity of action the VAT is enabled to take	Level of investment in VAT
% of contacts being handled		Performance focus
Volume of contacts being handled		Industry

North American grocery chain: Outsourcing to AI

Competition among grocery chains is fierce, and with thin margins, customer loyalty is critical. A large North American grocery chain recognized that a smart customer contact center could enable a stronger, expanded loyalty program. Hiring, training, and retaining call center agents is challenging. The chain needed a cost-effective, predictable, scalable way to handle increasing call volumes and complexity with minimal capital investment.

The company turned to IBM to design, build, and operate an enterprise cognitive call center solution that leverages VAT with voice integration. The solution features call flows designed to optimize customer experience, while lowering operational costs and scaling for the future.

Integrated with backend systems, the VAT system is enabled to authenticate callers and take action. Each call is logged in the company's customer relationship management system, which can track the solution's performance like it would for a human agent. The chain only pays for calls successfully handled and saves 40% on each contained call. It's like outsourcing the call center to VAT.

Leader attributes

Our analysis identified a small group (105 organizations) of VAT pioneers we call the "Leaders." Each Leader demonstrates three critical attributes that are the result of deliberate business decisions:

– Early adopter of VAT

– Large proportion of inbound contacts are within the scope of their VAT

– High degree of integration exists between their VAT and backend systems.

Comprising 10% of our sample, Leaders span all industries and regions surveyed, as well as all three types of VAT implementation, in almost equal proportions. Leaders also report outperforming their competition on revenue and profitability for the last three years. Leaders outperform other respondents on core metrics used to measure the efficiency of VAT (see Figure 3).

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Figure 3
The efficiency of Leaders' VAT far exceeds what others report

| Intent recognition | Containment* | First contact resolution |
| 80% / 66% | 75% / 62% | 74% / 63% |
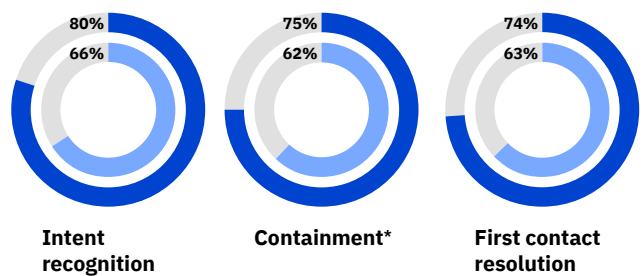
Leaders　**Others**

*Containment definition for this study: The portion of total contacts that the virtual agent technology has been trained to handle that it resolves without any escalation to or involvement from a human agent.

"Your first release will be your worst."

Virtual agent technology developer, financial services industry, UK

Continuous improvement

Continuous improvement is a critical component of VAT performance. Reviewing and retraining VAT is conducted by skilled humans and through automation. While all respondents report using automation, more of the respondents outside the Leader group use manual methods (41%) than Leaders (33%).

But it's the way Leaders select virtual agent conversations for review that truly differentiates them. Leaders use a wider range of techniques and more sophisticated methods (see Figure 4).
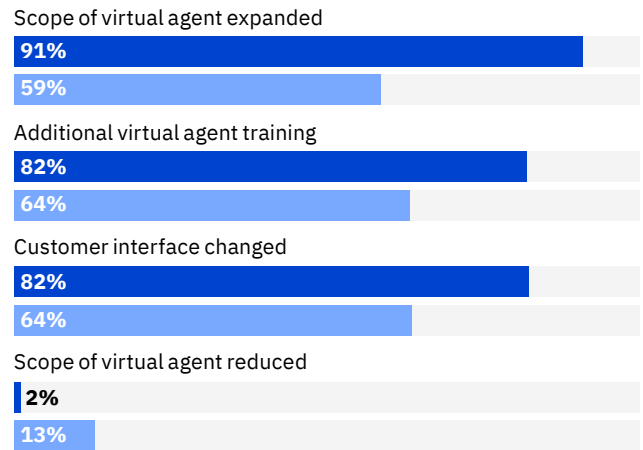
Leaders don't just passively measure; they act. Nearly all Leaders have expanded the scope of their VAT in response to their reviews, compared with 59% of others. Whether enhancements entail additional VAT training or upgrades to the VAT interface, Leaders are taking action to continually improve performance (see Figure 5).

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Figure 4

How virtual agent conversations are selected for review

Customer intent
- 86%
- 68%

Sentiment or tone analysis results
- 74%
- 55%

Contacts where SLAs missed
- 74%
- 51%

Neurolinguistic program confidence level
- 64%
- 14%

Specific call categories, e.g., abandoned calls or by agent
- 58%
- 51%

High volume, low containment
- 58%
- 45%

Algorithm
- 55%
- 36%

Random
- 30%
- 49%

Leaders   Others

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Figure 5

Results of virtual agent quality reviews in the last 30 days

Scope of virtual agent expanded
- 91%
- 59%

Additional virtual agent training
- 82%
- 64%

Customer interface changed
- 82%
- 64%

Scope of virtual agent reduced
- 2%
- 13%

Leaders   Others

Hong Kong bank: Continual VAT enhancement pays off

In the quest to improve customer utility and ease of engagement, a leading bank in Hong Kong launched a first-of-its-kind AI virtual assistant to address retail customers' inquires for select services. Over three years, the VAT was extended to support 13 services, including account services, payment platform, bill payment services, and credit card, with contextual conversation in Chinese (Cantonese and Simplified Chinese), English, and even a mix of languages.

Today, the company's VAT can talk with a customer to handle personal banking requests, such as a money transfer, and is integrated with the bank's e-banking services. The VAT system has won more than 15 awards, and customer use of the channel has grown by a factor of 6.

This success led the bank to implement VAT for its business banking digital engagement platform. Here, too, results are impressive: User surveys report 75% satisfaction, and use of the VAT channel has grown by a factor of 10.
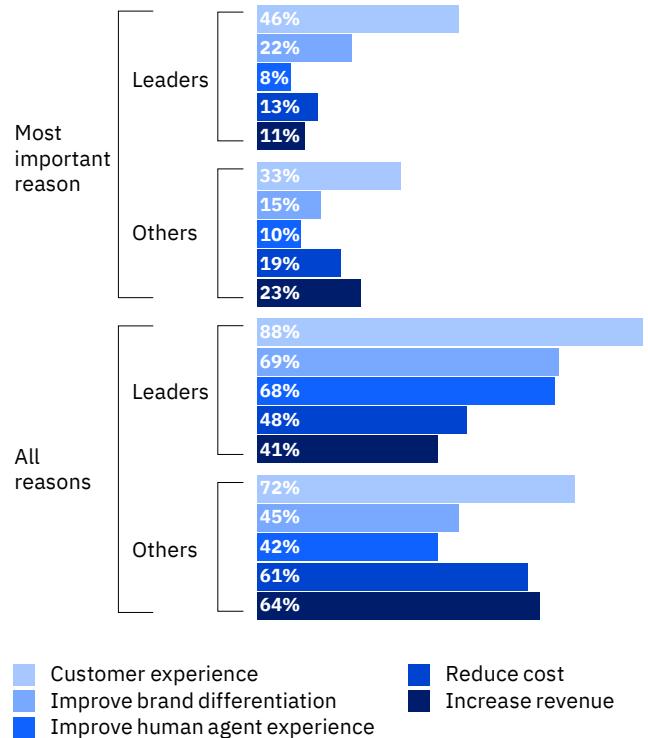
VAT impact

Virtual agent technology directly impacts customers, human agents, and organization financial results.

Impact on customers

There are a variety of reasons why organizations adopt VAT, but improving customer experience is, by far, the most cited one (see "Hong Kong bank: Continual VAT enhancement pays off"). For 46% of Leaders and 33% of other respondents, it is the single most important driver (see Figure 6).
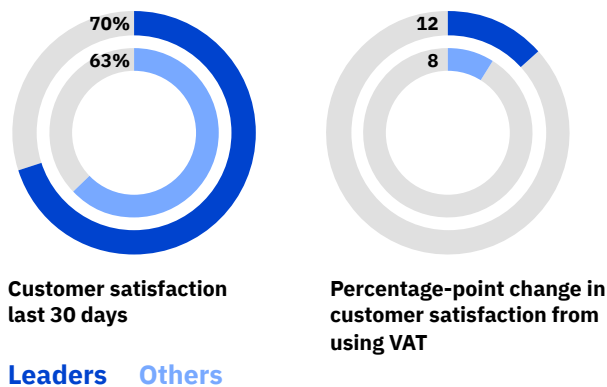
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Figure 6

Reasons for implementing VAT

Most important reason

Leaders
- 46%
- 22%
- 8%
- 13%
- 11%

Others
- 33%
- 15%
- 10%
- 19%
- 23%

All reasons

Leaders
- 88%
- 69%
- 68%
- 48%
- 41%

Others
- 72%
- 45%
- 42%
- 61%
- 64%

Legend:
- Customer experience
- Improve brand differentiation
- Improve human agent experience
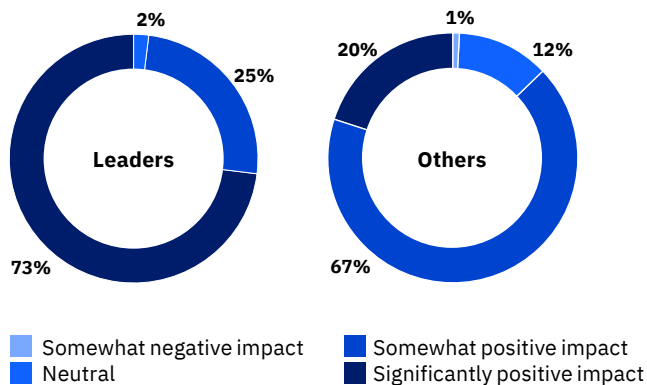- Reduce cost
- Increase revenue

99% of all respondents report positive absolute change-to-date in customer satisfaction for all inbound contacts as a result of using VAT. In other words, regardless of whether improving customer experience was the driver for their implementation, practically all report an increase in customer satisfaction scores as a result of using VAT. The vast majority of Leaders credit VAT for having a "significantly positive" impact on their customer satisfaction scores (see Figure 7).

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Figure 7

How the use of VAT has impacted customer satisfaction scores

Customer satisfaction last 30 days

Percentage-point change in customer satisfaction from using VAT

Leaders   **Others**

Impact of VAT on customer satisfaction

Leaders: 2%, 25%, 73%

Others: 1%, 12%, 20%, 67%

- ■ Somewhat negative impact
- ■ Neutral
- ■ Somewhat positive impact
- ■ Significantly positive impact

Vodafone: VAT success

As part of its customer experience strategy and digital transformation, Vodafone Group became one of the world's first telecommunications companies to adopt agent technology for customer service. Today, TOBi, Vodafone's AI-based digital assistant, is available throughout the UK, Europe, Africa, and the Middle East.

TOBi provides a central, modular platform to which channels can connect, enabling individual markets to prioritize the channels that suit the preferences and needs of their customers. Channels deployed include SMS, the My Vodafone app, local Vodafone homepages, Facebook, WhatsApp, and Amazon Alexa.

As a result, the number of Vodafone customers messaging versus calling the call center has almost doubled. In Italy, two-thirds of customer contacts are now contained through TOBi.

Impact on human agents

Agents who feel valued and empowered with the proper tools and support are more likely to deliver a better experience to customers. And the cost of replacing a dissatisfied agent who leaves the organization can be as much as 33% of the exiting employee's salary.[4]

Leaders, especially, are keen to improve the human agent experience; 68% cite it among their reasons for adopting VAT, and our data suggests it is having a positive impact. By calculating all respondents' reported change-to-date as a percentage of their current human agent satisfaction, we determined VAT's average contribution to current human agent satisfaction to be an impressive 20%.

VAT also impacts human agent handle time. Average change-to-date as a result of using VAT is a 12% reduction, with Leaders reporting an average reduction of 15%.

The only area where study results point toward a minor adverse impact is human agent attrition. Absolute change-to-date was an average 1% increase in annual agent voluntary turnover. In the context of typical levels of contact center turnover, this is not large, but the direction is interesting. This finding could suggest that VAT is a factor in the decision to leave for some agents, while it contributes to improved satisfaction for those who stay.

Impact on financial performance

When you reduce the time it takes human agents to resolve contacts, you reduce cost to serve. Whether you've empowered agents with VAT to reduce their manual effort or you've provided customers or employees with VAT for self-service or to conduct the initial intercept, these implementations can have a significant financial impact.

For example, the Forrester Consulting study estimated that a large organization could achieve an average cost saving of $5.50 per contained conversation using IBM's Watson Assistant™. A conversational AI platform, Watson Assistant allows users to interact with business systems using natural human language. Forrester Consulting estimates that over three years, with a conservative 25% containment rate, the cost savings would be worth more than $13 million.[5]

Respondents in our study report both top- and bottom-line benefits from using VAT. Every respondent indicates that VAT has contributed to an increase in organization revenue, the average increase being 3%. Total revenue uplift for respondents reporting results for VAT directly interacting with external customers sums to $5 billion.[6]

In addition, 99% of respondents report that VAT has reduced their cost per contact, with 25% citing a reduction of 20% or greater.

Leaders, particularly, have enjoyed VAT's benefits, both the increased satisfaction and decreased costs (see Figure 8).

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Figure 8
Leaders' average reported impact of using VAT
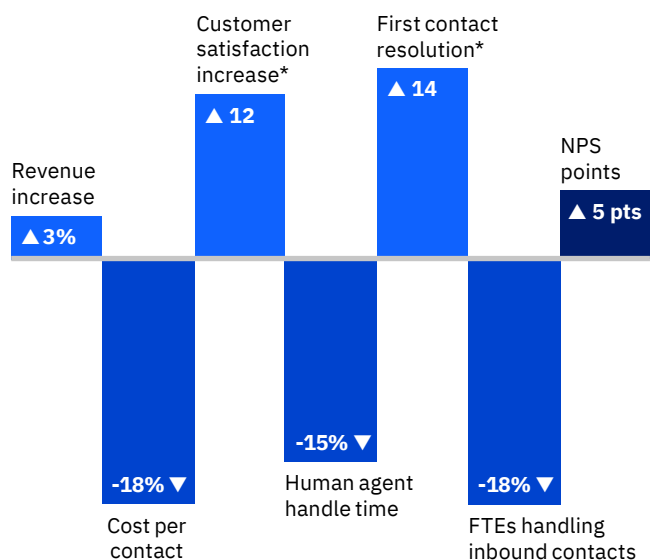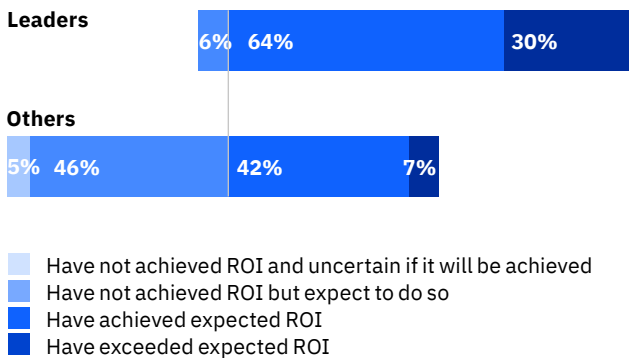

* Percentage-point increase

Return on investment

54% of all respondents report having already achieved or exceeded their expected return on investment (ROI) for their VAT implementation. 94% of Leaders are in this position compared to 49% of others (see Figure 9). It took, on average, two years to achieve expected ROI. For those who exceeded ROI expectations, the average time-in-use was only six months longer at two-and-a-half years.

64% of all respondents use a threshold rate of return for their VAT decision, while close to three quarters of Leaders do. The average threshold rate of return for Leaders is 25%, nearly double the average of other respondents.

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Figure 9
Achievement of ROI for VAT

Leaders

| 6% | 64% | 30% |

Others

| 5% | 46% | 42% | 7% |

- Have not achieved ROI and uncertain if it will be achieved
- Have not achieved ROI but expect to do so
- Have achieved expected ROI
- Have exceeded expected ROI

Optimizing VAT investments

Organizations are transforming their infrastructures, platforms, and cloud strategies alongside their VAT investments. VAT maturity for customer care relies heavily on an organization's ability to link and leverage the ever-increasing volume of customer data across internal and external sources. Cloud is a key enabler to achieve this across channels and ecosystems.

More than 200 survey respondents provide insights into their organizations' use of cloud computing across their service desk systems. All report using cloud for customer relationship management (CRM) and chat messaging systems, as well as their VAT. Considerably more Leaders report having fully integrated cloud strategies for their service desk systems (see Figure 10).

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Figure 10
Strategy to move service desk systems to the cloud

Leaders: 44%, 56%

Others: 19%, 68%, 13%

- Fully integrated cloud strategy for service desk systems, with specific actions plans and KPIs
- Cloud strategy for service desk systems with specific action plans and KPIs
- Cloud strategy for service desk systems, but it lacks specific action plans and KPIs
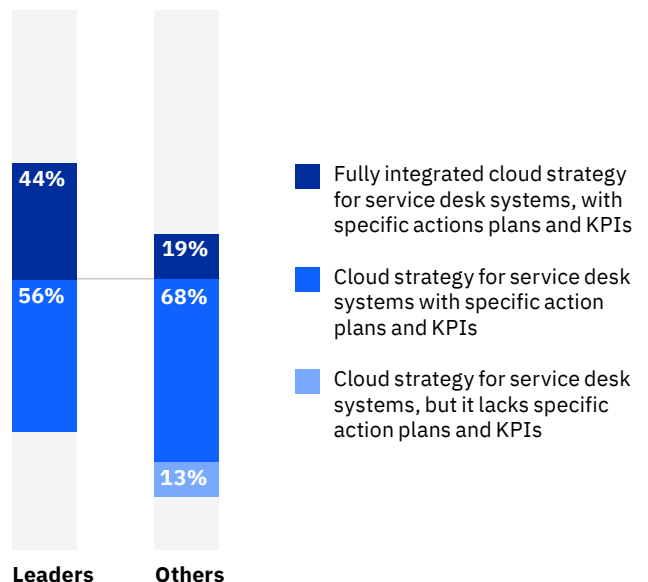
"It was COVID that sparked VAT as an opportunity. It drove us to innovate and take some risks to quickly implement something we'd already planned. The faster you launch something, test it, and iterate on it, the more value you can get out of it."

HR digital transformation leader, telecommunications, Australia

The pandemic effect

Today's business environment precipitated by the COVID-19 crisis is an ideal time to leverage the benefits of VAT. A majority of respondents saw a jump in contact center inbound volumes due to COVID-19. Having invested more in VAT, Leaders were prepared to reap the benefits.

Far more Leaders say they "significantly" increased the number of intents in the scope of their VAT (29% versus just 8% for others). Accordingly, three out of four Leaders increased the number of full-time employees (FTEs) reviewing and training their VAT, while as many as 59% of others did nothing to increase FTEs for these tasks.

Leaders' focus on VAT expansion and enhancement during the pandemic is paying off. Almost half report a "significant" increase for intent recognition, compared to just 23% of others. More Leaders also cite increases in containment and first contact resolution.

Although just over half of other respondents experienced an increase in customer satisfaction for contacts supported by VAT, this is true for 70% of Leaders. More Leaders also saw significant bumps in agent satisfaction.

Tellingly, their pandemic experience has made VAT enthusiasts out of the majority of respondents, with most expecting to increase VAT investments as a result (see Figure 11).

Figure 11

Nearly all Leaders and more than half of other respondents plan to increase their investment in VAT as a result of COVID-19

Leaders: 44%, 47%, 9%
Others: 5%, 49%, 36%, 9%, 1%

Leaders   **Others**

COVID-19 impact on organizations' investment in VAT in next six months

■ Significantly increase investment in VAT

■ Somewhat increase investment in VAT

■ No impact on investment in VAT

■ Somewhat decrease investment in VAT

■ Significantly decrease investment in VAT
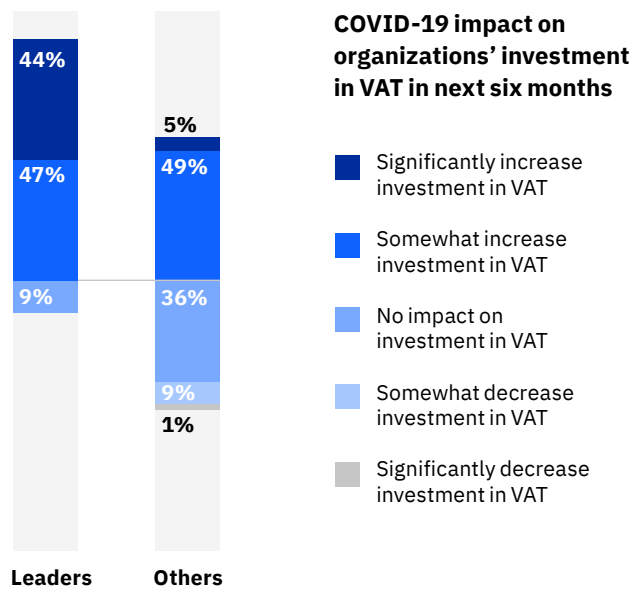
Action guide
The value of virtual agent technology

Establish the business value you want to deliver and how you measure success whether you are mature, mid-journey, or making a first decision about using VAT. The Forrester Consulting study estimated that a large organization can achieve payback within 6 months.[7] Respondents to the IBM Institute for Business Value survey[8] report achieving benefits for individual metrics *up to*:

– 50% cost savings

– 18 percentage-point increase in customer satisfaction

– 20 percentage-point increase in first contact resolution

– 20 percentage-point increase in human agent satisfaction

– 15 point increase in NPS

– 9% increase in revenue attributed to use of VAT.

If you don't have virtual agent technology today:

– For a situation in which you need to "stop the bleeding," you can get started by deploying VAT as an MVP within a few days.

– Move to automate thousands of conversations to scale capacity for business continuity and enhanced customer service.

– Focus on targets that don't have additional downstream implications or dependencies on other technologies you may be implementing.

– Develop a work-from-anywhere capability by leveraging a CCaaS partnership.

If you're on the journey:

– Through agile cocreation, establish an intent resolution plan to expand the scope of your VAT; train it to recognize and handle the vast majority of inbound contacts.

– Ensure your plan is aligned to your customer experience journey and develop 100% consistency in customer interactions across channels and additional lines of business.

– Enhance personalization and your ability to predict and proactively resolve customer queries by modernizing your data and cloud solutions.

– Conduct a value assessment periodically to stay current as technologies are sunset and refined solutions are introduced.

If you want to stay the course:

– Dedicate the time and investment needed to conduct the proper integration with your backend systems, particularly as you develop more complex use cases and integrate your VAT to achieve content intelligence.

– Create a VAT center of excellence to purposefully manage growth, coordinate measurement, and optimize the use of automation for continuous improvement activities.

– Refine the user experience leveraging AI and data to further personalize interactions with your customers to develop high-value interactions that enhance your digital brand.

– Build a longitudinal contact view into your measurement systems to target a substantial reduction in repeat contacts.

Regardless of where you are with regard to VAT, there are additional factors and steps to consider. Incorporating these actions throughout the process will help ensure long-term success.

Establish governance for continual improvement:
– Adopt a broad strategic vision for your VAT experience managed with a governance program to oversee VAT implementations across the enterprise.
– Determine consistent processes for monitoring the platform, channels, and change management.
– Create a consistent set of metrics, KPIs, and reporting methods that support new business objectives, digital brand, and customer and employee expectations.
– Build the services required to support digital change in the plan with the core competencies that support new digital roles.

Expand throughout the enterprise:
– Consider the value of scaling your virtual agent technology across the enterprise in all lines of business for your customers and employees.
– Enable your virtual employees like you enable your human employees. Dedicate the time and investment needed to integrate with 100% of your backend systems that are required to support end-to-end engagements with customers and employees in every channel.
– Expand the scope of your VAT by training it to recognize the vast majority of your contacts where customers require support.
– Optimize the use of automation for continuous improvement activities.

Study methodology

We conducted three types of analysis to investigate the significance of machine learning, systems integration, and organizational factors on VAT performance:

– We created peer group sets by factor and examined results for these sets, looking for consistent trends. We analyzed the average result for each metric for each set, looking for both a statistically significant differential across the entire range and a logical progression of results across the range.

– Using the factors identified as most significant based on the peer group analysis, we conducted regression analysis for twelve key metrics, including intent recognition, containment, customer and human agent satisfaction, and cost per contact.

– We grouped respondents into quartiles based on their results for three specific metrics, including containment, and reviewed them based on the machine learning, systems integration, and organizational factors.

Unless otherwise stated, values shown are median average values.

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Gillian Orrell develops the IBM Institute for Business Value's Performance Data & Benchmarking content for customer experience, contact centers, and sustainability and leads delivery of benchmarking services to clients in Europe and beyond. For 25 years, she has been helping clients measure and improve their performance across a wide range of priorities and processes.

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Carolyn Heller Baird is the Global Research Leader for Customer Experience and Design with the IBM Institute for Business Value. In addition to her research on topics impacting customer experience, Carolyn is responsible for the Chief Marketing Officer studies for the IBV C-suite series. Her work spans nearly 20 years as an experience strategy consultant.

Notes and sources

1 "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

2 Study respondents were senior executives, directors, or managers of contact center or customer service operations, channels, digital technology, or IT with hands-on knowledge of their VAT implementations.

3 Moore, Robert J., and Raphael Arar. *Conversational UX Design: A Practitioner's Guide to the Natural Conversation Framework*. AMC Books. 2019.

4 Hall, John. "The Cost of Turnover Can Kill Your Business And Make Things Less Fun." *Forbes*. May 9, 2019. https://www.forbes.com/sites/johnhall/2019/05/09/ the-cost-of-turnover-can-kill-your-business-and-make- things-less-fun/#77bebecd7943

5 "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

6 For each of these respondents, we multiplied organization revenue by the percentage by which the use of VAT has impacted the organization's annual revenue. The sum of these 343 calculations is $5 billion.

7 "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

8 Average benefits across all respondents in this study for individual metrics are as follows:

– 14% cost savings

– 8 percentage-point increase in customer satisfaction

– 10 percentage-point improvement in first contact resolution

– 7 percentage-point improvement in human agent satisfaction

– 4 point increase in NPS

– 3% increase in revenue attributed to use of VAT.

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