

**FUTURE  
AT HEART**

WHITE PAPER

# COGNITIVE CONTACT CENTER

NTT DATA – COGNITIVE CONTACT CENTER WHITE PAPER

# 01. EXECUTIVE SUMMARY

The Cognitive Contact Center seeks to help telcos and other large enterprises improve the quality and optimize the cost of their customer service operations. It adopts a channel-agnostic approach to customer interactions and makes extensive use of cognitive technologies to overcome the limitations of a traditional call center that often translate into a bad customer experience.

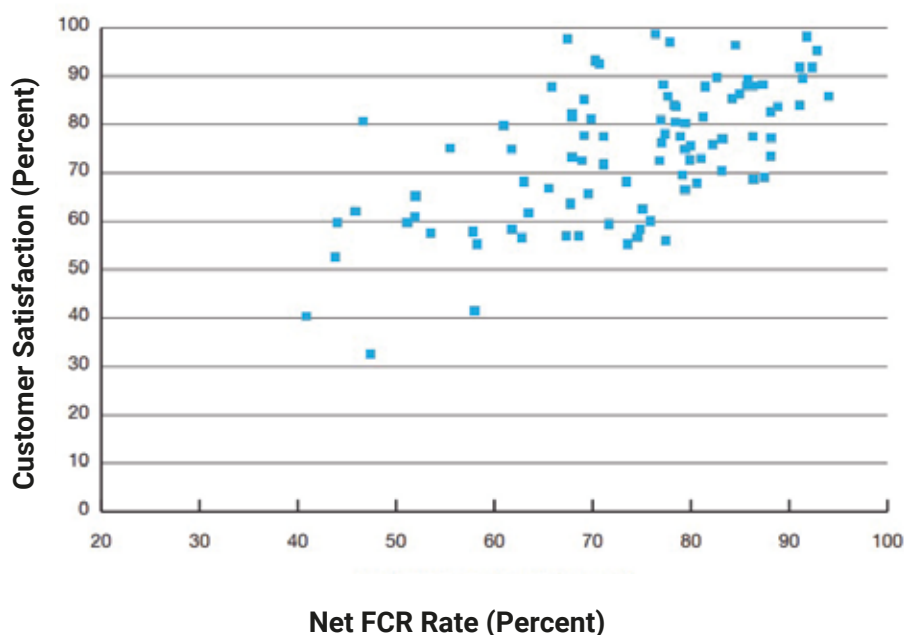
By integrating a range of related technologies in areas such as natural language understanding, predictive analysis, artificial intelligence and robotic process automation, the cognitive contact center enables enterprises to intelligently and selectively automate a wide range of customer-facing and back-office processes.

Actions and interactions of low complexity are offloaded to one or more specialist bots optimized to perform specific tasks, leaving the human agents to concentrate on adding value to customer interactions using their skills, technical knowledge or human empathy.

## 02. THE CHALLENGE

Many studies have shown that contact centers are widely disliked by consumers because of the long wait times and poor First Call Resolution (FCR) rates, which can drop as low as 50% or less.

Poor FCR rates push up contact center costs because the caller has to be called back, and they reduce customer satisfaction. Conversely, if the query is resolved during the first call, the customer is less likely to go to a competitor and more receptive to cross-selling of new products or services.



FCR versus Customer Satisfaction for a representative cross-section of contact centers worldwide (source: MetricNet)

## What is FCR?

**First contact resolution (FCR) is the percentage of contacts that are resolved by the customer service agent during the first interaction with the customer, which can be by phone or online chat. Calls or chats that require a customer callback, or are escalated to another source support, are not included in the FCR definition. For e-mails, which can account for a significant share of service desk contacts, the accepted standard is to aim to resolve the query within one hour.**

There are many reasons for why contact centers perform poorly, including software applications that are not well integrated, insufficient staffing levels at peak times, or demoralized staff due to bad pay or inadequate training.

The root cause of these problems is that the operational focus of a contact center is reactive and heavily focused on containing costs rather than finding ways to proactively improve customer satisfaction. That means that even if there is a desire to improve over time, the learning curve is slow and the best agents tend to leave rather than wait for improvements to take effect. That is why staff turnover rates of 30% to 45% are not uncommon in the call center industry<sup>1</sup>.

High turnover rates increase costs in several ways. The most visible direct costs are those associated with hiring, training and supervising new agents, but there is also the lost revenue due to not having enough staff available to handle the calls in a revenue-generating contact center, such as an airline reservations center.

In addition, there are the less visible indirect costs created by customer dissatisfaction -- high churn, poor brand reputation -- the lost skills and knowledge when experienced agents leave, and so on.

<sup>1</sup> QATC. Exploring Call Center Numbers. 2015. <https://qatc.org/winter-2015-connection/exploring-call-center-turnover-numbers/>



## 03. CUSTOMER SERVICE IN TELECOMS

**Customer service has traditionally been very labor intensive and can consume 10% of Opex for telcos. Against a backdrop of sluggish top-line growth, margin pressure and a reduction in physical sales outlets, they are embracing digital technologies in all parts of the customer-facing operations and are looking at new ways to serve their customers through automation strategies.**

Telcos have particular challenges when it comes to automating customer service. They have millions of customers and have to support a variety of products, bundles and tariff plans, some of which are obsolete and unfamiliar to agents but still need to be supported.

These products have specific requirements in terms of configuration, order fulfillment, customer care and billing. To extract the necessary information needed to answer an inquiry from billing and operation support systems when a customer calls can be quite a challenge, requiring the human agent to pull up different screens or put the caller on hold, which inevitably creates frustration.

According to one study, 60% of low FCR rates are due to an agent's inability to quickly access customer information<sup>2</sup>.

**For that reason, the telecoms industry has long been at the forefront in using technology to automate customer service and reduce the workload on human agents.**

**To address the twin challenges of reducing contact center operating costs and boosting customer satisfaction, a variety of approaches have been tried to allow contact centers to rapidly and cost-effectively handle routine interactions with little or no intervention from human agents.**

## 04. CONTACT CENTER AUTOMATION

The automation trend started with Interactive voice response (IVR), which is now largely accepted by consumers particularly for handling straightforward interactions, like paying a bill. In the telco domain, simple requests to reset routers or reconfigure passwords are now often handled by IVR without any human agent involvement.

More complex IVR systems use voice recognition software to overcome the limitations of the traditional menu-based IVR systems by attempting to identify what the call is about and so quickly separate calls that can be handled by automated response systems from those that need to be passed to a human agent.

IVR systems are an example of how automation technology, if well designed and implemented, helps offload low-value or repetitive interactions and so allow agents to focus on more complex or revenue-generating tasks.

While consumers often complain about having to "talk to a machine", if used wisely IVR systems can have a positive impact on service quality.

<sup>2</sup>3CLogic.2015. Must Read 'First Call Resolution' Facts. <https://blog.3clogic.com/must-read-first-call-resolution-facts>



Instead of handling just one phone conversation at a time, agents can handle up to four online chat sessions simultaneously. These online channels can increase productivity but they do not by themselves improve FCR rates or other measures of customer satisfaction.

That is because the knowledge bases, scripts and other resources available to the agent to answer the query are the same, irrespective of whether the customer is describing the problem over the phone or typing it in a chat session.

Online customer self-service tools, such as FAQs, forums and product configurators, offer an alternative resource to human agents and they allow the latter to focus on more complex requests, which in principal could leave to higher job satisfaction and a more engaged agent workforce.

Self-service tools are liked by many customers as they give them the satisfaction of having solved the problem independently, without having to contact customer service.

But these tools can only handle the simplest and most frequently occurring issues or requests, and if a customer has invested a lot of time in trying to solve the issue themselves but without ultimately succeeding, their frustration is likely to increase.

That's particularly so if, when they call the contact center in desperation, the agent tells the customer to repeat the steps they have already taken to try to resolve the problems for themselves.

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## 05. CONTACT CENTER TRANSFORMATION

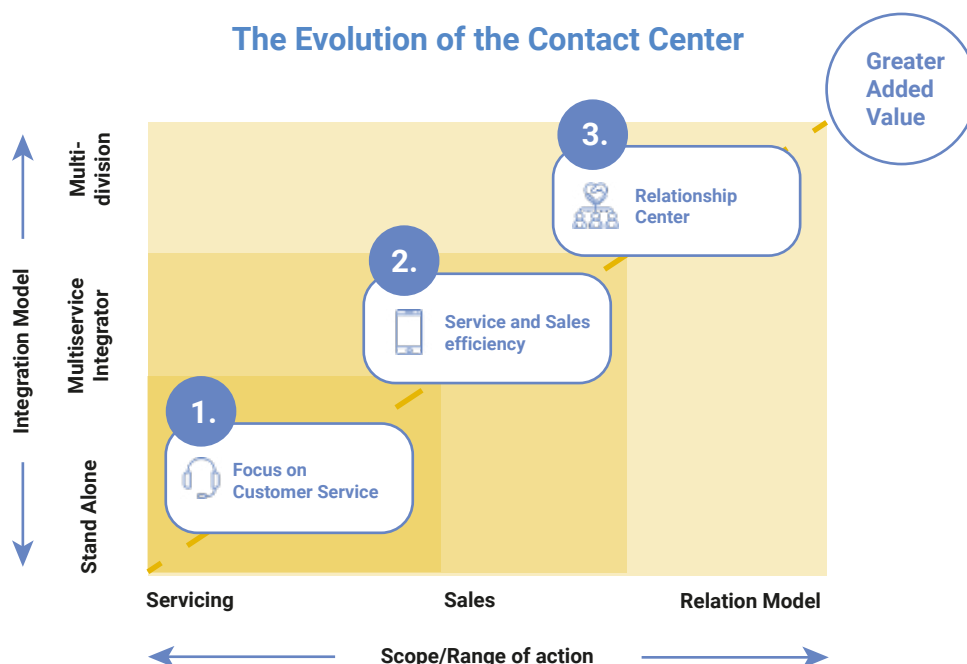
Technology plays a key role in enabling the necessary transformation of the traditional contact center to one that can deliver more personalized assistance and rewarding experiences for callers while also improving KPIs and optimizing costs.

But the transformation process needs to be implemented in a phased and systematic manner. Four main pillars can be identified to support a transformation strategy, as show in the following diagram.

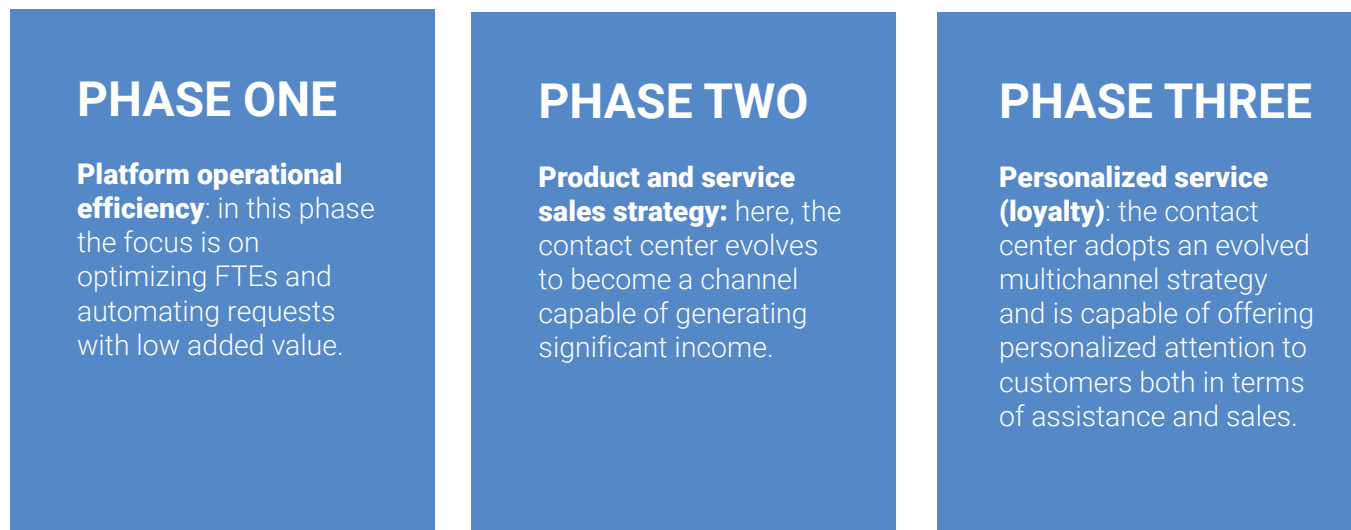
### The Four Pillars of Contact Center Transformation

<b>OPTIMIZATION OF PROCESSES &amp; OPERATIONS</b>	<b>AUTOMATION AND EFFICIENCY IN PROCESSES/OPERATIONS</b> to provide valuable and efficient service to the agent in each phase of interaction with the lead or client
<b>OMNICHANNEL STRATEGY AND IMPLEMENTATION WITH A COSTUMER VISION</b>	<b>OMNICHANNEL STRATEGY AND OBJECTIVE ATTENTION</b> with differentiated attention and management approaches by moment of interaction and costumer behaviour archetypes  <b>STRATEGY, GOVERNANCE AND CASE IMPLEMENTATION OF THE COGNITIVE CONTACT CENTER</b> facilitating prioritization and agile deployment
<b>ORGANIZATIONAL TRANSFORMATION</b>	<b>ORGANIZATIONAL TOOLS AND TRANSFORMATIONAL MODELS</b> that maximize the capabilities of teams of agents and resolvers
<b>CHANGE MANAGEMENT</b>	<b>THE EVOLUTION TOWARDS A PERSONALIZED ASSISTANCE MODELS</b> and a <b>GREATER FOCUS ON SALES</b> implies a management of change in people

The organization and operating model of contact centers depend not just on the business objectives but their future evolution. To ensure this, a phased transformation process can be adopted to transform the contact center towards a more relational and personalized model.



The above charts shows a typical Contact Center evolution comprising three phases:



Different technological solutions need to be deployed in the different phases. In **Phase One**, the focus is on improving efficiency in order to reduce the costs of providing assistance while ensuring an adequate level of service, a Net Promoter Score (NPS) equal to or better than the current figure, and efficiency gains through operational optimization, sharing of best practices and the use of specific technologies such as IVR, automation and intelligent call routing.

In the next stage, **Phase Two**, the objective is achieving a balance between ensuring an adequate and efficient level of service and maximizing sales through this channel. Typical technology-driven initiatives would include launching new digital channels for customer support, incorporating basic cognitive text and speech solutions, customizing the customer offer and strengthening the commercial focus.

Technologies that are most likely to be deployed in Phase Two include the Cloud, chatbots or WhatsApp to add new channels, cognitive technologies and advanced analytics, and CRM integration for the “frontline” agents.

During the final stage, **Phase Three**, the contact center evolves towards a model based on achieving a personalized relationship with the client. This requires the reduction or elimination of tasks with low added value, greater customization of service and commercial offerings, and a digital-led sales model.

In Phase Three, cognitive technologies and advanced analytics acquire much greater importance, as do automation tools such as chatbots, RPA and NLP. To be able to build meaningful personalized relationships across channels, contact centers will also deploy CRM and Big Data, omnichannel technologies and speech and social analytics to gain a fuller view of customers and their interactions.

## 06. WHAT IS THE COGNITIVE CONTACT CENTER

Automation is central to the evolution of the contact center, but it needs to be done intelligently in a way that delivers sustainable value and improves the customer experience.

This is one of the challenges that cognitive contact center addresses. In particular, it is designed to overcome the piecemeal automation that typically characterizes many call centers and leads to inefficiencies, disjointed experiences and customer dissatisfaction.

When business use automation holistically in the contact center, they observe the greatest benefits and a cognitive contact center seeks to help achieve those benefits through the use of automated reasoning and decision-making capabilities – what is commonly understood as Artificial Intelligence (AI).

As its name tells us, a cognitive contact center seeks to emulate human cognitive processes such as reasoning, knowing, judging and problem solving. These are higher-level functions of the human brain so it is only with the advances in AI and machine learning (ML) algorithms that computer systems have been able to emulate human cognitive capabilities and so handle complex situations where the meaning of a question is ambiguous, for example, or where there are various possible actions or responses.

This description closely describes many of the interactions that human agents deal with each day in a contact center, of course. That is why there is so much interest in using AI and ML to improve contact center operations and automating customer support processes.





The introduction of AI in the contact center is taking place against a much broader trend to incorporate AI into a growing range of IT and operational systems, either to help with decision-making or to automate business processes using technologies such as Robotic Process Automation (RPA). According to Gartner, within the next three years, 65% of enterprises that have deployed RPA will introduce AI, including machine learning and natural language processing algorithms<sup>3</sup>.

Clearly, the main driver for cognitive contact centers is to automate repetitive tasks and enable them to be performed at lower cost, more quickly and without human error.

But that is just one aspect, and indeed as more customer contacts involve digital channels, businesses want to leverage the data they have on customer's interactions to understand the journey that their customers take and so help build more effective and personalized experiences.

So, much of the current interest in cognitive contact centers is driven by a desire to improve the customer experience (CX), which is a real "pain point" for many organizations that have to rely on a traditional call center to handle customer interactions.

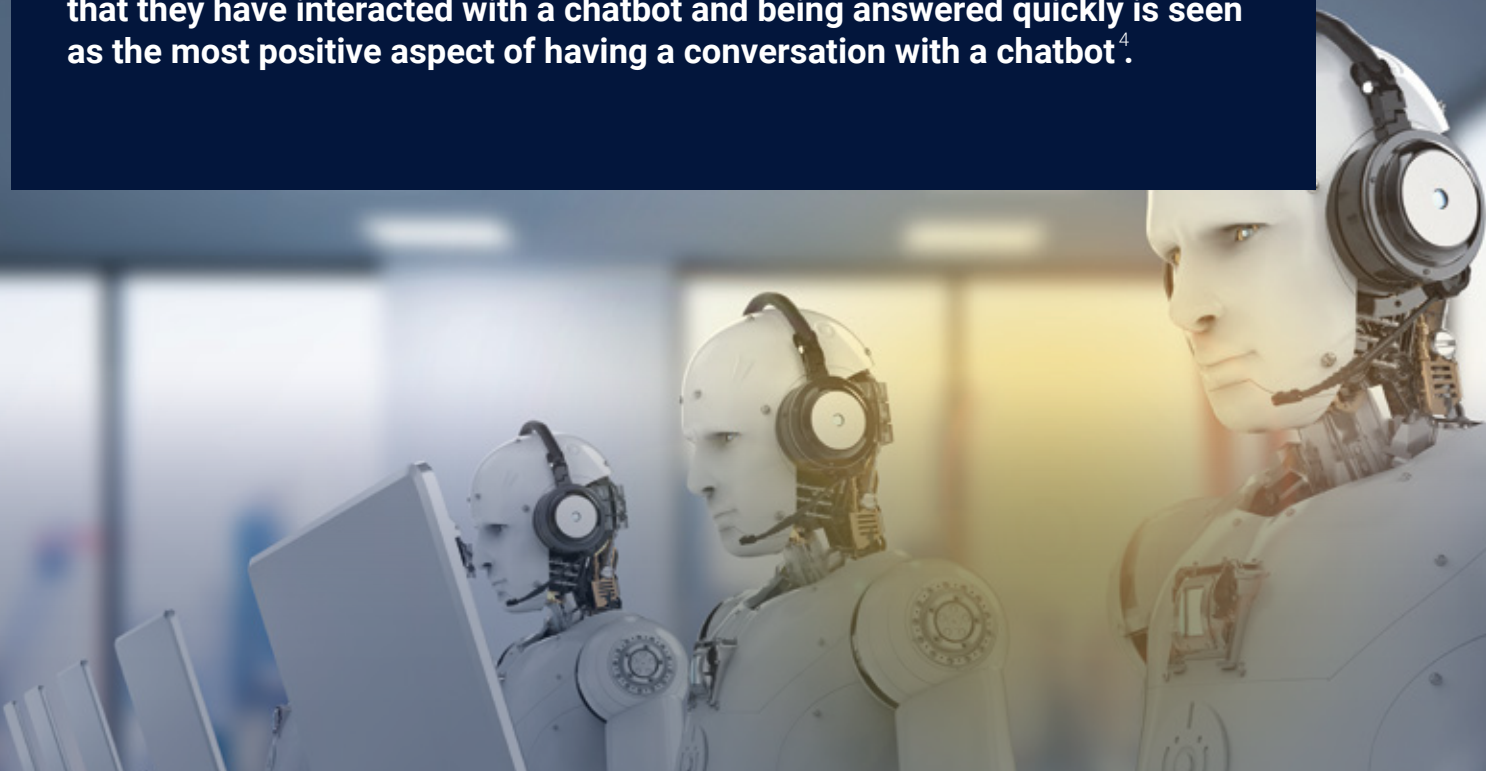
## VIRTUAL AGENTS

The most familiar AI-based technology in the cognitive contact center is virtual agents, also known as chatbots. Many consumers are now comfortable talking to general-purpose virtual agents such as Amazon's Alexa or Microsoft's Cortana and more and more websites also feature virtual agents to help answer queries or find information.

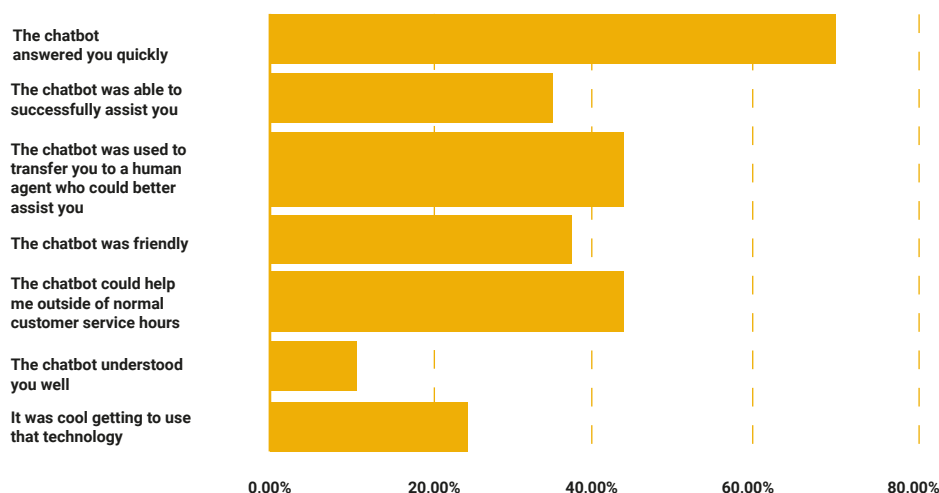
**Virtual agents are transforming customer service by allowing brands to hold real-time conversations with customers who don't want to wait on hold to talk to a human agent. According to one user study, 80% of consumers recognize that they have interacted with a chatbot and being answered quickly is seen as the most positive aspect of having a conversation with a chatbot<sup>4</sup>.**

<sup>3</sup> GartnerGroup. Move Beyond RPA. 2019. Move Beyond RPA to Deliver Hyperautomation. <https://www.gartner.com/en/documents/3978174>

<sup>4</sup> Userlike.2020. What Do Your Customers Actually Think About Chatbots? <https://www.userlike.com/en/blog/consumer-chatbot-perceptions-ments/3978174>



If you've chatted with a chatbot, what were some positive aspects? (Choose all that apply)



The Most Positive Aspects of Interacting with a Chatbot (source: Userlike)

Virtual agents are fast and convenient, but the early generation of chatbots was relatively primitive and limited when it came to understanding what the customer wanted or could not give the information requested.

A few years on, the technology has matured considerably thanks to advances in natural language processing (NLP) that allow customer to have a more natural interaction with virtual agents, using colloquial language and complex grammatical expressions. In addition, a new generation of sophisticated conversational AI platforms now makes it easy to develop virtual assistants that can be deployed at scale and optimized for a particular role.

That has encouraged telcos and other large enterprise users of contact centers to accelerate investment in conversational AI, initially by focusing on the "low hanging fruit" - areas where the technology has been shown to work well and deliver rapid ROI. These areas include:



## Round-the-Clock Support

Chatbots can answer queries instantly and do not take lunch breaks or sleep. So contact centers can use chatbots to ensure fast and efficient service even with reduced staffing levels.

## Replacing the IVR

IVR systems work well for businesses with limited range of customer interactions, but once a customer has to burrow their way through three or four voice-driven menus, each with several options, then the limitations of menu-based IVR systems are readily apparent. Chatbots provide more flexible assistance and help callers bypass the menus.

## Improving Customer Self Service

The website is often the first port of call for customers seeking technical information, such as how to configure a product or activate an option. So it makes sense to integrate a chatbot into the FAQs section of a website, for example. That way, if the customer cannot get the answer to their query from the FAQs, they can ask the chatbot, which because it already knows the conversational context should be better able to answer.

## Customers prefer chatbots

**The global chatbot market is expected to reach \$1.25bn by 2025, growing at a CAGR of 24.3%, according to Grand View Research<sup>5</sup>. Amongst the firm's findings is that approximately 45% of end users prefer chatbots as the primary mode of communication for customer service activities.**



<sup>5</sup>Grand View Research. 2017. Chatbot Market Size, Share & Trends Report. <https://www.grandviewresearch.com/industry-analysis/chatbot-market>

# KEEPING HUMANS IN THE LOOP

As the capabilities of AI-powered virtual assistants improve, there are concerns that companies will use them to replace human agents and so cut labor costs. Telcos and other large enterprises that depend heavily on contact centers need to reduce their operating costs and given the problems of high staff turnover and motivation issues, reducing the number of human agents through greater automation has obvious attractions.

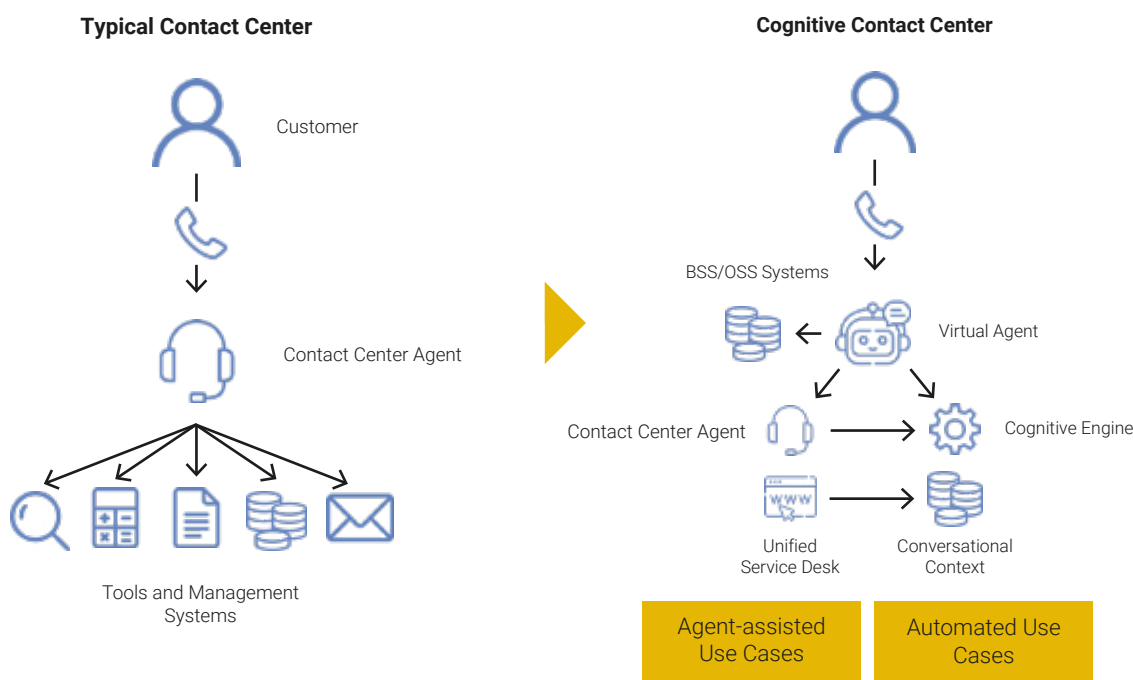
It is clear that automation technologies have a key role to play in increasing productivity and optimizing staffing levels in contact centers. But they need to be used intelligently if they are to not backfire.

Completely removing the option of speaking to a human agent from contact center interactions, or making the option difficult to access, is likely to alienate a significant number of customers.

According to one industry survey, having an opportunity to speak to a human agent is cited by 38% of US consumers as one of the top three requirements for ensuring they leave a customer service interaction happy<sup>6</sup>.

That is why the concept of a hybrid operating model, combining human and virtual agents, has long been seen as the preferred solution and it is now possible to make it work well, thanks to the cognitive contact center.

## Cognitive Contact Center Offloads Routine inquiries to Virtual Agents



The hybrid model delivers the best of both worlds: AI and automation to handle mundane, repetitive customer inquiries, while human agents handle more complex tasks that hopefully are more fulfilling for the agent to resolve and produce higher satisfaction for the caller.

With the hybrid operating model, it is important to stress the customer is not locked into an end-to-end conversation with the virtual agent. When the customer calls, the virtual agent obtains all of the necessary information upfront and then decides if the query or request can be resolved automatically or if a human agent is necessary.

<sup>6</sup>CGS. 2020. Customer Services Preferences in Times of Distress Survey. <https://www.cgsinc.com/en/resources/customer-service-in-crisis>



It the call is passed to the human agent, he or she already understands the context of the call and does not have to ask for information that the caller has already provided to the virtual assistant. If appropriate, the human agent can then hand back to the virtual agent to perform a credit card authorization, for example.

By eliminating repetitive tasks and providing human agents with real-time access to a more complete set of information -- on the company's products on the caller's demographic profile, their past interactions and even sentiment analysis -- the cognitive contact center can make an agent's job more enjoyable, which in turn should lead to a more rewarding interaction and a better customer experience for the caller.

## END-TO-END AUTOMATION

Telcos, along with all large enterprises, are reevaluating their operations models to transform the customer journey and to embrace end-to-end automation based on optimized processes that can scale and sustain business transformation initiatives.

The aim with end-to-end automation is to overcome the technology silos that have often resulted from ad hoc automation projects and instead adopt a more systematic and holistic approach, supported by methodologies, tools and specialized automation technologies.

The cognitive contact center is central to these automation initiatives and the maximum benefits are achieved when the virtual agent technology in the front office is tightly integrated with other systems and back-office business processes that are also automated or use cognitive technologies.

By taking an end-to-end approach, it is possible to automate more complex use case cases than those traditionally associated with a contact center and telcos can focus on understanding and improving the customer journey by proactively engaging with customers and predicting their needs rather than simply waiting for them to call with a complaint – see box “Proactive Service Assurance Using the NTT DATA Cognitive Contact Center”.





As well as customer-facing operations, the cognitive contact center can be used to integrate, automate and optimize many internal business processes. For example, one interesting Business-to-Employee (B2E) application of the cognitive contact center is to optimize the configure, price and quote (CPQ) processes used by sales teams.

Telecoms products are often complex and configurable, and it can be challenging for salespeople, particularly recent recruits, to prepare the best proposal. To address this need, the cognitive contact center can be configured as a highly specialized virtual assistant that advises salespeople on the best configuration for a particular customer based on historical sales and the customer's profile, and then generates a price quote.

This use case requires tight integration between specialist back-office systems, such as the CRM system, the product catalog, quote management system and price calculator, with an RPA system working behind the scenes to link the information flows together.

While the focus of the contact center has historically been on piecemeal automation of simple, low-value interactions, by taking an end-to-end approach the cognitive contact center breaks down the technology silos and enables user organizations to achieve sustainable improvements in a wide range of processes and operations.

## **Proactive Service Assurance Using the NTT DATA Cognitive Contact Center**

Fiber-to-the-Home (FTTH) is an attractive commercial opportunity for network operators but the quality of service and quality of experience (QoS/QoE) can be impacted by network issues that will often affect several users in the same neighborhood.

The traditional way these QoS/QoE issues are handled is reactive, labor-intensive, and often leads to a poor customer experience.

To solve this challenge, NTT DATA participated in a TMF Catalyst<sup>7</sup> project with Telefonica, the Spanish operator, and specialist technology suppliers to demonstrate a use case of the NTT DATA Cognitive Contact Center designed for FTTH service assurance.

By embedding AI in the contact center and other back-office systems, and using technical bots to automate and speed up incident resolution, NTT DATA has demonstrated how it is possible to dramatically improve the customer experience associated with customer-facing technical support operations.

In the particular case of FTTH service assurance, faults can be detected earlier or even predicted before they occur, because the contact center detects an unusual increase in QoS/QoE complaints from customers in a certain neighborhood, for example.

The contact center then proactively contacts other users in the area who may be affected by the problem, using their preferred channel of communication: voice call, SMS, WhatsApp, etc.

The NTT DATA Cognitive Contact Center automatically transfers the issue to a dedicated "technical bot", in this case supplied by Nokia, which is designed to perform network diagnosis without human intervention. If the technical bot can resolve the issue, service can be restored with the minimum of human intervention and delay.

If the problem cannot be resolved, it is escalated to a human technician who may decide a repair is needed, in which case the cognitive contact center will inform the affected users that a repair is scheduled to be carried out and the problem should be resolved in a defined timeframe.

<sup>7</sup><https://www.tmforum.org/collaboration/catalyst-program/current-catalysts>

## 07. DESIGN CONSIDERATIONS FOR THE COGNITIVE CONTACT CENTER

Creating meaningful user experiences is particularly important in today's digital era with the competition often just one click away. A customer's perception of a brand is increasingly influenced by digital channels and this is particularly the case with telecoms, for example, as many mobile operators have largely abandoned traditional physical sales channels.

When it comes to designing user experiences for virtual agents, it is essential to focus on a user-based (conversational) interface design, creating a system that supports the intentions and attitudes and behavior of the target audience.

It is helpful to use a specific project methodology for designing an optimized UX and list the benefits that the business hopes to achieve from the project. This could be done by specifying KPIs, for example, which would enable the progress in evolving the contact center to be readily monitored.

In the case of virtual agents, it is useful to identify various use cases and prioritize them according to their importance either to the users or to the business. It makes sense for an initial project to choose a use case where the dialog is relatively simple and fairly predictable. That enables UX designers to easily and rapidly create the related frequent questions.

Later the designers can work on defining the responses based on the bot's personality.

A conversation has a very high level of involvement on the part of users. Even if they know they are speaking to a machine, they want to have a "real" conversation, so it is important to give a virtual agent its own personality and voice.

That means deciding on the tone of the messages, the gender and the type of voice to ensure that the messages not only communicate information effectively but also create a certain empathy with the customer.

An approach that has proved particularly successful is to "humanize" the virtual agent, defining it in the first person, understanding its objectives, its frustrations and the key concepts that define it.

Based on the use case, the possible conversational flows are identified and developed further. It is particularly important to identify the introduction / greeting and closing of the conversation to ensure it comes across as natural and not mechanical.

The conversational flows are then tested and iterated in a final phase to ensure that they adapt to the needs of the users.



A background image showing two call center agents, a man and a woman, wearing headsets and smiling while working at their desks. The woman in the foreground is wearing a blue denim shirt and has a headset with a microphone. The man behind her is also wearing a headset and glasses. They are in a bright, modern office environment with large windows in the background.

## Business Benefits

**NTT DATA develop a virtual agent solution for a leading telco to assist its B2C clients with their transactional and operational inquiries. The solution handles more than 10m interactions each month from more than 1.2m users. Benefits achieved:**

- **90% accuracy**
- **30% less tickets**
- **70% claims reduction**
- **70% retention**
- **User satisfaction improved from 5/10 to 7/10**

## 08. CONCLUSION

The contact center continues to be the preferred channel for communicating with customers because they value the opportunity to engage with human agents but also want the option to use newer digital channels. The cognitive contact center has been designed to better address this need by leveraging cognitive technologies such as NLU, AI and ML to help contact centers optimize their cost base through intelligent automation, move to more proactive models of customer engagement and enhance the overall customer experience.

# APPENDIX

## NTT DATA Cognitive Contact Center

The NTT DATA Cognitive Contact Center has been designed to conform to the conceptual understanding of the cognitive contact center described in this white paper. It has been designed to offer four main benefits:

1. Improve the client experience through the use of omnichannel communication and personalization.
2. Achieve greater efficiencies through extensive automation and increase KPIs such as FCR rates.
3. Transform contact center operations by integrating new channels such as WhatsApp and combining technologies such as RPA and bots with traditional human agents.
4. Simplify technologies to standardize the technology landscape in the contact center and eliminate silos.

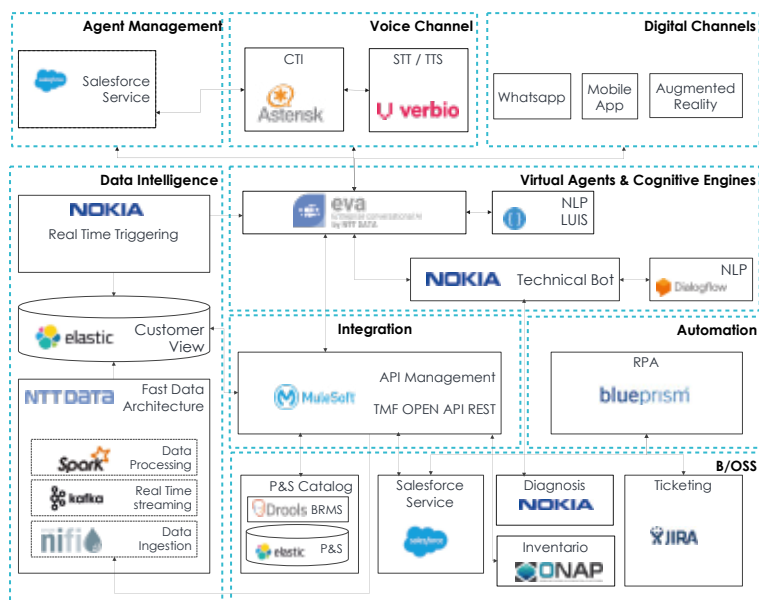
To achieve these goals, the NTT DATA Cognitive Contact Center employs a range of automation technologies, some created in-house, such as eva, the NTT DATA conversational assistant platform, while others come from specialized providers.

The key cognitive capabilities of eva were designed and developed at the NTT DATA Center of Excellence for AI, where a team of data scientists and engineers work closely with other AI professionals in the NTT DATA group.

To develop cognitive contact center solutions for its telecoms clients, NTT DATA applies a proven and differential methodology that seeks to define the best customer experience in each of the channels for each use case.

NTT DATA experts then propose an architecture supported by the best market solutions, extending them in those domains that, based on our knowledge, will limit the impact on the customer experience.

Once the solution has been defined, we work with the client to develop the optimum deployment plan that ensures a safe transition, improving the customer experience and managing the impact on the operation of the Contact Center.



NTT DATA Cognitive Contact Center Architecture. The following diagram depicts the “Cognitive Contact Center phase 2”, an implementation model NTT DATA presented as catalyst at the TM Forum 2019