CIO APPLICATIONS

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CHATBOT EDITION

The Future of Chatbots

JOHN TUBERT, SVP, TECHNOLOGY, R/GA

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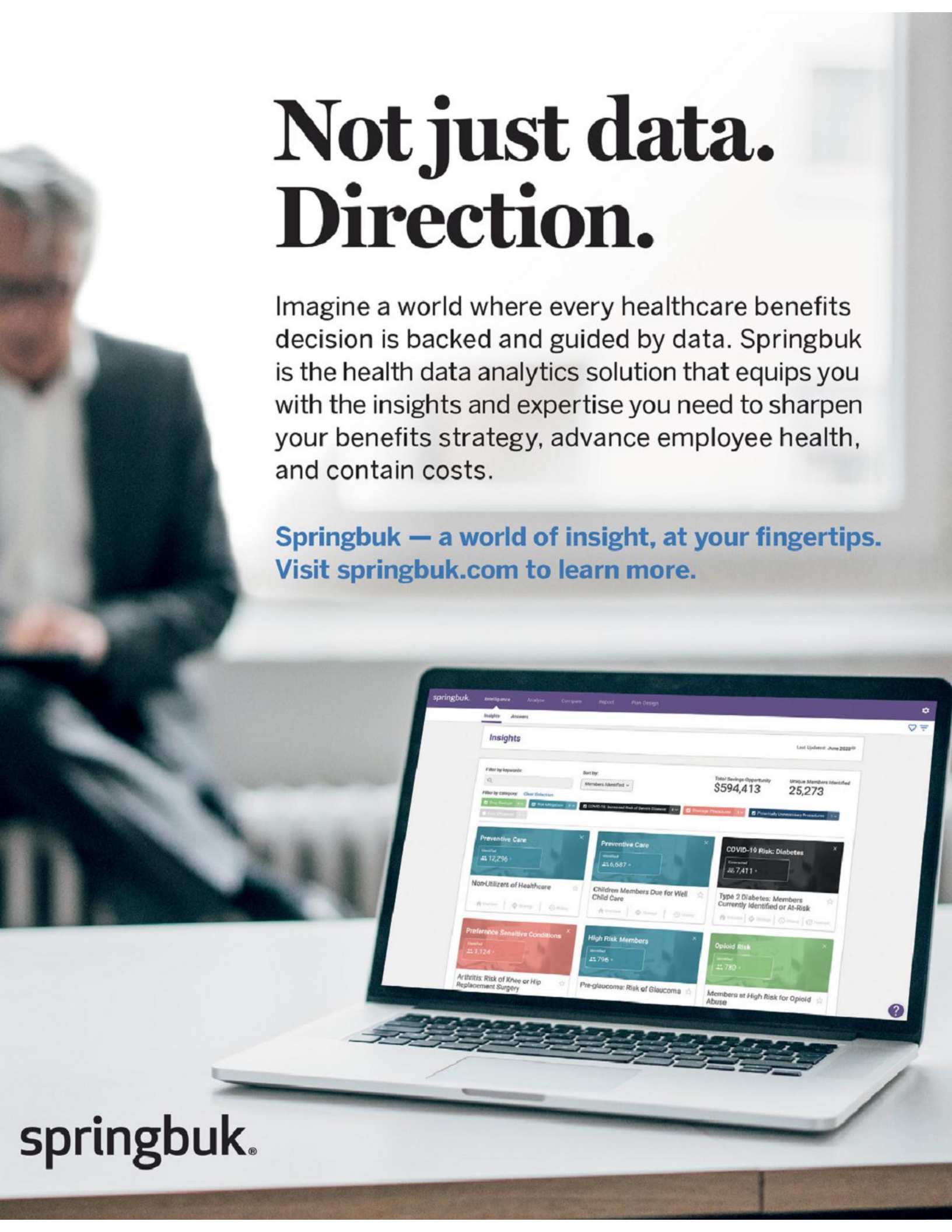

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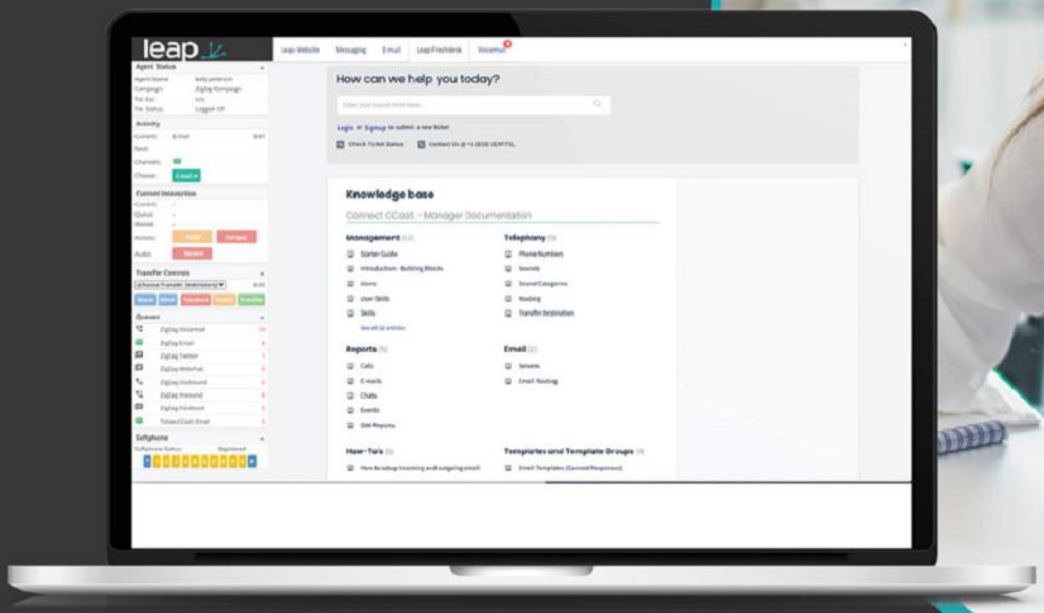

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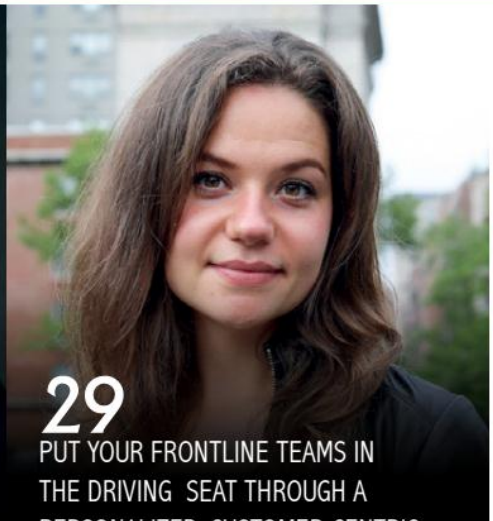

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**Some of the Insights are based on the interviews with respective CIOs and CXOs to our editorial staff*

Editorial

The Rising Significance of Chatbots

Today, the reason behind the rapid adoption of chatbots and virtual assistants by almost every organization, ranging from banking to healthcare, is mainly because of the round-the-clock demand of consumers for assistance. A recent study has revealed that around 40 percent of internet users worldwide prefer engaging with chatbots rather than virtual human agents. Consequently, according to a market research firm, the chatbot tech market is likely to reach $142bn in retail consumer spending by 2024.

Chatbots offer the simulation of human-like interactions using artificial intelligence (AI) and natural language processing to provide organizations with effective communication with their existing customers and engage with new prospects. As of date, giant enterprises like Microsoft have launched chatbots that alleviate administrative tasks of healthcare institutions. Also, Wall Street is implementing machine learning (ML) technology to understand consumer behavior and make better trade decisions. Chatbot technology also leverages voice recognition and perception, which can be seen in Alexa, Siri, and Google Assistant. This voice recognition technology is currently gathering immense popularity amongst the common mass.

The chatbot ecosystem is expanding rapidly and becoming robust with each passing day. The increasing usage of this technology is giving traction to an abundant number of companies with advanced ML and chatbot tech solutions, urging them to push themselves to the forefront of their particular industry. This edition aims to provide readers insights from industry leaders to help them have a detailed understanding of the chatbot technology arena and the recent developments in this field.

Let us know your thoughts.

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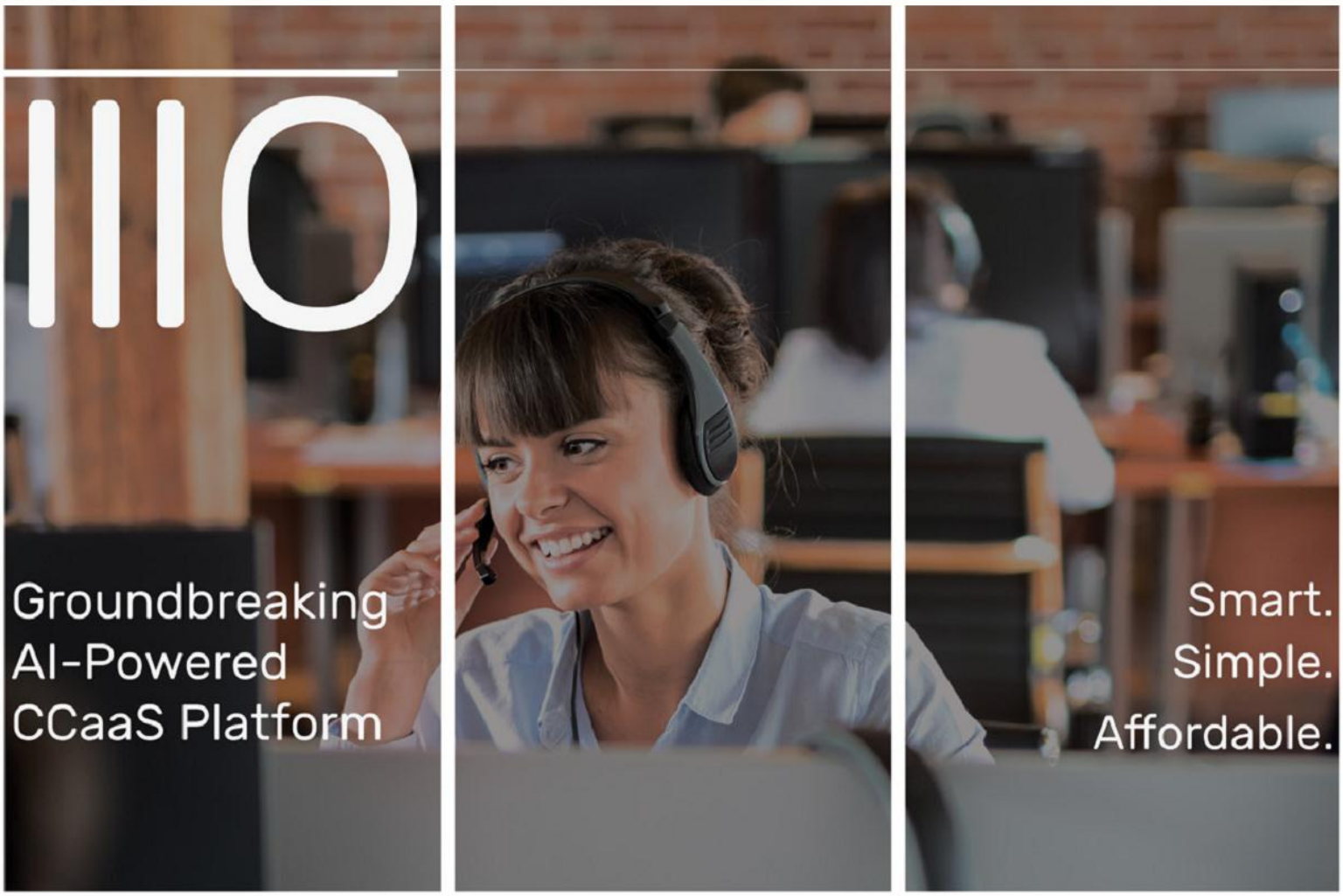

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How "Path to Production" Ensures Safety and Soundness on Our Digital Transformation Journey

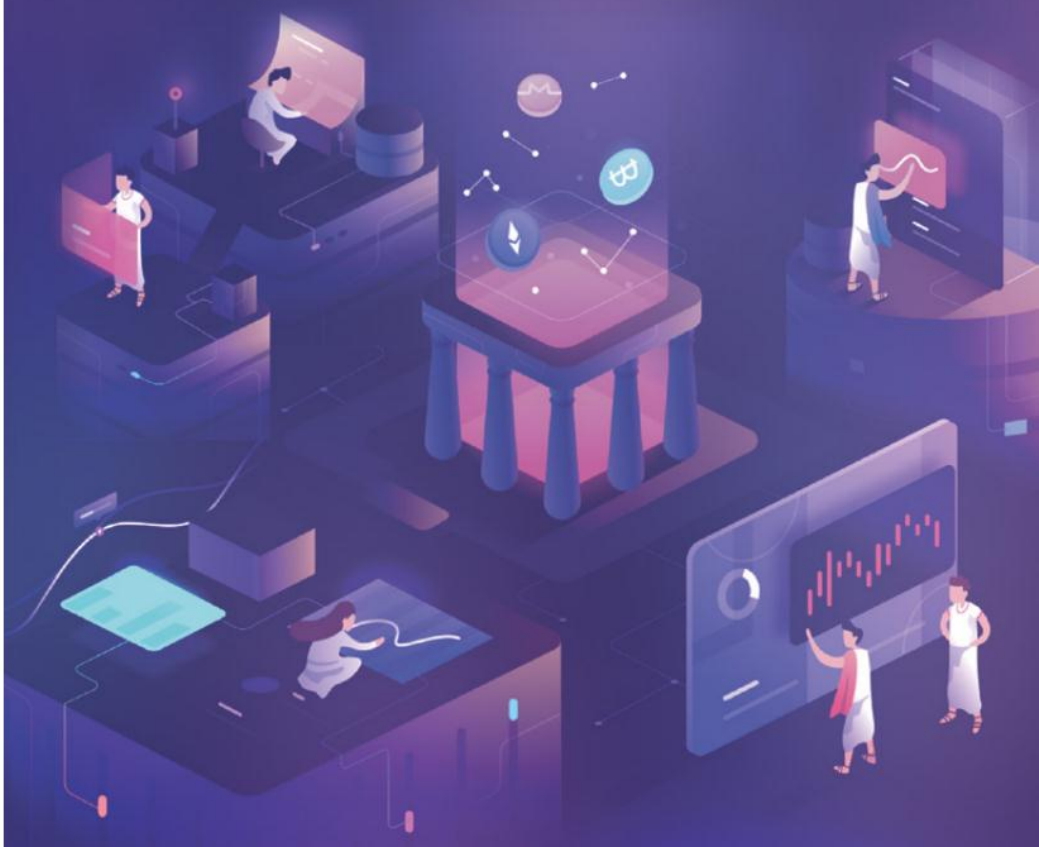
BY **RAMON RICHARDS,** SENIOR VICE PRESIDENT OF INTEGRATED TECHNOLOGY SOLUTIONS, FANNIE MAE

At Fannie Mae, our mission is to provide a reliable source of affordable financing for homeowners and renters in the United States. As a leading source of mortgage financing, Fannie Mae purchases mortgages from lenders and helps facilitate the flow of capital into the housing market by issuing and guaranteeing mortgage-related securities. We embrace innovation and invest in technology to accomplish this mission in a safe, sound, and efficient manner.

The technology side of this business requires a delicate balance of agility, speed, and security.With it comes the need for critical governance, control, and risk parameters to guide our development of software products. Historically, that's been good for safety and security, but can slow down the pace at which we can deliver new capabilities for customers.

This challenge, coupled with our company-wide focus on digital transformation, motivated us to take a look under the hood and assess the Fannie Mae software development lifecycle. We discovered opportunities to eliminate redundancies and shift the engagement of key governance and control stakeholders up in the process.

We launched Path to Production, or P2P, earlier this year to address these challenges and reimagine the way we work to develop software at Fannie Mae. It's a software change framework that weaves security and risk management practices into a single streamlined process for development-related work. It




Ramon Richards

> “SECURING PERMITS ENSURES GOVERNANCE AND RISK CONTROLS ARE BUILT INTO THE PROCESS AND ESTABLISHES EVIDENCE OF COMPLIANCE”

standardizes the way our delivery teams engage key stakeholders for software changes and allows us to deliver with greater efficiency, speed, stability, and security.

What's been a significant undertaking started with some clear objectives:

• Create a process that fosters proactive engagement among cross-functional teams throughout the software development process.

• Move validations and verifications that had traditionally occurred at the end of the development process to the beginning to avoid delays and redundant reviews.

• Simplify management of software delivery process across multiple platforms and business applications by automating controls and integrating with existing tools and frameworks where possible.

• Increase the transparency and reportability of technology work across the organization by tracking all new and change-related work in one place.

P2P is a holistic framework that addresses these objectives. It introduces a permit-based development framework that helpsfacilitate delivery teams' early engagementin the right activities, from ideation to operation.Like a license to drive, delivery teams must secure permits at each critical juncture.

We implemented a self-governed review process to ensure Information Technology General Controls (ITGCs) are adequately designed and implemented, and to avoid major disruptions to key strategic commitments. The process isintended to be efficientand has been designed to maximize the use of automation:

• A team will first register a project, idea, or proof of concept in an internal application.

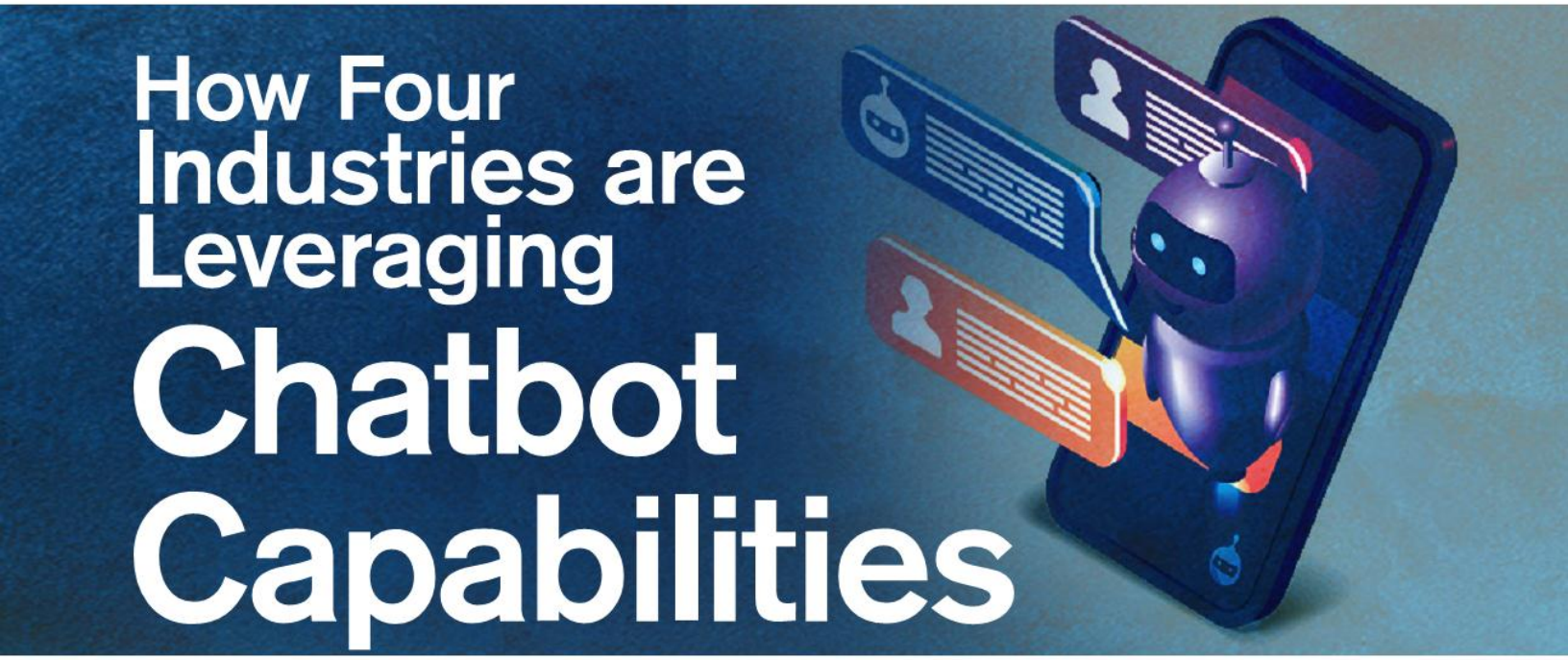
• If the idea passes the prioritization process, the team is issued a permit to launch, which gives the green light to initiate the formal P2P workflow.

• From there, subsequent permits allow teams to design/build, and eventually operate the new application or enhancement to an existing application.

Securing permits ensures governance and risk controls are built into the process and establishes evidence of compliance. This takes the burden off development teams to secure manual approvals and it builds consistency, stability, and security into the products we deliver as a company.

Beyond compliance, this approach has huge implications for the way we bring products to market and influence the evolution of a more digitized mortgage finance industry. With P2P, we've created an automated, integrated framework of activity that streamlines software development and provides straight-through processing. This translates to faster delivery of new capabilities that benefit our customers, which include homeowners and renters, and help us accomplish our mission. We are excited about the possibilities P2P creates for our innovative future. CA

How Four Industries are Leveraging Chatbot Capabilities



Chatbots can be used to provide timely medical advice if implemented correctly. This would save patients the difficulty of dialing a helpline and waiting for a response endlessly.

When it comes to the first line of contact with a customer, chatbots have become the most favored choice for companies across many sectors. Chatbots are revolutionizing many industries that can be monetized, providing personalization and driving interaction. Companies that use chatbots bring value to their clients' lives and, at the same time, open market opportunities that remain unidentified by their rivals.

Here are four industries that are utilizing the benefits of chatbots:

Retail

Today's eCommerce customers demand a personalized shopping experience, and an AI-powered chatbot can achieve their needs by providing personal sales assistant. It can help a client find exactly what the person is looking for and cross-sell or upsell based on suggestions.

Real Estate

By making the acquisition, sale, and rental of properties more engaging than dull, chatbots have revolutionized the real estate market. A chatbot ensures that a client does not miss out on any leads even outside working hours with round-the-clock availability.

Also, chatbots can arrange meetings and property tours and make the most of real estate players' various social media channels. With the bot, a quick virtual tour is also possible to ensure that prospective customers can determine whether to go ahead or back out with all prima facie info.

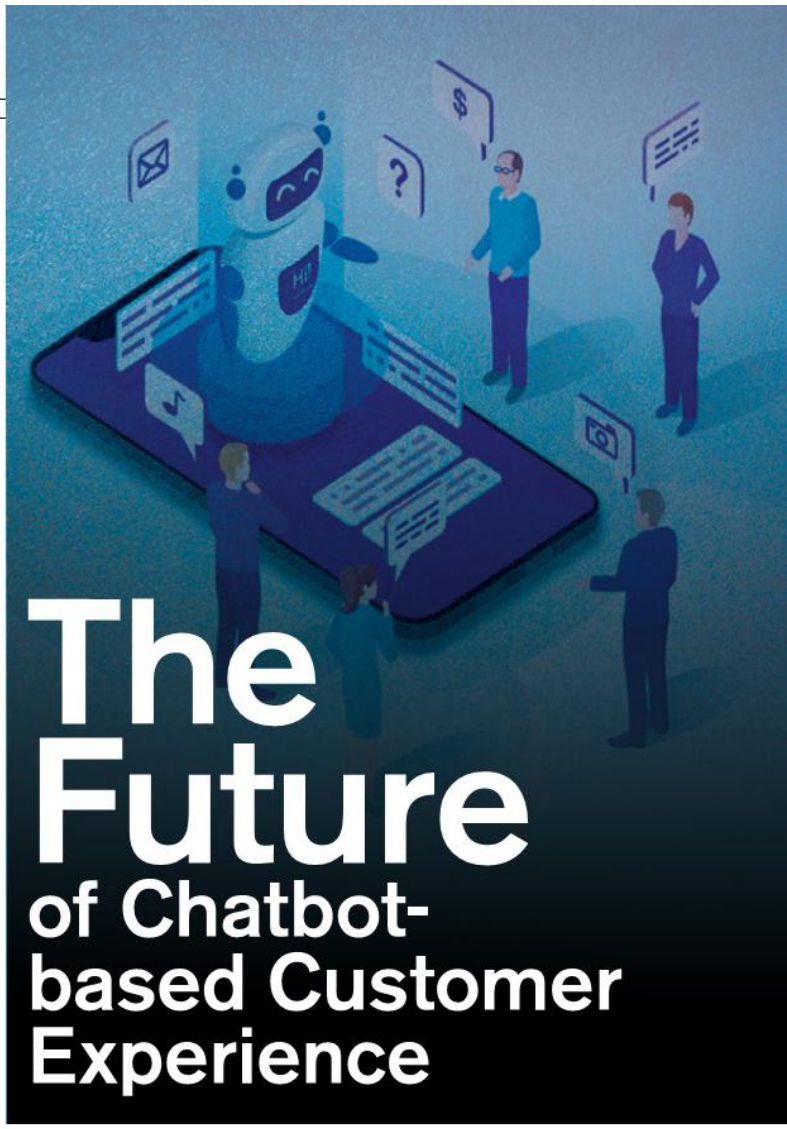
Healthcare

The appointment system can be further simplified with chatbots in place, and patients can interact with the same in case of last-minute setbacks to rearrange the appointments, so neither the patient nor the doctor should spend additional hours.

Since chatbots do not have number constraints, they can handle hundreds of queries at the same time, thereby scaling several notches of customer service. Chatbots can be used to provide timely medical advice if implemented correctly. This would save patients the difficulty of dialing a helpline and waiting for a response endlessly. The bots can also be used as medication reminders.

Banking

For the better, chatbots are transforming the banking industry and are also facilitating the much needed redesign of customer service. Banks are early adopters of chatbots for customer service and offer essential services to their online customers, such as finding the nearest ATM, providing account balance information, and enabling fast money transfers between friends. In addition, chatbots also make it easier for clients to contact their banks and leverage resources and policies without waiting in long lines. CA



The Future of Chatbot-based Customer Experience

Chatbots are gradually moving beyond enabling the online user experience, eventually having a broader, more significant impact on the organizations' revenue.

Chatbots are getting more advanced, functioning regularly into the mainstream. From instant access to banking information to contacting a live health practitioner, companies and customers have started considering them as a vital part of their connectivity pipeline, the key to fulfilling customer needs and company competitiveness.

In 2019, around 67 percent of users used a chatbot for online support at least once. Since chatbots offer support 24 hours a day, the number will only rise when the users demand instant assistance. Within the next 6 to 12 months, 85 percent of companies will probably have a chatbot, and they will handle 30 percent of the customer service experience.

Curious about how companies and service providers will implement these new systems? Will bots replace any more customer service operations or play an increasing role in generating leads? Here are some ideas to consider.

User Experience Humanized and Streamlined

Any customer interaction must be conversational, and successful exchanges can only occur if the bots can understand the customers properly. Currently, 59 percent of the chatbots deployed are poorly built, unable to comprehend human demands. This confirms that most chatbots are not appropriately designed and easily overwhelmed when tasked with too much to do.

With the proper AI and an in-depth strategy, the chatbot can become more conversational, lead to a more human-like experience.

Examples of experiences are:

Switch customers to live agents with ease.
Experience engaging welcome messages.
Answering FAQs.
Scheduling callbacks.

After-Hours Sales

Chatbots are gradually moving beyond enabling the online user's online experience, eventually having a broader, more significant impact on the organizations' revenue. Bots may be taught to chat about particular sales and marketing strategies, landing pages, and selling specific items.

Consumers are online 24 hours a day and will arrive on a platform from several diverse backgrounds. Whether it is a direct advertisement, recommendation, SEO, or an organic search, customers usually have concerns about the goods, services or, details they provide.

Examples of improved customer service experience with bots are: they effectively address queries about vehicle models, facilitate the return process, schedule callback service, open the Aid Ticket, recommend the right watch, tear down insurance policies, and assist the client in locating the right bank or savings portfolio.

Bots that Meet Marketing and Branding Targets

Creating and developing a dynamic brand is the most critical goal of the marketer. Repeated positive interactions continue to build consumer satisfaction and a strong brand image. When users communicate with a chatbot, 80 percent of them report having a good experience. Customers are eager to connect with a chatbot, and the touchpoint is an ideal opportunity to involve them positively with a company.

The 24/7 functionality of the chatbot makes them a great marketing and lead-generating vehicle. More than 64 percent of consumers see 24-hour service as the most significant benefit of the chatbot. Well-built chatbots quickly gather user data and transform users into leads, helping them enter marketing. CA

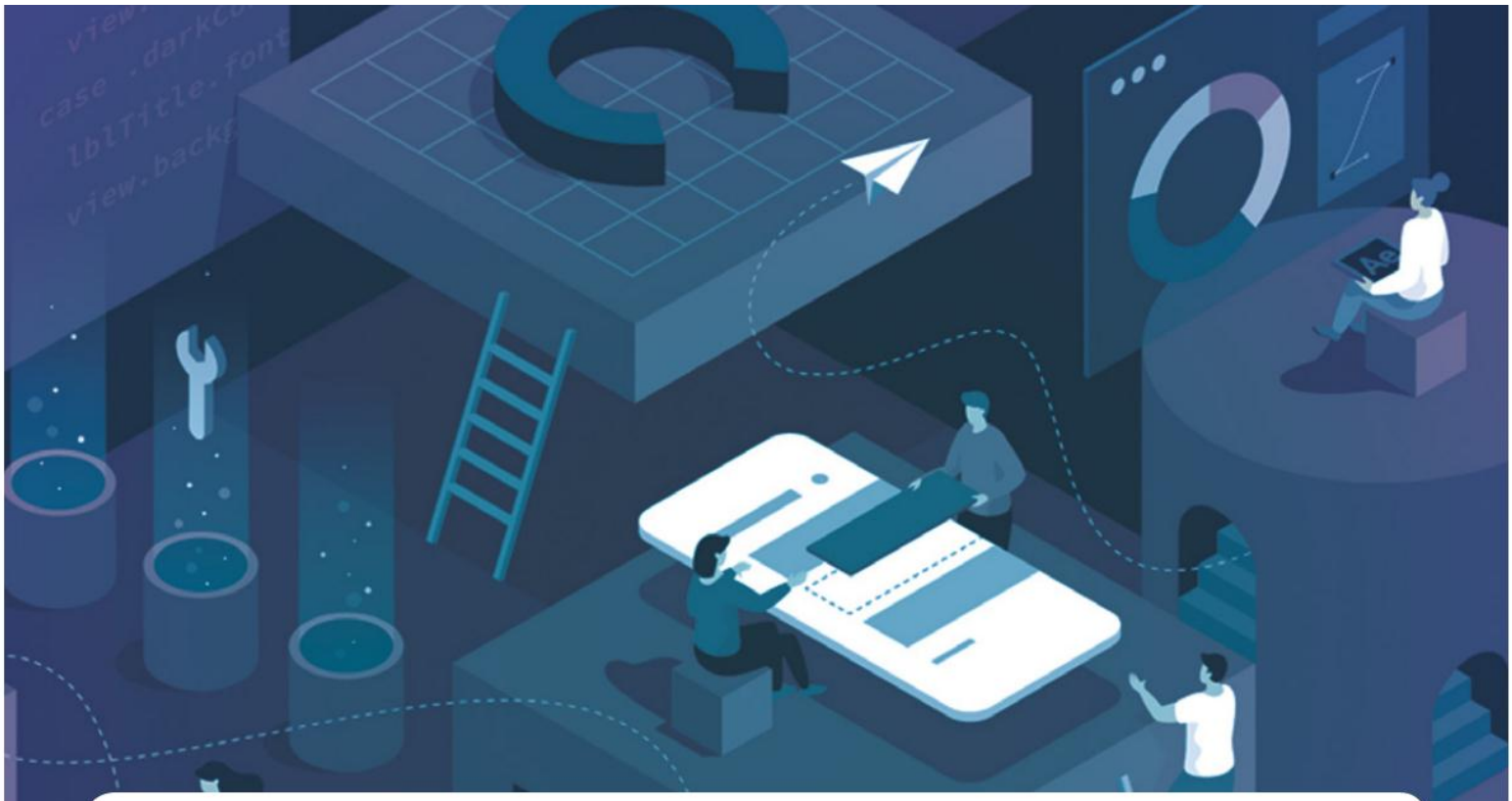
The Future of Chatbots

JOHN TUBERT,
SVP, TECHNOLOGY,
R/GA

Chatbots have been around for years and years. As early as 1966, the first chatbot named Eliza was born, but it was only able to answer a few simple questions that had to be asked in a simple and straightforward way. With the advancement of technologies such as Natural Language Processing (NLP), Artificial Intelligence (AI), and more specifically technologies like GPT-3 that can be used to generate new text that is grammatically correct. In addition, chatbots can now answer pretty much any question without having the answers hardcoded by connecting to large answer repositories like Wikipedia. Some of the AI models from Google and Microsoft are so advanced in language understanding that some benchmarks show that they are exceeding humans. Interestingly enough, they both exceeded the human baseline score of 89.8. The score is a percentage that is calculated for each of the tasks based on their individual metrics.

Beyond language understanding, chatbots now can also translate text, answer questions, summarize texts, write essays, write code, and even draw images based on a description. The new, soon to be released, AI from OpenAI, it's called Dall-e (a combination of artist Salvador Dalí and Pixar's WALL•E). It's a chatbot that allows you to type something, and it returns images interpreting what you are saying; if you type, "show me a chair with the shape of an avocado," it could return something like this:

Beyond language understanding, chatbots now can also translate text, answer questions, summarize texts, write essays, write code, and even draw images based on a description



The same way that GPT-3 can write endless pieces of text, Dall-e can create endless images that can be either photo-realistic or look like drawings.

The COVID-19 pandemic has also kept everyone at home, providing additional interest in chatbots. Chatbots are a great way to interact with brands, they are used for customer service and more and more on social platforms. The first venue to support chatbots was Facebook Messenger, but shortly after, many other platforms followed suit: Telegram, Skype, Viber, Slack, Microsoft Teams, Twitter, Google Assistant, WeChat, Line, WhatsApp, and many more.

With the combination of these and other technologies, today's chatbots are pretty smart and powerful (definitely smarter than Eliza, the chatbot of 1966!), but what will the chatbots of the future look like? Will they be a fully immersive experience? Will you chat in virtual reality? Will you have a hologram customer service representative?

I think the chatbots of the future will look and sound more human. These bots should be able to respond to emotions as well as participate in actual conversations. More importantly, the chatbots of the future will take on a larger share of the cognitive load. Instead of using a search engine, you could ask a chatbot what you want to know, and it will find the most relevant information for you. Imagine interacting with a chatbot over video chat (or hologram chat) and this celebrity or expert in the field, that looks and sounds human, is a bot that can have a conversation with you and answer your questions by sorting and filtering information. The two technologies that can power cognitive capabilities (in addition to the ones I mentioned before) are voice cloning and deep fakes; there are many companies doing this today. For example, for voice cloning, I was recently playing around with resemble.ai and 15.ai. Resemble.ai lets you record a few messages to build your voice. From there, you can type any text and it will read it with your voice. 15.ai has a preset of characters (like Spongebob or Dr. Who) to which you can select and have them say anything you type. There are also some companies working on Deep Fakes, like synthesia.io, which lets you generate deep fake videos. We used it for a campaign called Malaria must die to recreate a video of David Beckham in many different languages.

While this future is pretty impressive, all these technologies can be used to impersonate or scam others. Because of this, more companies are also creating tools to detect fake voices, deep fake videos, and AI-generated text. Microsoft has a tool called "Microsoft Video Authenticator", and it can analyze video or a still photo and provide a percentage chance, or confidence score that the media is artificially manipulated. Microsoft also created a quiz to help people identify deep fakes. Another tool called "Reality Defender" helps you detect synthetic media, and for audio, Resemble.ai created an open-source tool to help you detect fake speeches. There are also tools to detect generated text like https://gltr.io/ and "GPTrue or False", a chrome extension that helps you detect if the text was written by GPT or not.

What do you think the chatbot of the future looks like? CA

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TOP 10 CHATBOT SOLUTION PROVIDERS - 2021

Chatbot technology is evolving and providing enterprises with more sophisticated ways to mimic human conversations via artificial intelligence (AI). The credit of this evolution primarily goes to the improved capabilities of AI-enabled language programs. As of date, various organizations are investing in the development and deployment of chatbot technology to maintain contact with their subscriber base and acquire more prospects. As per a market research survey, the chatbot industry will likely provide conversational platforms to over 70 percent of white-collar workers by 2022.

Using natural language processing that maps both verbal and written input to intent, organizations are rapidly implementing chatbots in their workflow. However, with the market being crowded with over 2000 vendors, it is not easy to select one that offers an effective chatbot solution for all stakeholders, implements governance policies, and applies these best practices into a conversational platform. To ensure having the best-fit provider for a venture, some criteria need to be checked. These include proper and defined chatbot guidelines, specialization in data preparation and building, secure and ongoing model management, voice support implementation, and incorporation of soft features that reflects the brand value.

Every industry needs to look for new ways to maintain its competitive edge in order to succeed. Keeping that in mind, chatbots are turning out to be a valuable commodity among businesses that are trying to provide round-the-clock customer communication services. To implement this technology, the significance of chatbot solution providers becomes paramount. So, to help organizations select the best chatbot solution, we present to you CIO Application's "Top 10 Chatbot Solution Providers 2021."

TOP 10 CHATBOT SOLUTION PROVIDERS - 2021

COMPANY	DESCRIPTION
CHAT-SAVVY BOTS *CHATSAVVYBOTS.COM*	Chat-Savvy Bots we're focused on developing strategic digital solutions that are tailored to client's brand's specific needs
CONVERSICA *CONVERSICA.COM*	Conversica is the leading provider of Conversational AI solutions that help enterprise marketing, sales, customer success, and finance teams attract, acquire and grow customers at scale across the customer revenue lifecycle
KALEYRA *KALEYRA.COM*	Kaleyra is a communications solutions provider, comes to the fore and provide real-time assistance to customers through chatbots
LIVEPERSON *LIVEPERSON.COM*	LivePerson's Conversational Cloud platform empowers consumers to stop wasting time on hold or crawling through websites and message their favorite brands instead, just as they do with friends and family
NUANCE COMMUNICATIONS *NUANCE.COM*	The company delivers solutions that understand, analyze and respond to human language, amplifying human intelligence
RASA TECHNOLOGIES *RASA.COM*	Rasa is the leading conversational AI platform, enabling enterprises to build a next-level customer experience
SENSEFORTH *SENSEFORTH.AI*	Senseforth.ai builds chatbots, voice bots, and email virtual assistants to automate customer service, enhance agent productivity, increase sales, and improve customer retention
SPEAKEASYAI *SPEAKEASYAI.COM*	The company's Speech-to-IntentTM system enables businesses to understand and respond to their customers' needs in voice with AI
VELARO *VELARO.COM*	Velaro is website live chat software built to support the unique needs of the enterprise. Leaders across various industries turn to Velaro's integrated platform to optimize sales, deliver stellar service and dramatically improve rep productivity
VOICIFY *VOICIFY.COM*	Voicify is the market leader in conversation experience management software that combines voice optimized content management, cross-platform deployment, and voice-specific customer insights

Kaleyra

Providing Exemplary Customer Communication via AI-Powered Chatbots

Customer service expectations are evolving at an unprecedented rate, challenging companies to keep up. As modern-day consumers actively seek out information or contact customer service at a never-before-seen rate, providing prompt responses to their queries has become critical to maintaining good brand perception. This is where Kaleyra, a communications solutions provider, comes to the fore and provides real-time assistance to customers through their highly intuitive chatbots. The company helps businesses leverage conversational bots to automate customer interactions, which solves consumer problems in real-time, with fast, prompt, and effective responses, avoiding customer frustration. With their solutions, companies can effectively manage communication across many channels such as live chat, messenger apps, SMS and voice calls, to name a few. Kaleyra also brings an omnichannel business communication platform that enables its customers to reach, engage, and manage an integrated and multi-channel notification service. Their innovative communication tools help companies connect and communicate with the customer base effectively, and significantly increase customer retention and satisfaction. In a conversation with CIO Application's editorial team, Kaleyra's Chief Product Officer, Nicola Junior Vitto, discusses the company's solutions and their efficacy at length.

Could you provide our readers a brief history of Kaleyra?

Kaleyra is a trusted Communication Platform as a Service (CPaaS). Our primary offering is an API-based platform, a single web interface that allows businesses to manage communications with their customers across various channels. Currently, we serve over 3,500 customers globally, including Hyundai, Uber, and MasterCard, to name some. Kaleyra was started back in 1999 as Ubiquity, in Milan, and the firm later merged with Solutions Infini, a Bangalore-based startup, in 2017. After this major acquisition, we rebranded the company as Kaleyra and we became a publicly-traded company in 2019 by getting listed on the NYSE. Last year, we had managed about 25 billion messages, and about four billion voice calls through our platform. In order to facilitate communication with customers, we collaborate with network operators in various countries. We work with more than 1600 mobile network operators worldwide that help us deliver our services efficiently and reliably.

Nicola Junior Vitto,
Chief Product Officer

Could you walk me through Kaleyra's solutions?

Yes, sure. Kaleyra offers a single platform through which businesses can manage all their communication with their customers. We help companies engage their customers with personalized messages, chatbots, programmable voice services, push notifications, transactional emails, and other channels. Messaging and voice services are considered network-based channels, while every other service is IP or internet-based; we offer both kinds. Kaleyra has very robust APIs which allow developers to interconnect their systems easily with Kaleyra's platform, and we also offer a web interface, an intuitive UI, where companies can simply create an account and log in to setup virtual business numbers, run marketing campaigns, build user communication flows, extract reports and such. As we cater to many organizations working in highly regulated sectors, especially in Italy, our primary differentiators are security, reliability and scalability. We offer authentication solutions to many financial institutions and help them validate and secure their users' banking transactions. The solution enables businesses in other sectors as well to generate one-time passwords and send them to customers through SMS, voice calls, and email. We also provide chatbots that work across various channels. We also help companies implement actionable alerting systems, which enable them to send transactional notifications to customers. More importantly, we provide contact center services and improve companies' operations efficiently.

> **Our solutions come with a natural language understanding engine, which we built leveraging our in-house capabilities**

What are some of the flaws of chatbots in the market space today, and how does Kaleyra address them?

Today, many companies in the market come with great capabilities in natural language processing, AI, and ML. However, to deploy such solutions, companies require extensive help from developers due to complications in the setup. Although many firms offer no-code or low-code solutions, which are easy to set up, such chatbots are rule-based and do not offer much in terms of NLP, AI and ML. For that reason, most bot offerings tend to work in one context and fail in another. Moreover, these chatbots are not future-proofed, meaning they work with one or two communication channels today, but may not scale to other channels tomorrow. Kaleyra's chatbots address all these pain points. For one: our solutions come with a natural language understanding engine, which we built leveraging our in-house capabilities. Our proprietary natural language engine also enables easy setup while customers try to build the chatbots. Clients should be able to set up a chatbot in a few minutes without any outside help. Two: our algorithm is capable of dealing with intent recognition efficiently. For example, our chatbots can differentiate between two sentences with the same number of words and tokens. We utilize the natural language understanding engine to recognize the intent of a sentence or a query raised by a

customer. We have built many features to help businesses improve performance by leveraging the data coming from chatbots. Smart detection is one such feature, which helps the bot ask only the necessary questions and avoids redundant questions, like if a user mentioned that they want a table for 7pm, the bot can avoid asking what time the user would like to reserve the table for. We primarily provide the service in English, but other languages, European, Indian, and others can be accomodated.

Could you walk me through the step-by-step approach that you take while building a chatbot?

The first step in building a chatbot is making sure it can understand the user intent. The purpose of a chatbot can be to fulfill any need, but to fulfill that purpose, the bot should have some idea of what a user may say to express their needs. Our algorithm looks for utterances that express this intent. For instance, when someone comes in and says, "please book a cab for me," this statement indicates a particular intent. After understanding the intent, the chatbot can follow up the user's query with questions required to fulfill the same. Such follow-up questions are generally entered into what we call slots. We make the slots smarter by leveraging AI, so the bot knows the right follow-up questions to ask. The final step in building a chatbot is fulfillment. Once the chatbot captures all the information from the user, it can perform the required actions, such as creating a cab booking or booking a doctor's appointment, and respond with a confirmation message of some sort.

There can be many instances when the chatbot fails to answer the user's query without the help of a service executive. For those instances, we use a human-plus-AI concept, which facilitates a seamless handover to an agent when the chatbot cannot fully recognize the user intent. The most common instance is when the customer asks for an agent—we can hand over the interaction to an agent swiftly. In other cases, we can also analyze the customer's sentiment and hand over the conversation to an agent, especially in the case of the bot conversation taking a negative turn. The nice thing about the humans-plus-AI concept is that as the chatbots learn various from human interactions, they can handle customers who express the same intent in the future without the help of a human agent.

Could you narrate an instance that highlights the benefits brought to one of your clients after approaching Kaleyra?

Yes, of course. We completed a project with the government of India where we helped them effectively manage the COVID-19 pandemic through chatbot triage by helping the people book medical appointments in the event that they test positive. We built a chatbot that performed a preliminary screening of users which enabled the government to understand the patient's medical condition before assigning any limited resources. The chatbot provided instant appointments to patients who were screened as being at high risk. Doctors reached out through video calls to provide medical care and expertise to patients in the early stages of the disease. We completed this project in just two days and launched the service in three different languages. With the help of the chatbot, the government screened more than 2,500 patients who tested positive for COVID-19.

In another instance, we collaborated with the government of Karnataka—one of the southern Indian states—to help them manage the lockdown imposed during the initial waves of the COVID-19 pandemic. We partnered with last-mile delivery services operating in the state to provide essential goods to people. We built a chatbot on WhatsApp where users could place orders for essential groceries and medicines. The bot would pass the orders over to the delivery partners via APIs, and they would deliver these essential groceries at the user's doorsteps. The bot was intended for delivery of essential goods only, so we leveraged AI to screen the orders for prohibited items such as alcohol and cigarettes. We helped more than 25,000 customers just within Bangalore city through over 55,000 chat sessions.

What does the future hold for Kaleyra?

It's pretty obvious that chatbots can be used in a number of different applications to interface with customers. One application that we see in particular is the use of bots to solve the issue of fragmented customer interactions across channels. Part of this is employing bots to obtain the correct information from the users based on intent, but bots could also be used to surface the correct information in front of support agents to provide them with better context about the customer, which in turn would help them provide the customer with a better and more seamless experience. This has a lot to do with improving organizational processes with AI. The future of conversational interfaces will be to address some of the fundamental flaws in such processes. In the future, chatbots will emulate the material world through a variety of virtual interfaces, not just text like we mostly see now. In this regard, we can expect to see the market evolve by combining AL and ML capabilities with a variety of channels, including voice, which a few players have already started experimenting with. We believe that conversational AI will become integral to business processes in the days to come, and we'll augment our solutions with new, innovative capabilities to help our clients communicate better with their clients. CA

The Shift toward Cloud:
Is it a Cost-Effective Process?

BY **IAN COHEN,** CIO, ADDISON LEE GROUP

Well it's what I said so it must be true... But, like everything it is all in the detail.

The quote came from an interview with Silicon.com during this year's CloudForce event in London and, overlooking my indignation at being called "veteran CIO", I stand by it 100 percent.

The undeniable fact is that in this time of budget pressures, many companies are looking to cut their costs by moving to the cloud and that may well be possible but only if you avoid the inevitable expansion of activity that will come as a result of this move. You see once you create new capacity, demand will always grow to fill them—it's as sure as eggs are eggs.

If you don't believe me then it is worth considering the observation that 'technological progress that increases the efficiency with which a resource is used tend to increase the consumption of that resource'. Ironically it is not a quotation from some cloud guru but is actually called "Jevons paradox", first postulated by William Stanley Jevons back in 1865. As I blogged earlier—nothing changes, everything stays the same— pretty much.

Anyway here's an extract from the Silicon interview: Veteran IT chief Ian Cohen has other ideas—telling silicon.com that any company looking at moving to cloud computing purely as a way of saving money should "forget it".

JLT's Group CIO Ian Cohen says any company looking at cloud purely as a way of saving money should "forget it", Cohen is speaking from experience.


IAN COHEN

> "WE ARE A REGULATED BUSINESS SO WE HAVE TO BE MORE PRUDENT THAN SOME OTHER ORGANIZATIONS BUT THAT DOESN'T MEAN WE CAN IGNORE CLOUD TECHNOLOGIES AND THE OPPORTUNITIES THEY OFFER"

As group CIO of Jardine Lloyd Thompson (JLT) he is helping the global risk management and insurance broker to make greater use of cloud-based services, such as Salesforce. com's CRM platform.

When businesses shift to cloud services, the oft-talked-about savings won't last, Cohen said, as any reduction in cost or overheads is quickly swallowed up by fresh demand for IT services. "If you go into cloud thinking you will save money, forget it. What invariably happens is that you create more efficiency and headroom. However, demand that previously could not be met can now be enacted and thus your activities simply increase to fill the available resources—be that time, people or infrastructure," he told silicon.com at Salesforce's recent CloudForce conference in London.

"People will be using your systems to do more. That's the killer sell as to why people should be looking at cloud: the ability to flex your enterprise into a more extensible model at light speed."

Cohen also cautioned that shifting operations to the cloud is not straightforward for any business—there will always be resistance and challenges, particularly for a heavily regulated business such as JLT.

"Its early days. We are working around some of the issues with some of the naysayers and a lot of it is around security and audit, all the usual cloud stuff," Cohen said. "A lot of concerns are still around data location, traceability and auditability. It's still a challenge if an auditor comes in and simply asks, 'Where is the data? Let me see it'.

"We are a regulated business so we have to be more prudent than some other organizations but that doesn't mean we can ignore cloud technologies and the opportunities they offer." CA

Leverage Advanced Chatbot to Enhance Customer Experience

BY **WESLEY RHODES,** VP R&D AND TECHNOLOGY TRANSFORMATION, KROGER

Wesley Rhodes, who serves as the Vice President of R&D and Technological Transformation at Kroger, is responsible for executing and implementing innovative projects, architectures, and technologies that helped the company create cutting-edge, cohesive experiences for its clients. He has extensive experience in AI, cloud computing, and machine learning, making him a prominent leader in the space and helps him embrace several robust technologies. In the conversation with CIO applications magazine, Rhodes has focused on the latest trends going on Chatbot space and how this innovation can provide a better customer experience.

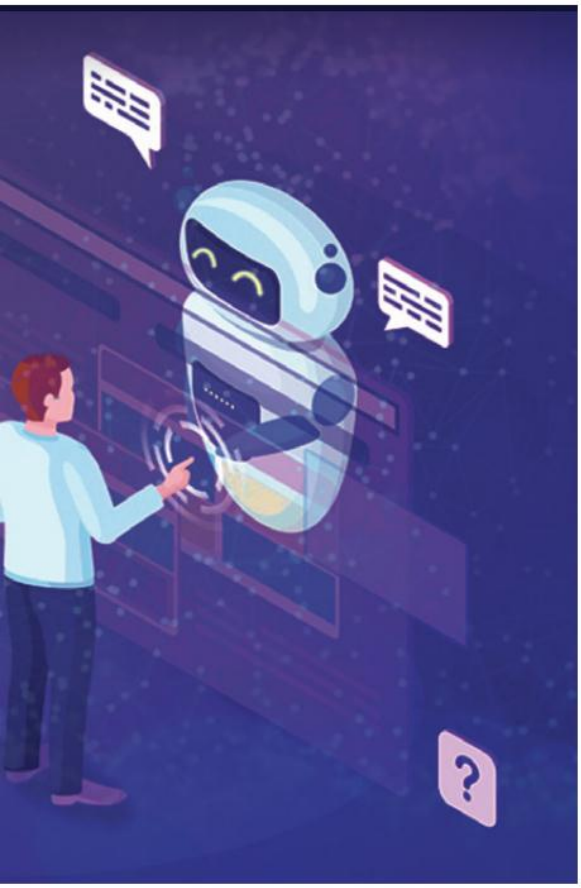
Could you shed some light on your journey in this industry, current role, and responsibilities at Kroger?

I started my career as the VP of research & development and technology transformation around three years ago. I also serve as the COO in one of the leading technology transformation companies called Sunrise Technologies, a Kroger subsidiary. Before joining Kroger, I spent 18 years of my professional career at the tech behemoth IBM as a Chief Technologist, gaining significant experience and technical expertise in the technological landscape. I was responsible for addressing the most crucial issues—both business and technical—of IBM's high-priority customers.

Later on, I have served as the deputy chief technology officer for the U.S. federal, where I was responsible for the National Security and Defense operations. I leveraged my expertise to resolve the most complicated engineering problems within the space. More importantly, my high-risk programmatic background and the National Defense and Intelligence experience have trained me to overcome the most complex commercial issues. It requires a lot of innovation to manage risky projects that are difficult to resolve.

What are some of the trends that you see in the Chatbot space?

Traditionally, chatbots had a marginal amount of intelligence. It was just used to gather data and assist the user in interacting with their consumers to solve their queries and issues. However, as the needs of most businesses for exceptional customer experience have gone up the ladder in the past decades, there was an appetite for highly intelligent conversational experiences. But, with the pandemic, where physical interactions are no longer a real possibility, it became extremely crucial for the industry leaders to boost the use of intelligent chatbots that ever before to enhance and optimize their customer interactions. As a result, they were upgraded to have highly intelligent conversations and even for research assistance. Not just that, they were being used in several industries in a plethora of complicated and sophisticated tasks.



Coming back to customer interaction, the use of conventional models to connect with consumers has undeniably decelerated business operations and their quest to ensure high customer satisfaction. As people had to wait longer to connect to a human, the traditional one-on-one model has put organizations' customer experience index at a disadvantage. But, today, conversational Artificial Intelligence (AI) is making a paradigm shift in chatbot space. It makes customer interaction easier for businesses, helping them ensure that their consumers' issues were solved on time. The conversational AI behaves as an intermediary between company personnel and customers. They have gone from a normal chat to a very intelligent and sophisticated conversation between the chatbot and humans. So, we are deploying those AI solutions, which is no longer just a traditional chatbot. They're very well-trained AI agents that are doing repeatable human thought. That is the trend. It's almost a misnomer now to call them chatbots.

How do you see the Chatbot space changing in the next 12 to 24 months?

I'd say that the Chatbot space is witnessing two major transformations simultaneously. Primarily, we are witnessing a massive influx of data, which is followed by advanced analytics to help the solutions make more information-driven decisions. Not just that, the chatbots are also integrated with advanced sensors to further optimize the use of AI. So the ultimate aim of deploying AI into organizations is to improve customer experience and offer insights easily. They can help businesses reduce their operation costs, connect with the logistics chain, give information and insight to streamline their operations and minimize the risk during business disruptions. As a result, it runs naturally into the decision-making processes.

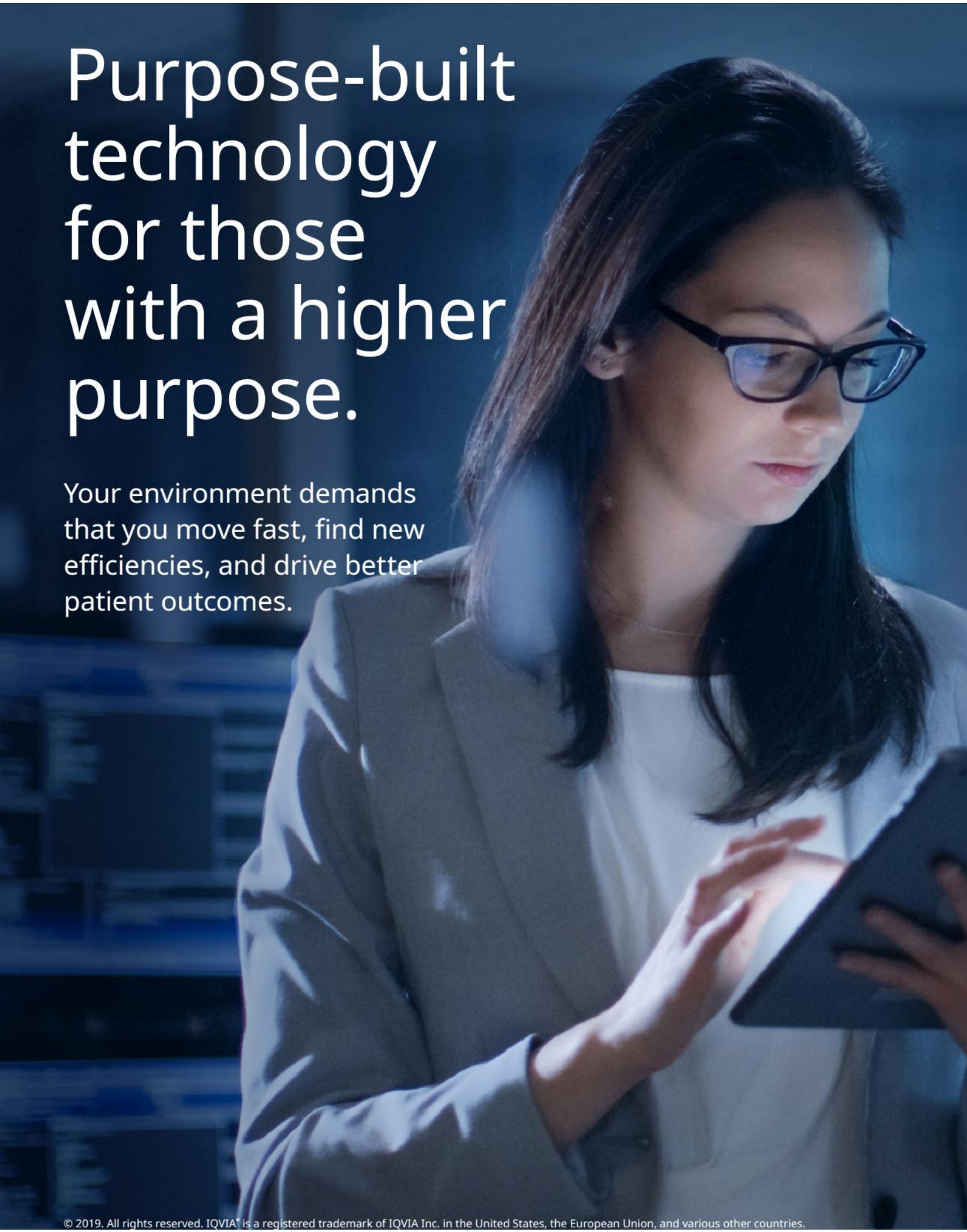
A well-created data program is mandatory to feed, clean, correlate, and enrich data so that AI programs can function smoothly. We are also witnessing a major overhaul in terms of data management to make the huge volumes of data fit for AI applications. Born with an ultimate objective to help businesses achieve their goals—whether it's ensuring customer experience or optimizing logistic chains—these solutions are being fed with the most appropriate interpretations and perspectives. And, it's designed as a layered AI that can handle multiple functions and manage multiple systems. Various models are used to obtain intelligence, allowing customers to seamlessly engage with business and enable them to buy or make decisions more quickly than before.

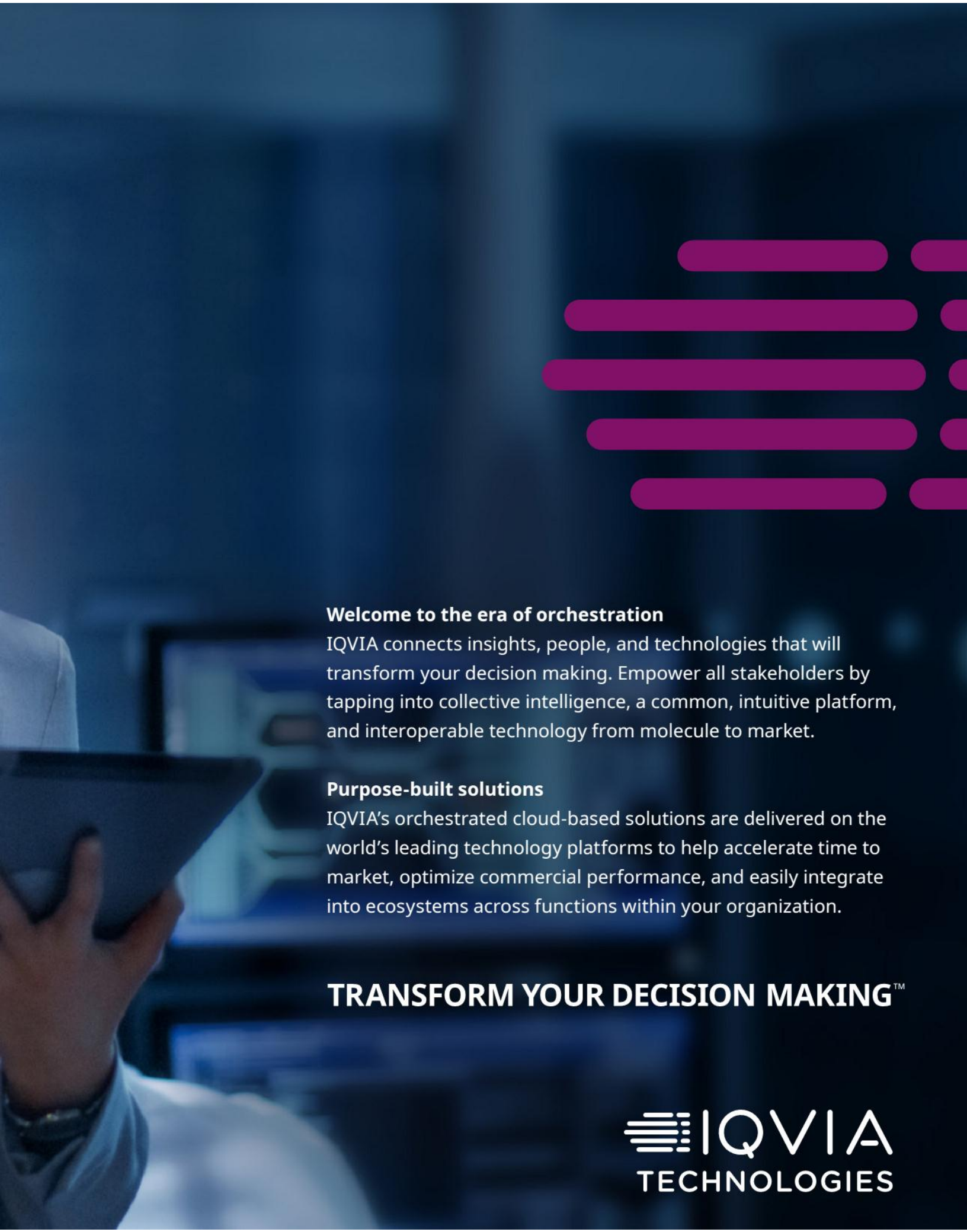
> "CONVERSATIONAL ARTIFICIAL INTELLIGENCE (AI) IS MAKING A PARADIGM SHIFT IN CHATBOT SPACE. IT MAKES CUSTOMER INTERACTION EASIER FOR BUSINESSES, HELPING THEM ENSURE THAT THEIR CONSUMERS' ISSUES WERE SOLVED ON TIME"

As a result, a consumer's time to choose between you and your rivals is getting shorter. Businesses now must respond quickly to take advantage of opportunities. This is absolutely necessary for today's pandemic-riddled business environment. With more people moving online for their daily operations, the innovative AI chatbots will serve as a reliable partner for most businesses that help them interact with more consumers and attract them into their ecosystem. And we witness a rush toward innovations like Conversational AI.

Would you like to provide any advice to your colleagues or aspiring professionals in this field?

My advice for them is to think out of the box as things are evolving fast. They need to focus on two critical aspects: hire multi-dimensional people who have multi-perspectives. With that, you will have different disciplines and points of view to look at a problem. Second, hire people who come from different walks of life to look at the situation differently. When these things come together, it will help the organization create some differentiation and diversity of perspective on a problem that yields value. CA





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The Evolving Landscape of Mortgage

BY **SCOTT LONG,** VP - BUSINESS & ARTIFICIAL INTELLIGENCE MANAGER,PRIMELENDING

In the residential lending industry notorious for financial complexities, fluctuating market conditions and persistent operational and regulatory changes, staying at the forefront of revolutionary technology is the key to success—which is why PrimeLending strives to develop forward-thinking solutions at every step of the process. As a national mortgage lender, PrimeLending is governed by one goal: make homeownership dreams come true while providing a simple, best-in-class borrower experience.

The paradigm shift from traditional to digitally-driven business models has largely been propelled by Artificial Intelligence (AI). From increasing Loan Officer productivity to enhancing the borrower experience to maximizing price competitiveness, AI is hugely influencing the lending industry's future.

To ensure a strong digital presence in the market and a faster, more profitable home loan process, PrimeLending has zeroed in its focus on four areas of AI: Machine Learning (ML), Natural Language Processing (NLP), Computer Vision (CV) and Robotic Process Automation (RPA). AI's value creation is boundless, and PrimeLending is proactively adjusting business strategies to provide the best experience for both borrowers and employees. Before exploring exactly how these four areas are impacting the mortgage industry, let us properly define these focuses:

- **Machine Learning –** Provides systems with the ability to automatically learn and improve applications from large amounts of data without being explicitly programmed.
- **Natural Language Processing –** Technique used to aid computers to read, decipher, understand and make sense of human language.
- **Computer Vision –** Technique used to help systems understand images and decipher text in order to take the appropriate action.
- **Robotic Process Automation –** Software that can be easily programmed to do basic tasks across applications just as human workers do.

Predicting Customer Lifecycle

By quickly accessing and learning from existing data, ML will allow lenders to determine a borrower's next steps

and their likelihood of progressing through the sales funnel. By verifying, prioritizing and validating a borrower's creditworthiness to ensure high-quality leads are being routed to our workforce, PrimeLending hopes to improve upon an already exceptional customer experience and deliver a highly productive, efficient process for Loan Officers in the future.

Simplifying the Mortgage Process

For those with little home loan experience, the world of mortgage, especially industry lingo, can be overwhelming. But, because NLP reads, deciphers, understands, and makes sense of human language in a manner that is effective and actionable, borrowers can interact with other AI technologies using their natural dialect.

Accelerating Application Reviewal

One of the most time-consuming aspects of the home loan application process is collecting and reviewing information required from borrowers. There are several areas throughout this experience that complete 'stare and compare' activities where the analysts verify that the data in the Loan Origination System matches the data on a document. By extracting information from images and documents, CV makes the data available for end users to do analysis. This will reduce a large percentage of the comparisons and allow analysts to focus on tasks requiring critical thinking.

> "FROM INCREASING LOAN OFFICER PRODUCTIVITY TO ENHANCING THE BORROWER EXPERIENCE TO MAXIMIZING PRICE COMPETITIVENESS, AI IS HUGELY INFLUENCING THE LENDING INDUSTRY'S FUTURE"

Scott Long

Increasing Internal Productivity

Robotic Process Automation bots perform mundane day-to-day tasks allowing employees to focus and concentrate on critical thinking tasks and building internal and external relationships. Once a resource gets to the point in a process that can be automated, the resource could hand it off to the bot to complete the work and move onto the next task. RPA combined with ML and CV can also help reduce cost by automating tasks that previously seemed impossible to automate before. Mortgage is a cyclical industry, and this innovation should help alleviate the need to hire up during spikes in business.

Even though our current use of AI has drastically improved business, the lending industry is just scratching the surface of what this powerful technology can do. In an industry of relentless change, adapting to this technology revolution is paramount to thriving in this hyper-competitive market which is why PrimeLending strives to infuse ground-breaking innovation at every step throughout the process. CA

Conversica

Amplifying Organization Sales With Intelligence

The human ability to grasp and acknowledge the content and context of communications for a meaningful reaction is at the heart of every human conversation. Can we ever imagine if communication may be replicated via machines, artificial intelligence (AI), Internet of Things, or machine learning? A Chabot is an AI-powered software that provides man-machine-type two-way communication. According to Gartner, "By 2022, 70 percent of white-collar employees can act with a colloquial platform on a daily basis." At the same time, most organizations are disposing of their traditional processes and adopting AI and Chatbots. The customer's loyalty depends on the quality of the interaction with the enterprise, wherein they want to have a simple means to interact and get a faster response to their queries. Modern Chatbots powered by AI allow businesses to understand the customers' requirements and establish a two-way communication channel.

Chatbots are proliferating across each domain—optimizing manufacturing operation to supply chain management. However, their most significant impact has been felt in customer-centric service, transforming the field. It assists businesses in automating their customer service engagement and improve customer service support. Unlike other Chatbots providers, Conversica is a cloud-based conversational artificial intelligence platform that helps enterprises interactively engage with customers and generate more revenue. The AI-powered virtual assistant tool allows organizations to communicate with their potential customers seamlessly. It will enable businesses to increase sales, marketing and enhance customer engagements.

Conversica Sales AI feature permit enterprises to contact every single lead that comes up with unwavering diligence. The intelligent sales assistant uses modern technology, such as, AI and machine learning to generate emails, text messages to drive potential customers in an ongoing conversation. The virtual assistant uses natural language and highly turned conversational skills to respond to incoming leads effectively and quickly. Conversica's virtual sales assistant is given a name and specific email address, which allows it to contact the customers automatically, engage users in a conversation and make them ready for a live demo product. It provides a seamless installation process. Whether you are a tech-savvy person or not, the account manager and customer success teams will guide you from purchasing software to answering your queries.

Conversica also helps organizations to reduce business costs by minimizing customer service representatives and downsizing overhead. The services offered through varied products facilitate organizations to boost their customer service and increase engagement with the purchasers. Conversica has always provided tailored solutions to its clients. A leading EdTech client in North America was facing difficulty with inbound leads. The client offered a cloud-based teaching experience to professors to engage with students online or offline with informative content, tools, and interactive platform. The client receives thousands of leads every month from various sources; the human workforce couldn't handle such a large number of leads systematically. The client turned to Conversica to help them streamline their process swiftly. Conversica's virtual sales assistant captures lead data from the database using custom variables. It then reaches out to these leads based on specific criteria and sets an email with pre-determined messaging. Based on these feeds, the client registered an increase in engagement rate by approximately 42 percent. The client witnessed a 20 percent conversion rate to hot lead. From that, 25 percent transform to opportunities with an expected revenue of ninety thousand dollars.

Talking about their future endeavor, Conversica will continue to enhance virtual technology with improved capabilities, expand into new sectors and add new assistants that automate business conversations. With the rise of automation in businesses to improve productivity and customer service, Conversica is developing new intelligent assistants to enhance customers' experience. CA

Put your Frontline Teams in the Driving

Seat through a Personalized, Customer-Centric Approach

BY **TATIANA SOROKINA,** SOLUTIONS DIRECTOR, DATA SCIENCE & ARTIFICIAL INTELLIGENCE, DSAI INNOVATION EXECUTION, NOVARTIS

In the age of digital transformation and the COVID-19 induced acceleration of online customer interactions, sales forces remain one of the biggest commercial expenses for the pharmaceutical industry. Every year, pharma companies spend $10B to $15B on salesforce in the US alone. This fact shouldn't be surprising considering that "personal selling" could contribute up to 20 percentof incremental drug revenue. But from a brand marketing standpoint, a sales force is an expensive channel which is hard to optimize because sales reps are usually employees of the company and can't be turned on and off like an email campaign.

Over the last ten years, pharma brand teams have been experimenting with various digital channels, attempting to get closer to an omnichannel approach to outbound marketing. Omnichannel promotion is important not just to reach physicians with more than one medium, but it can also decrease the reliance on salesforce resources and sustain or expand sales margins. As a result, the number of total sales reps has declined over the years, but the overall marketing effectiveness hasn't improved as much as the industry had hoped it would. Year over year, pharma companies continue to shed their field force headcount while struggling to replace it with automated non-personal engagement with the customer.

Moving from Selling to Building Relationships

Coming to pharma from a B2B healthcare technology background, I have always struggled to see a sales rep as one of the marketing channels. To me, a marketing channel is an email, a text message, a mobile app or a TV commercial. In the B2B world, sales and account teams are viewed as strategic partners who don't just sell a product, but offer a solution to a customer's pain point. I always liked to imagine pharma's commercial, medical, and patient account experts forming a dream team to build a kind of relationship with a physician that addresses her needs holistically, from learning about new clinical trials happening in her therapeutic area, to choosing the right treatment regimen for her new patient, to dealing with insurance companies and streamlining patient approval for a prescribed drug.

It has been very encouraging to see new initiatives happening in non-pharma industries that get us closer to this new model. Imagine customer account teams operating as mini-businesses that are held accountable for the revenue they bring to the HQ. At the same time, they are provided with the full suite of digital tools to manage their sales pipeline, address customers' ongoing challenges and communicate with them. This is where digital transformation powered by AI becomes key to the success of this new business operation.

A New Augmented Intelligence Approach

If your brand has 30 sales reps, 10 medical science liaisons (MSLs) and 5 patient support liaisons (PSLs) and they operate as individual mini-businesses, you're looking at a model where you are responsible for orchestrating daily activities of about 150 teams consisting of customer-facing experts who often don't interact on a daily basis and sometimes are not even aware they need to work together. This is where digital technology and AI come into play. Through an integrated and seamless CRM interface powered by hyper-personalized algorithms, a sales rep, an MSL, or a PSL can see which physician accounts they need to attend to and for what reason. The AI identifies specific customer pain points, suggests the best intervention, and the team acts on it.

> "YEAR OVER YEAR, PHARMA COMPANIES CONTINUE TO SHED THEIR FIELD FORCE HEADCOUNT WHILE STRUGGLING TO REPLACE IT WITH AUTOMATED NON-PERSONAL ENGAGEMENT WITH THE CUSTOMER"


Tatiana Sorokina

If a clinical study has just come out and it's important to increase awareness of new data, an MSL can make the first visit to the doctor and tell her about the results of a trial. AI then assigns the next steps to the sales rep covering the same account based on the outcomes of a medical discussion and anticipated needs from the physician. A recent HBR article authored by a famous chess grandmaster Garry Kasparov and a behavioral science scholar David De Cremer calls this human-machine collaboration Augmented Intelligence.

Because customer account teams can drive their own marketing plan, they have access to a suite of digital marketing tools with AI-driven recommendations about the next best action and automated marketing cadences that account owners can trigger. Everyone on the same account team can see what activities their customer has engaged in, in-person or virtual.

This AI-driven customer-centric approach puts the frontline teams in the driving seat and elevates the role of sales, medical and patient support associates. It also focuses on building a trusting relationship with the customer and emphasizes supporting their needs through coordinated and optimized engagement.

As an additional benefit, a solid strategy with the right amount of support makes each account owner less likely to leave the company because, in this new model, the solution is provided by the entire account team rather than by an individual. The long term benefit of retaining key talent is undeniable.

In the new customer-centric reality pharma industry is moving towards AI, and digital technology does not replace sales, medical or patient support reps. Instead, they amplify one's ability to build long-lasting relationships with the customer and move the conversation from selling to creating value. CA


ON ACD CALLS (2)
ON NON-ACD CALLS (1)
UNAVAILABLE (2)
LOGGED OUT (2)
7001 00:53 WENDY
From (213) 555-1234
ACD calls 18
ACD time 0:21:12
7206 00:14 ROBIN
To (313) 555-6900
ACD calls 0
ACD time 0:00:00
7053 15:48 KRISTEN
ACD calls 0
ACD time 0:00:00
7107 8:31:25 DON
ACD calls 26
ACD time 0:47:06
7000 00:03 ASHLEY
From (812) 555-7222
ACD calls 11
ACD time 0:30:09
7005 2:16 HELEN
ACD calls 11
ACD time 0:14:33
7108 8:31:05 SEAN
ACD time 0:31:32
Big Time.
Everything happens in real time.
Why should your contact center be any different? TASKE Real-time provides invaluable up-to-the-second views of your contact center – giving you insight into unforeseen issues before they become unmanageable situations. Welcome to the big time, with TASKE Real-time. Take your contact center to TASKE.
600 Agent Monitor
TASKE TECHNOLOGY
Immediate insight...
That's TASKE Real-time.
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Where can You Use Quantum Computing in Data Analytics?

BY **AARON MCCLENDON,** DATA SCIENTIST AND PRACTICE LEAD, AIMPOINT DIGITAL AND
ALEKSANDAR LAZAREVIC, VP ADVANCED ANALYTICS & DATA ENGINEERING, STANLEY BLACK & DECKER

Quantum computing is a disruptive and revolutionary new type of technology that will soon have major impacts on the way we conduct business. From the printing press to the locomotive, each revolution has dynamically forced our hand to change the current economic operating model. During each revolution, the winds of success look kindly to those who are quick to adapt and learn and wisp away those who stall and postpone.

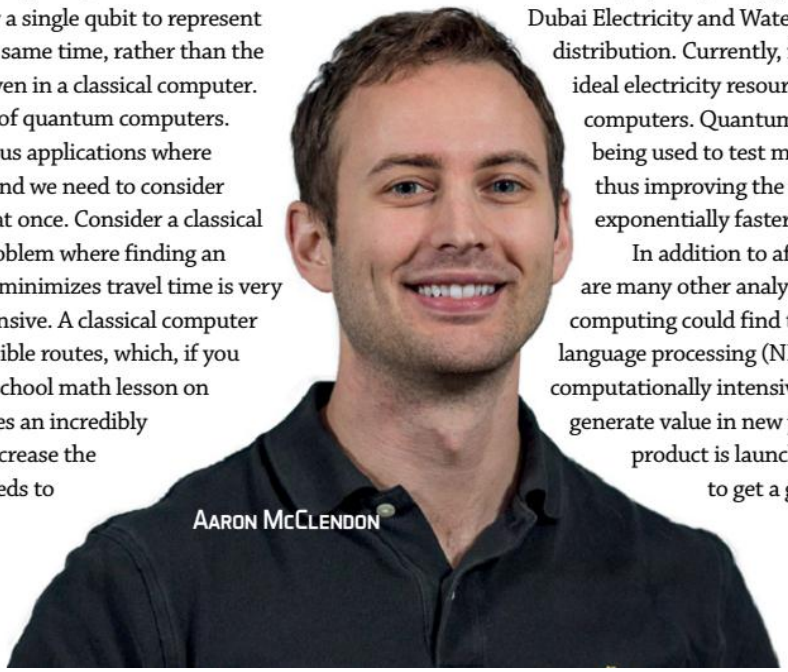
Although still in its infancy, quantum computing possesses the potential to impact operations as crucial as logistics or traffic control at a large-scale level, allowing, in certain cases, exponentially faster computational power and billions of dollars of additional revenue.

A quantum computer works using quantum bits or qubits. In stark contrast to a classical computer's bit, which can only represent a 0 or a 1, a qubit can exist in a superposition state, which means it can be a little bit 1 and a little bit 0 at the same time. Only upon "looking" at it, does it become all 1 or all 0. This can allow a single qubit to represent multiple things at the same time, rather than the deterministic state given in a classical computer. Herein lies the power of quantum computers.

There are numerous applications where this becomes handy, and we need to consider multiple possibilities at once. Consider a classical traveling salesman problem where finding an optimal solution that minimizes travel time is very computationally expensive. A classical computer must consider all possible routes, which, if you remember your high school math lesson on permutations, becomes an incredibly large number as we increase the number of sites he needs to visit. Quantum computers are thought to be able to solve these types of problems exponentially faster, as they can consider multiple routes at once. Although the example above may seem contrived, this is directly applicable to everyday problems like logistics, travel routes, supply chain, and inventory optimization. Imagine the value generated by knowing the exactly optimal route to move shipments between factories and stores. Until this point, finding the perfect route was merely a pipe dream.

Quantum computing is already seeing research and applications in numerous industries. For example, in Barcelona, Spain, a city buzzing with taxis, metros, and personal cars, Volkswagen has worked with a quantum computer from D-Wave (company leading in developing quantum computers) to develop quantum computing solutions to minimize traffic, allowing companies to distribute taxis and cars in the best possible way. This allowed transportation companies to avoid traveling long routes with empty seats, prevented long wait times for taxis, and benefited the entire population by reducing traffic congestion. In another example, computing giant Microsoft has partnered with Dubai Electricity and Water Authority to optimize power distribution. Currently, finding an optimal solution for the ideal electricity resource balance is a tall order for modern computers. Quantum algorithms, however, are currently being used to test multiple scenarios at the same time, thus improving the electricity grid distribution in an exponentially faster manner.

In addition to aforementioned examples, there are many other analytics use cases where quantum computing could find the solution much faster. Natural language processing (NLP) is one such application where computationally intensive topic modeling could be used to generate value in new product development. When a new product is launched, it often takes a year or longer to get a grasp on public response to the


AARON MCCLENDON

item. Instead of waiting until sentiment is readily available, we could scrape the web for all relevant product information and feedback from multiple locations, including online retail stores, online shopping reviews, professional reviews sites, social media, news, and financial releases. This could allow us to identify common topics/themes that occur in those documents. For example, we can see what features of the new product the users appreciated, and which features were commonly eschewed. Quantum computing has recently begun to venture into this realm in the form of quantum latent semantic analysis and quantum NLP. It has been shown that quantum topic analysis can outperform classical computing algorithms in certain situations and potentially could allow the processing of greater amounts of data in less time than a classical computation would take.

Another very big area where quantum computing can have a significant impact is freight logistics. Often, large companies need to move products, both components and finished level goods, between locations using a variety of different modes of transportation. Moving components into factories, shipping them across oceans, and loading ships and ground transports with the correct items as well as giving them the routes which best minimize time and cost is an area of intensive research in business. If a company knew the optimal routes to move inventory, it would allow faster response times in meeting customer demand, thus driving sales while also keeping inventory costs down. Various companies have already begun experimenting with quantum computers to obtain advantageous freight routes. Quantum optimization programs are not only computationally more efficient but also produce improved results. The technology is still a few years behind full-scale implementation, but the first companies to develop the techniques and prove their superiority will certainly gain an edge over their competition.

We are truly standing on the precipice of a new era of computing, but there still are numerous hardware and software challenges before successfully applying quantum computers. First, they need to be cooled to nearly absolute zero. Second, they require a myriad of advanced technologies, and building them can easily run into the high numbers of millions. Third, using a quantum computer requires manually stringing together qubits, about as base a level of computer programming as you can get. This means that the flashy machine learning packages and even standard programming commands taken for granted in classical computers do not exist in the quantum world.

Commercial applications of quantum computers are still being discovered, and technology giants such as Google, IBM, and Microsoft have even opened their machines to the public to use for free as people test the waters and begin to figure out uses and applications. Although it is unlikely, quantum computers will ever replace classical computers, a future in which the two will walk side by side is almost inevitable. Putting in place quantum algorithm research divisions to research and develop novel applications will drive businesses into tomorrow, putting them on the cutting edge of technological development and light years ahead of the competition.

> “QUANTUM OPTIMIZATION PROGRAMS ARE NOT ONLY COMPUTATIONALLY MORE EFFICIENT BUT ALSO PRODUCE IMPROVED RESULTS”

Bio:

Aaron McClendon is a data scientist and practice lead at Aimpoint Digital, specializing in advanced applications of machine learning and artificial intelligence within business facing data science problems. His team focuses on time series analysis, natural language processing, deep learning, and AI within a research context to include quantum machine learning and potential applications of quantum computing within business.

Aleksandar Lazarevic is a VP Advanced Analytics & Data Engineering at Stanley Black & Decker. Aleks leads the company’s efforts to drive savings through advanced Big Data analytics. Aleks is responsible for providing scalable enterprise wide data lake / warehouse platform and leveraging machine learning / AI tools to solve various business problems. Previously, Aleks worked at Aetna, where he was responsible for overall analytics solution in health care fraud, waste and abuse detection. In addition, he has extensive experience in applying analytics in various industries ranging from banking, credit and insurance industry to smart manufacturing and computer security. He is also a frequent speaker at national data science and analytics conferences. CA

Augmented Intelligence is ImprovingCustomer Experience

BY **TOM LUTZ,** SVP, AND CHIEF PROCUREMENT OFFICER,U.S. BANK

At U.S. Bank, customers and their experiences with us are central to everything we do. As we evolve with our customers, "One U.S. Bank" is the guiding principle that is transforming U.S bank for our employees and customers, and the use of Artificial Intelligence is driving that transformation.

In the past, we faced significant challenges in delivering a unified customer experience. Business lines were siloed, customer information existed in disparate systems and employees had different understandings of customers' needs and expectations. A customer could have savings and checking accounts, a mortgage, credit cards, small business loans and family wealth being managed by U.S. Bank – but would be engaging with employees who had an incomplete and inconsistent picture of his or her current and future needs.

At the same time, the expectations of banking customers are being shaped by their experiences with companies like Apple, Amazon and Disney, which offer comprehensive assistance, recommendations, advice and transparency 24 hours a day, 365 days a year. "Our customers don't compare us with other banks, they compare us to whoever is providing their best user experience," said Bill Hoffman, U.S. Bank Chief Analytics Officer and head of Customer Relationship Management.

U.S. Bank wanted to provide access to customers to financial services across all channels, including our 3,000-plus branches, ATMs, mobile devices and computers. We also wanted a single, unified database of customer information. The solution: a partnership with Salesforce that is central to harnessing the power of all our customer information—coupled with the bank's pioneering use of the analytics and insights of Einstein, Salesforce's artificial intelligence platform.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> "ARTIFICIAL—LET'S CALL IT AUGMENTED—INTELLIGENCE IS VITAL TO DELIVERING AN IMPROVED CUSTOMER EXPERIENCE BOTH TODAY AND IN THE FUTURE"

Our work with Salesforce started modestly, beginning with Small Business Banking in 2009. Salesforce has now been implemented across our home mortgage, credit card payments, wealth management and commercial banking business lines. More than 12,000 U.S. Bank employees use Salesforce to help deliver a "customer-obsessed" experience everywhere they possibly can.

U.S. Bank now drives the customer experience with the data it gleans from Einstein, using it to help bankers build relationships with customers by having the right conversation at the right time. Customers expect their bank to know them in this digital age, and Einstein can spot and notify bankers of anything from spending patterns indicative of prospective first-time homebuyers to news articles about customers receiving awards in their communities.

At U.S. Bank, we consider our use of Einstein as "augmented intelligence," because there is nothing artificial about building good relationships with people. We're leveraging Einstein to help human beings do what they do best – be human.

The progress so far in coupling the power of Salesforce and the insights of Einstein with 12,000 employees: a lift in converting high-quality sales leads by 2.35 times. And there is no denying the positive effect of providing U.S. Bank employees with accurate, complete and timely information regarding customers, because that allows them to engage with the customer in the most human way possible.

Artificial—let's call it Augmented—Intelligence is vital to delivering an improved customer experience, both today and in the future. As customers connect in more ways across a greater number of devices, the opportunity to gather and gain insights and act upon them becomes increasingly important. The organizations that employ this will be creating a sustainable and scalable relationship with their customers, to the benefit of all involved. CA

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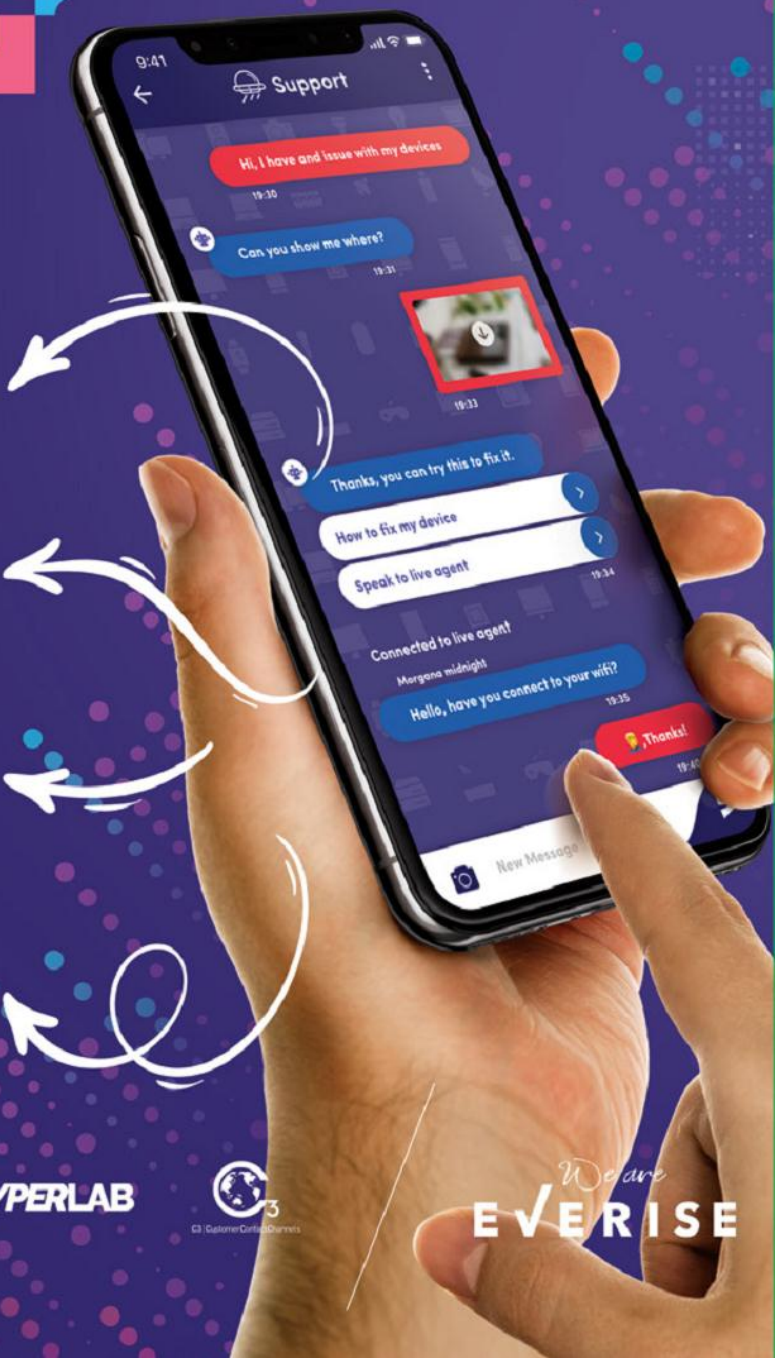

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