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***PwC DeNovo Strategy-on-Demand  
Artificial Intelligence/Voice assisted commerce  
in Banking***

*“Could you provide a landscape and adoption of Artificial Intelligence/Voice assisted commerce solutions by banks?”*

***Sample deliverable***

**strategy&**

*Part of the PwC network*

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# *Overview and Trends*

SAMPLE **1**

# ***Conversational commerce solutions in banking have emerged by utilizing chat, messaging and natural language interfaces to engage with customers***

## ***Conversational Commerce***

- **Conversational commerce** combines chat, messaging or other natural-language interfaces with natural language processing, speech recognition and voice recognition to process human language input and converts it into understandable representations
- Banks adopt conversational commerce solutions to allow customers to *transfer funds, check account balances and receive answers to queries*

## ***Key conversational commerce solutions and their adoption by banks***

 <b><i>Interactive Voice Response (IVR)</i></b>	 <b><i>Chatbots</i></b>	 <b><i>Virtual Personal Assistants</i></b>
<p>Automated telephony system that interacts with callers, gathers information and routes calls to the appropriate recipient. IVR primarily uses rules-based advance decision trees</p> <ul style="list-style-type: none"><li>• <b>CitiPhone</b> Banking allows clients to partake in virtual banking by responding to automated voice prompts</li></ul>	<p>Easy-to-use applications which interact with users via conversational text or voice (i.e., text-based or voice-based chatbots) and are normally used for a single function (such as a help desk). Chatbots use rules-based regular expression matching, deep learning or deep Q&amp;A and discourse understanding to provide "human-like" responses</p> <ul style="list-style-type: none"><li>• American Express launched a Facebook Messenger <b>chatbot</b> to send customers real-time purchase alerts and key information about American Express benefits</li></ul>	<p>Computer programs that interact with users and simulate conversation based on natural language processing and machine intelligence. Assistance can be derived across multiple applications from user input, location, and patterns of behavior to provide real-time relevant information</p> <ul style="list-style-type: none"><li>• Bank of America has developed virtual assistant, <b>Erica</b>, which analyzes the financial state of clients through text and voice-based interactions</li></ul>

# Conversational commerce solutions rely on Natural Language Processing and speech recognition to transform human interactions into discernible insights

## Key conversational commerce solutions



**Interactive Voice Response (IVR)**



**Chatbots**



**Virtual Personal Assistants**

## Technologies that enable conversational commerce

Technology	Description	Example
Natural Language Processing (NLP)	Ability of computer programs to understand text and voice based human interactions as well as derive meaningful insights from the interactions	Goldman Sachs has invested in Kensho Technologies, which makes robots that can answer complex financial questions
Natural Language Generation (NLG)	A sub-topic of Natural Language Processing that follows business rules and algorithms to analyze and interpret data to produce logical human understood sentences	Virtual personal assistants such as Amazon's Alexa, Microsoft's Cortana, Apple's Siri, and more, utilize NLG to communicate back with the user
Proactive Software Agents	Software applications based on Robotic Process Automation (RPA) that use advanced analytics to make predictions and suggestions. Applications proactively initiate actions without prompting users	BofA's chatbot "Erica" scans the financial state of clients and offers opportunities to optimize their banking functions
Speech Recognition / Speech Synthesis	System that recognizes the spoken word so that it can be processed into text or an input or output	Capital One customers can use Amazon Alexa-enabled devices to check balances
Speech-to-Speech Translation	Method of computer translation that translates natural spoken language in real-time from one language into another language	Caixa Bank has partnered with IBM to develop a cognitive system based on IBM's Watson that is able to understand Spanish
Voice Recognition / Voice Biometrics	Method of authentication which uses an individual's unique voiceprint to ascertain identity	Citibank has launched voice biometrics authentication from NICE for its Asia Pacific consumer banking customers
Intelligence Engines	Complex rules engines that combine rules, predictive and prescriptive analytics based on user data, profiles and history that provide real-time "intelligence" through search, dashboards, or applications	Ally Bank's Ally Assist is a virtual assistant that responds to customer inquiries using automated intelligence and customer profiles
Rules-Based Regular Expression Matching	Rules and searching algorithms that select an appropriate response from a repository of predefined response based on user input and context	Dyme's Facebook Messenger chatbot converses with customers by providing options to answer linked to predefined responses
Deep Learning	A method based on learning representations of data that attempt to model high-level abstractions in data by using multiple processing layers, with complex structures or otherwise, composed of multiple non-linear transformations	Microsoft's AI chatbot on Twitter generates responses based on overall context and commands
Deep Q&A and Discourse Understanding	Process of building meaning from segments of language such as conversations, articles and textbooks to enable 'intelligent conversation' and discourse with the machine	Clinic's voice-powered AI platform for banking, Finie, moves away from rules-based commands to support unbounded and unconstrained speech to answer common and complex queries

# ***Banks are adopting conversational commerce solutions to provide personalized solutions, improved customer experience and circumvent high costs associated with manual systems***

## ***Drivers of trends in conversational commerce solutions***

1

Clients are increasingly demanding user-friendly banking solutions that cater to individual needs as well as provide quick answers to questions

2

There are high costs associated with human-based systems that cater to banking customers

3

There are security risks associated with authenticating users through traditional systems that require passwords

4

Advances in Natural Language Processing, voice recognition and software development technologies facilitate faster development of conversational commerce solutions

## ***Impact on banks from trends***

Banks are providing personalized solutions such as chatbots, IVR and virtual assistants that allow clients to:

- Carry out transactions without opening or logging into a separate application
- Receive answers to queries in real-time

Banks are replacing human-based customer servicing systems with self-service systems that allow them to save on human resource costs

Banks are adopting conversational commerce-based authentication systems such as IVR and voice biometrics that secure the identity of clients, thereby reducing the risks associated with passwords

Banks are increasingly developing conversational commerce solutions in-house instead of relying on vendors for these solutions

# Voice and text-based conversational commerce solutions are deployed to facilitate processes across banking functions

Application across banking functions				
	Loan Servicing	Authentication / Fraud Detection	Sales and Marketing	Distribution and Customer Servicing
Use Cases	<ul style="list-style-type: none"> <li>• <b>Banking chatbots</b> help customers manage and track loan accounts</li> <li>• Use <b>text analytics</b> to send monthly loan statements and reminders and collect principal, interest, and escrow payments on preferred dates</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Interactive Voice Response (IVR) and voice identification</b> services authenticate customers based on their speech patterns and allow them to execute banking transactions more securely, eliminating the need for passwords</li> </ul>	<ul style="list-style-type: none"> <li>• Banks use <b>sentiment analysis</b> to target clients with products that align to their choices and needs</li> <li>• Voice-based systems such as <b>virtual personal assistants and IVR</b> are used to augment the sales process</li> <li>• <b>Text and social media analytics</b> are used by banks to understand market trends and customer sentiment</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Virtual personal assistants, chatbots and IVR</b> allow banks to enhance the delivery of products to clients, reducing the need for carrying out processes manually through call centers</li> <li>• <b>Virtual personal assistants and IVR</b> solutions allow banks to deliver personalized experiences to customers. These solutions automatically process and redress client queries without any human intervention</li> </ul>
Enabling Technologies	<ul style="list-style-type: none"> <li>• Natural Language Processing</li> </ul>	<ul style="list-style-type: none"> <li>• Voice biometrics</li> <li>• Natural Language Processing</li> </ul>	<ul style="list-style-type: none"> <li>• Proactive software agents</li> <li>• Natural Language Processing</li> </ul>	<ul style="list-style-type: none"> <li>• Speech recognition</li> <li>• Proactive software agents</li> <li>• Intelligence engine</li> <li>• Natural Language Processing</li> </ul>
Illustrative Example	 <p>Avaamo provides a loan service agent that sends monthly loan statements and reminders to clients and collects principal, interest, and escrow payments on clients' preferred dates</p>	 <p>Voicepin provides advanced voice biometrics solutions for companies and their customers. Its flagship product, VoicePIN, is a biometric system for secure user authentication, based on voice analysis</p>	 <p>Elafris develops NLP enabled chatbots that allow banks to reduce sales costs by automating sales promotions and lead generation</p>	 <p>Through software development kits, Kasisto provides conversational virtual assistants for enterprise mobile applications. The solution helps consumers complete complex tasks (using voice, text) which require the presence of live agents</p>

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# *Competitive Landscape*

SAMPLE

2

***Most companies offer solutions focused on sales and marketing and customer servicing to deliver more value to customers***

	Application across banking functions			
	Loan Servicing	Authentication / Fraud Detection	Sales and Marketing	Distribution and Customer Servicing
	X	X	✓	✓
	X	X	✓	✓
	X	✓	✓	✓
	✓	X	✓	✓
	X	X	X	✓
	X	X	X	✓
	X	X	X	✓
	X	✓	✓	✓
	X	✓	✓	✓
	X	X	X	✓
	X	X	✓	✓
	X	X	✓	✓
	X	X	✓	✓
	X	X	✓	✓
	X	X	X	✓
	X	X	X	✓
	X	X	X	✓

## Key emerging conversational commerce solution providers (1/6)

Company	Funding to-date	HQ	Key Investors	Key Solutions	Technologies	Use Cases / Potential Banking Solutions
 KASISTO	\$8.2MM	Spain	<ul style="list-style-type: none"> <li>Alam Mundi Ventures</li> </ul>	<ul style="list-style-type: none"> <li>Provides a speech and text-enabled <b>intelligent personal assistant platform</b> for smartphones</li> <li>Offers prioritized and personalized information and interacts with digital services using <b>speech recognition and a natural language interface</b></li> </ul>	<ul style="list-style-type: none"> <li>NLP</li> <li>NLG</li> <li>Proactive Software Agents</li> <li>Speech Recognition / Speech Synthesis</li> <li>Deep Learning</li> </ul>	<ul style="list-style-type: none"> <li><b>Problem:</b> Mastercard wanted to provide personalized experiences to customers and allow them to transact, manage finances and shop via messaging platforms</li> <li><b>Solution:</b> Mastercard partnered with Kasisto to develop a conversational commerce platform through which consumers will be able to shop and transact on messaging platforms</li> </ul>
 abe	N/A	US	N/A	<ul style="list-style-type: none"> <li>Financial management <b>chatbot</b> that links user's bank accounts and designs a <b>custom-made budget</b>, after monitoring the <b>income/expenses pattern</b></li> <li>Works on the <b>short message service (SMS) and Slack messaging platforms</b></li> </ul>	<ul style="list-style-type: none"> <li>NLP</li> <li>NLG</li> <li>Proactive Software Agents</li> <li>Deep Learning</li> </ul>	<ul style="list-style-type: none"> <li>Abe provide a white-label conversational banking solution for community banks and credit unions</li> </ul>
 KORE	\$2.25MM	US	N/A	<ul style="list-style-type: none"> <li>Provides a <b>bot-based messaging platform</b> enabled through its SAP cloud technology</li> <li>Its chatbots review and approve requisitions and get treasury, credit and accounts payable information from transactions</li> </ul>	<ul style="list-style-type: none"> <li>NLP</li> <li>NLG</li> <li>Proactive Software Agents</li> <li>Deep Learning</li> </ul>	<ul style="list-style-type: none"> <li><b>Problem:</b> Retail banks and credit unions were looking for methods to attract and retain millennial customers</li> <li><b>Solution:</b> The financial institutions launched Kore Smart Bot which helps customers of banks and credit unions pay bills, find an ATM, transfer funds and talk to Smart Bot via SMS, e-mail, or chat platforms like Facebook Messenger</li> </ul>

## Key emerging conversational commerce solution providers (2/6)

Company	Funding to-date	HQ	Key Investors	Key Solutions	Technologies	Use Cases / Potential Banking Solutions
	\$9.3MM	India	<ul style="list-style-type: none"> <li>Wipro Ventures</li> <li>WI Harper Group</li> <li>Streamlined Ventures</li> <li>Rembrandt Venture Partners</li> </ul>	<ul style="list-style-type: none"> <li>Provides <b>banking bots</b> to manage accounts, find ATMs, track expenses and support credit applications</li> <li>Uses <b>Natural Language Processing (NLP)</b> to execute conversations with customers and <b>records responses</b> through text recognition to match requested services</li> </ul>	<ul style="list-style-type: none"> <li>NLP</li> <li>NLG</li> <li>Deep Learning</li> </ul>	<ul style="list-style-type: none"> <li><b>Problem:</b> Bank ABC Brazil wanted to personalize customer engagement and decrease the time to respond to customer queries</li> <li><b>Solution:</b> Banks ABC Brazil partnered with Avaamo to deploy chatbots for the retail banking vertical where more than 200 users now use Avaamo to manage their accounts</li> </ul>
	N/A	US	N/A	<ul style="list-style-type: none"> <li>Provides a micro-saving money management <b>chatbot app</b> that creates a Chip savings account and integrates it with the user's current account</li> <li>Chip <b>proactively transfers money</b> from a user's current account to the Chip savings account on a periodic basis, without requiring the user's intervention</li> <li>Also allows transfer of money from the <b>Chip savings account</b> to the current account through a single-tap withdraw button</li> </ul>	<ul style="list-style-type: none"> <li>NLP</li> <li>NLG</li> <li>Proactive Software Agents</li> <li>Rules-Based Regular Expression Matching</li> </ul>	<ul style="list-style-type: none"> <li>Chip offers its money management app in partnership with banks such as Barclays, Lloyds, NatWest, Nationwide, Halifax, HSBC, TSB, Santander, First Direct, RBS and Co-operative Bank</li> </ul>
	\$1.2MM	US	<ul style="list-style-type: none"> <li>Social Capital</li> </ul>	<ul style="list-style-type: none"> <li>Provides a <b>personal financial management</b> application that chats with the user and provides real-time feedback on <b>savings performance</b></li> </ul>	<ul style="list-style-type: none"> <li>NLP</li> <li>NLG</li> <li>Proactive Software Agents</li> <li>Deep Learning</li> </ul>	<ul style="list-style-type: none"> <li>Penny can help banks better engage with customers and provide personal financial management solutions through chatbots</li> </ul>

## Key emerging conversational commerce solution providers (3/6)

Company	Funding to-date	HQ	Key Investors	Key Solutions	Technologies	Use Cases / Potential Banking Solutions
	N/A	US	N/A	<ul style="list-style-type: none"> <li>Provides <b>chatbots</b> through <b>Facebook Messenger</b> to increase customer engagement and education</li> <li>Helps customers define their <b>savings initiatives</b> through their <b>historical account statements</b></li> </ul>	<ul style="list-style-type: none"> <li>NLP</li> <li>NLG</li> <li>Proactive Software Agents</li> <li>Rules-Based Regular Expression Matching</li> </ul>	<ul style="list-style-type: none"> <li>Dyme can integrate its offering with banks to offer customers personalized solutions and savings initiatives as per their historical spending patterns as a part of personal financial management solutions</li> </ul>
	Public*	US	Went public in 2000	<ul style="list-style-type: none"> <li>Provides solutions that use <b>voice biometrics</b> and detect unique characteristics of a person's voice to create a voiceprint</li> <li>Detects <b>call center fraud</b> by matching voice patterns to the voiceprints</li> <li><b>Nina</b>, Nuance's virtual assistant provides <b>customer servicing solutions</b> through chat</li> </ul>	<ul style="list-style-type: none"> <li>Voice Recognition / Voice Biometrics</li> <li>Speech Recognition / Speech Synthesis</li> <li>Deep Learning</li> </ul>	<ul style="list-style-type: none"> <li><b>Problem:</b> Barclays wanted to enable authentication through voice recognition</li> <li><b>Solution:</b> Barclays deployed Nuance's FreeSpeech voice biometrics solution to securely and automatically confirm the identity of Barclays' customers</li> <li><b>Problem:</b> Swedbank Group wanted to enhance its customer service experience by enabling self-service capabilities</li> <li><b>Solution:</b> Swedbank deployed Nuance's virtual customer service agent, Nina, which resolved 78% of the queries during the first touchpoint with customers</li> </ul>
	Public*	Israel	Went public in 2016	<ul style="list-style-type: none"> <li>Specializes in <b>telephone voice recording, data security, and surveillance</b>, as well as systems that analyze this recorded data</li> <li>NICE Voice of the Customer (VoC) solutions identify changes in customer behavior as well as hidden operational inefficiencies</li> </ul>	<ul style="list-style-type: none"> <li>Voice Recognition / Voice Biometrics</li> <li>Speech Recognition / Speech Synthesis</li> </ul>	<ul style="list-style-type: none"> <li><b>Problem:</b> Citi wanted to upgrade its authentication and fraud detection technologies</li> <li><b>Solution:</b> Citi launched voice biometrics authentication from NICE for its Asia Pacific consumer banking customers</li> </ul>

## Key emerging conversational commerce solution providers (4/6)

Company	Funding to-date	HQ	Key Investors	Key Solutions	Technologies	Use Cases / Potential Banking Solutions
	\$14MM	Spain	<ul style="list-style-type: none"> <li>Plug and Play Ventures</li> <li>Scale Capital</li> <li>Amasia Ventures</li> </ul>	<ul style="list-style-type: none"> <li>Provides a chatbot-based online customer support platform through its NLP platform supported by <b>cloud technology</b></li> <li>The chatbot development platform allows developers to build and deploy bots for <b>Skype, Facebook Messenger</b> and provides flexibility to <b>integrate</b> with any outside websites such as <b>Google</b></li> </ul>	<ul style="list-style-type: none"> <li>NLP</li> <li>NLG</li> <li>Deep Learning</li> </ul>	<ul style="list-style-type: none"> <li><b>Problem:</b> BBVA wanted to enhance its online customer support by reducing the time to resolve customer issues</li> <li><b>Solution:</b> BBVA partnered with Inbenta. Inbenta's AI-powered interface provides structured and specific responses to frequently asked questions by customers</li> </ul>
	N/A	US	N/A	<ul style="list-style-type: none"> <li>Provides <b>NLP-powered</b> chatbots that enable companies to <b>automate</b> their responses to inquiries related to <b>insurance policies</b>, claim settlement status and <b>bank account information</b></li> <li>Helps its clients to reduce <b>underwriting risk</b> by analyzing <b>social data</b> of customers and providing automated customer support</li> </ul>	<ul style="list-style-type: none"> <li>NLP</li> <li>NLG</li> <li>Rules-Based Regular Expression Matching</li> </ul>	<ul style="list-style-type: none"> <li>Elafris can potentially help banks and credit card companies by providing social data to access customers and reduce underwriting risks</li> </ul>
	\$18MM	US	<ul style="list-style-type: none"> <li>Lightspeed Venture Partners</li> <li>Carmel Ventures</li> <li>Sequoia Capital</li> </ul>	<ul style="list-style-type: none"> <li>Offers a <b>predictive interaction</b> solution for financial institutions to deliver <b>personalized customer experiences</b></li> <li>Supports multiple messaging platforms such as <b>Facebook Messenger, WeChat, Amazon Alexa and Skype</b></li> </ul>	<ul style="list-style-type: none"> <li>NLP</li> <li>NLG</li> <li>Proactive Software Agents</li> <li>Deep Learning</li> </ul>	<ul style="list-style-type: none"> <li>Personetics allows banks to deploy chatbots which provide AI-powered personalized guidance to customers and connect them to the most suitable solutions</li> </ul>

## Key emerging conversational commerce solution providers (5/6)

Company	Funding to-date	HQ	Key Investors	Key Solutions	Technologies	Use Cases / Potential Banking Solutions
 Smartly.ai	\$0.45MM	France	<ul style="list-style-type: none"> <li>BNP Paribas</li> <li>FaDièse</li> <li>NUM</li> </ul>	<ul style="list-style-type: none"> <li>Provides an AI-powered platform that allows developers to build and deploy <b>chatbots</b> and <b>voice applications</b></li> <li>Chatbots support several mediums such as <b>Slack, SMS, Skype, Webchat, and Facebook Messenger</b>, while the voice applications support Amazon Alexa and Apple Siri</li> </ul>	<ul style="list-style-type: none"> <li>NLP</li> <li>NLG</li> <li>Proactive Software Agents</li> <li>Speech Recognition / Speech Synthesis</li> <li>Deep Learning</li> </ul>	<ul style="list-style-type: none"> <li>Smartly.ai is used by banks to build and deploy chatbots and voice applications which could facilitate banks' sales and customer servicing functions</li> </ul>
 SECOND EGO	N/A	Slovenia	N/A	<ul style="list-style-type: none"> <li>Develops <b>chatbots</b> that offer a <b>real-time chat</b> experience</li> <li>Chatbots act as a <b>virtual chat agent</b> for clients who offer pre- and post-sales support. They enable clients to <b>reduce costs and time</b> spent and robotize workflows while responding to similar questions</li> </ul>	<ul style="list-style-type: none"> <li>NLP</li> <li>NLG</li> <li>Proactive Software Agents</li> <li>Deep Learning</li> </ul>	<ul style="list-style-type: none"> <li>SecondEgo is used by banks to deploy chatbots which serve as virtual chat agents and provide pre- and post-sales support to banks' clients</li> </ul>
 cline	\$1.2MM	US	<ul style="list-style-type: none"> <li>Elab Ventures</li> </ul>	<ul style="list-style-type: none"> <li>Provides an open source platform for building artificial intelligence (AI) and deep-learning-based <b>virtual personal assistants</b> for the financial services industry</li> <li>Finie, its mobile <b>voice-powered AI platform</b> for banking, moves away from rules-based commands to support unbounded and unconstrained speech to answer common and complex queries related to banking</li> </ul>	<ul style="list-style-type: none"> <li>NLP</li> <li>NLG</li> <li>Speech Recognition / Speech Synthesis</li> <li>Intelligence Engines</li> <li>Deep Q&amp;A and Discourse Understanding</li> </ul>	<ul style="list-style-type: none"> <li>Cline's Finie solution can be integrated into banks' mobile banking applications and act as a voice-powered virtual personal assistant that is able to answer financial questions unique to individual consumers, offer personalized spending advice, and fulfill additional banking tasks</li> </ul>

## Key emerging conversational commerce solution providers (6/6)

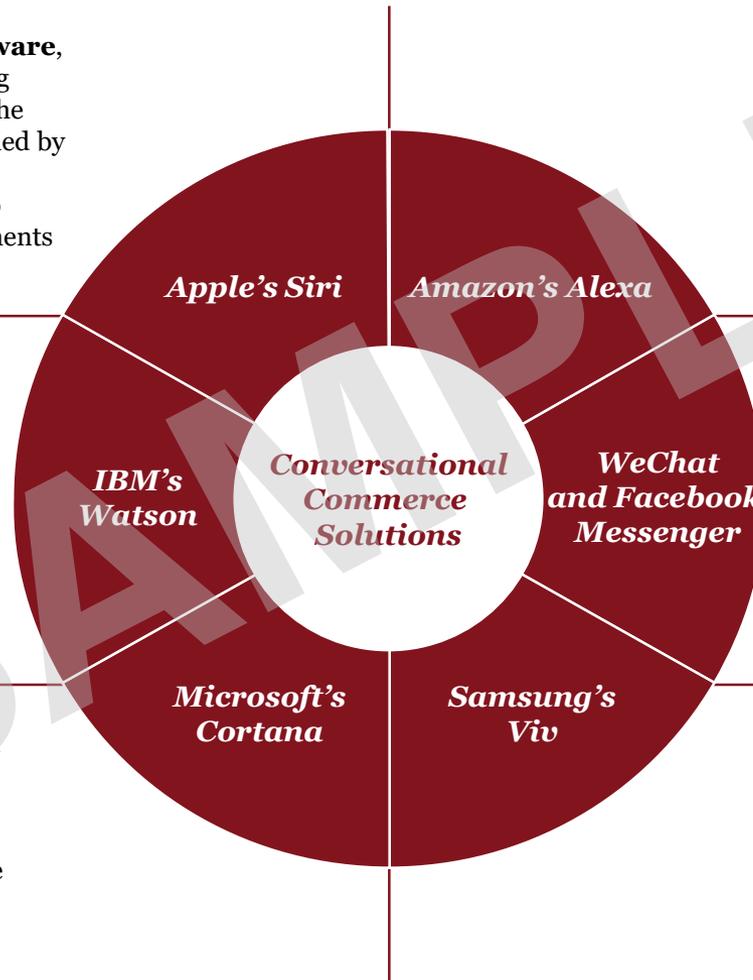
Company	Funding to-date	HQ	Key Investors	Key Solutions	Technologies	Use Cases / Potential Banking Solutions
	\$36.3MM	US	<ul style="list-style-type: none"> <li>Ribbit Capital</li> <li>General Catalyst Partners</li> <li>Baseline Ventures</li> </ul>	<ul style="list-style-type: none"> <li>Provides a <b>chatbot</b> solution through <b>SMS text</b> that helps consumers manage savings in Digit's digital savings account</li> <li>Chatbot sends consumers text notifications regarding automatic savings that Digit sets aside by analyzing spending and income history of checking account to predict cash flow</li> </ul>	<ul style="list-style-type: none"> <li>NLP</li> <li>NLG</li> <li>Proactive Software Agent</li> <li>Rules-Based Regular Expression Matching</li> </ul>	<ul style="list-style-type: none"> <li>Digit's chatbot is a part of its automatic savings solution that can integrate with banks' existing products (e.g., checkings accounts) to create additional personalized personal finance management solutions for consumers</li> </ul>
	\$0.5MM	UK	<ul style="list-style-type: none"> <li>500 Startups</li> </ul>	<ul style="list-style-type: none"> <li>Provides a <b>chatbot</b> solution through <b>Facebook Messenger</b> that helps consumers manage savings in Plum's digital savings account</li> <li>Chatbot sends consumers notifications through Facebook Messenger about automatic savings that Plum sets aside by analyzing spending and income history to predict cash flow; chatbot also allows consumers to request savings balance and make withdrawal</li> </ul>	<ul style="list-style-type: none"> <li>NLP</li> <li>NLG</li> <li>Proactive Software Agent</li> <li>Rules-Based Regular Expression Matching</li> </ul>	<ul style="list-style-type: none"> <li>Plum's chatbot is a part of its automatic savings solution that can integrate with banks' existing products (e.g., checkings accounts) to create additional personalized personal finance management solutions for consumers</li> </ul>

# Tech giants are increasingly offering their voice and text-based conversational commerce solutions to leading global banks and FinTech startups

- Apple's **virtual assistant software**, Siri, is automated to take banking clients' voice input and process the language to perform tasks specified by clients
- Digital bank **Monzo**, uses Siri to allows users to send secure payments through voice

- IBM's Watson is a **Q&A computer system** which can find solutions to questions posed by banking clients in an unstructured format in natural languages
- South Africa's Standard Bank uses IBM Watson to speed up handling of customer queries

- Cortana is a **virtual digital assistant** that is built into select Microsoft phones. It allows banking clients to carry out banking transactions
- **Bank of America's** new mobile app allows individuals to use Cortana's voice commands to carry out banking transactions and avail of customer service



- Amazon's **voice service** Alexa, provides capabilities that enable banking clients to interact with devices in a more intuitive way using voice-based commands
- **Capital One** customers can use Alexa-enabled devices to check balances

- Banks can embed their **chatbots** into WeChat and/or Facebook Messenger and interact with clients through the WeChat and Facebook interfaces
- WeChat integrates with several banks including Citi, ICBC China, and China Merchant Bank.
- **Yes Bank** allows clients to download the chatbot, Yes Tag, and use "Chat Banking" on Facebook Messenger

- Samsung has acquired Viv, a **voice assistant** which understands the intent of the user through speech recognition and creates dynamic programs to connect the different components of a desired service
- **Bank of America** plans to transform its virtual assistant Erica into a virtual system that will work on Viv's voice platform

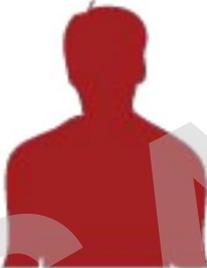
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*Perspectives from the Field*

SAMPLE

3

***We interviewed several subject matter experts in the innovation ecosystem for additional perspective on conversational commerce in banking***

Accelerators / Incubators		FinTech Innovators		PwC R&D		Author
<b>Co-Founder,</b> Chatbot Accelerator in Europe	<b>VP of Strategy,</b> Chatbot Portfolio Company in Accelerator	<b>Senior Director,</b> Financial Services Virtual Personal Assistant Solution	<b>Chief Marketing Officer,</b> Banking Chatbot Solution	<b>Lead Researcher,</b> PwC Emerging Technology Lab	<b>Director,</b> PwC New Ventures	<b>Author,</b> “Developing Alexa Skills for Amazon Echo” Course
						

**We asked a range of questions including the following:**

*What is the current environment of conversational commerce in banking?*

*How will conversational commerce technologies evolve in the banking industry?*

*How would you characterize adoption of conversational technologies by banking incumbents?*

*What are the key challenges in technology adoption?*

## Players in the ecosystem provided a variety of perspectives on conversational commerce...

What is the current environment of conversational commerce in banking?

“Right now is a gold rush – tech giants like Amazon and Google are racing into the game by opening up their artificial intelligence technologies to the public (e.g., Amazon Lex, Amazon Polly, etc.).”

“Chatbot engagement that is pushed to consumers is the way to go, making predictive modeling a priority – 90% of engagement comes from consumers clicking something versus 10% is from consumers asking a chatbot something.”

“Innovators are emerging with a host of pre-built, AI-enabled chatbots that enable enterprises to rapidly deploy.”

“We leverage vertical ontology (i.e., defining data in terms of semantics native to an industry like banking and insurance) to enhance solutions.”

How will conversational commerce technologies evolve in the banking industry?

“Artificial intelligence technologies will become smarter and error rate will become miniscule to enable better conversations and higher contextual awareness.”

“I can see a trend towards speaker verification (e.g., Microsoft’s Speaker Recognition API) to aid conversational commerce in banking, but there may be security concerns if personal / banking information is involved.”

“As deep learning technologies are democratized and unbundled, conversational commerce will be conducted across a wide range of hardware – mobile, wearable, device, laptop.”

“Chatbots are the stepping stone to higher technology. Text dominates now, but the industry will transition to audio and will then bring in contextual awareness.”

Opportunity

Neutral

Concern

**... they provided insight to where the industry is going and some key challenges to consider**

**How would you characterize adoption of conversational technologies by banking incumbents?**

“Chatbot companies report strong traction and count over half of top 10 banks as customers in pilot or beta testing.”

“Banking chatbots are not only adopted for front-end customer experience but also for within businesses such as providing internal chatbot support.”

**What are the key challenges in technology adoption?**

“One challenge is that this tech ecosystem is fragmented (e.g. certain services only work with Amazon Echo, Google Home, etc). This causes friction in providing a seamless end to end experience - there are multiple standards and no universal integration.”

“There is relatively low cost of entry, but the challenge is likely connecting the technology to the disparate, legacy systems of the banks.”

“Certain technologies, such as Amazon Alexa, require information to be passed into the cloud. This may pose restrictions due to financial institutions’ private networks in order to leverage voice technology.”

Opportunity

Neutral

Concern

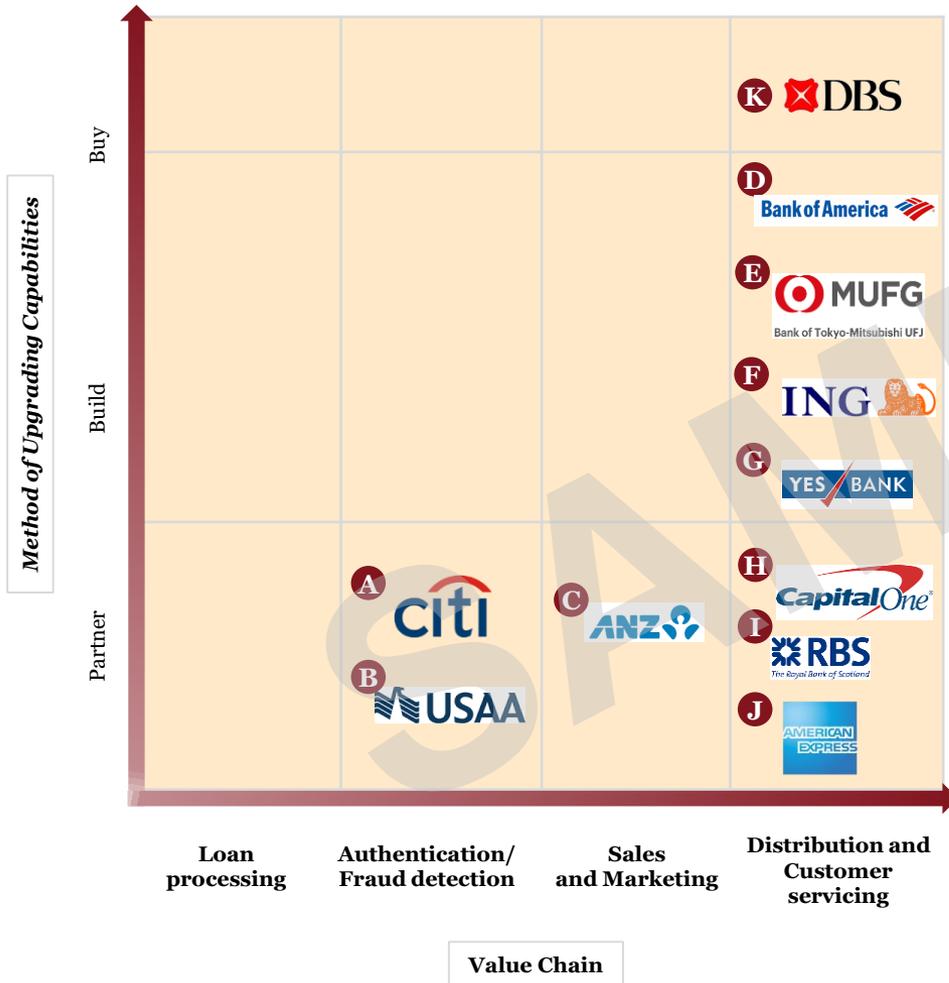
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# *Incumbent Adoption*

SAMPLE

4

# Conversational commerce is being increasingly adopted by large banks to automate processes and cut human resource costs



- A Citibank:** Launched voice biometrics authentication from NICE for its Asia Pacific consumer banking customers
- B USAA:** Embedded a voice biometric service called Nina into its iPhone application for mobile banking
- C ANZ Bank:** Australian bank has partnered with IBM's Watson to observe the types of questions received from both customers and financial advisors
- D BofA:** Launched chatbot "Erica" which scans the financial state of customers and offers opportunities to optimize and consolidate their banking functions
- E Bank of Tokyo-Mitsubishi UFJ:** Employed non-human staff, with the introduction of a customer service humanoid robot, at its flagship Tokyo outlet
- F ING:** First bank in Europe to provide hands-free banking by introducing a voice control mode in its mobile banking app
- G Yes Bank:** Launched a chatbot-based banking app, Yes Tag, that offers a conversational banking experience to customers
- H Capital One:** Talkwalker, a social media analytics tool and social media monitoring tool, generates social media-based analysis of Capital One's customers
- I RBS:** Installed advanced 'human' AI, Luvo, to help staff answer customer queries, thus driving employee productivity
- J AmEx:** Plans to launch AmEx bot through Facebook Messenger that would let customers receive real-time purchase alerts and key information about benefits related to their purchases
- K DBS:** Acquired minority stake in Kasisto. Kasisto plans to provide its AI based virtual personal assistance to enhance DBS's retail banking customer servicing solutions

**While some conversational commerce solutions serve customers in one or two channels, the majority are not available in all channels nor integrated across channels (1/3)**

	Solution Offered	Description	Channel				
			Web	Mobile Banking <sup>1</sup>	Mobile App <sup>2</sup>	Phone Banking	In-branch
	Chatbot	Recently launched an AI powered chatbot, in partnership with Kasisto. The chatbot allows customers to make transactions such as money transfers and bill payments through Facebook Messenger that can be accessed via mobile and web channels	✓	✓	✓	✗	✗
	Virtual Assistant	Offers a virtual assistant, AskMe, to Indian banking customers. Customers ask queries to and receive answers from AskMe, which can be accessed through the Customer Service Center section of Citi India's website	✓	✓	✗	✗	✗
	Voice Recognition	Offers voice recognition-based phone banking which authorizes the bank's customers through voice-based biometrics	✗	✗	✗	✓	✗
	Chatbot	Offers an AmEx chatbot through Facebook Messenger. The chatbot allows customers to receive real-time purchase alerts and key information about benefits related to the purchases through mobile and web channels	✓	✓	✓	✗	✗
	Chatbot	Launched Mastercard KAI, a chatbot for banks which allows Mastercard's users to shop and transact through Facebook Messenger, and can be accessed through web and mobile channels	✓	✓	✓	✗	✗
	Virtual Assistant	Offers a virtual assistant, Andrew to banking customer in the UK. Andrew can be accessed through HSBC UK's website and is designed to provide answers to customer queries	✓	✓	✗	✗	✗

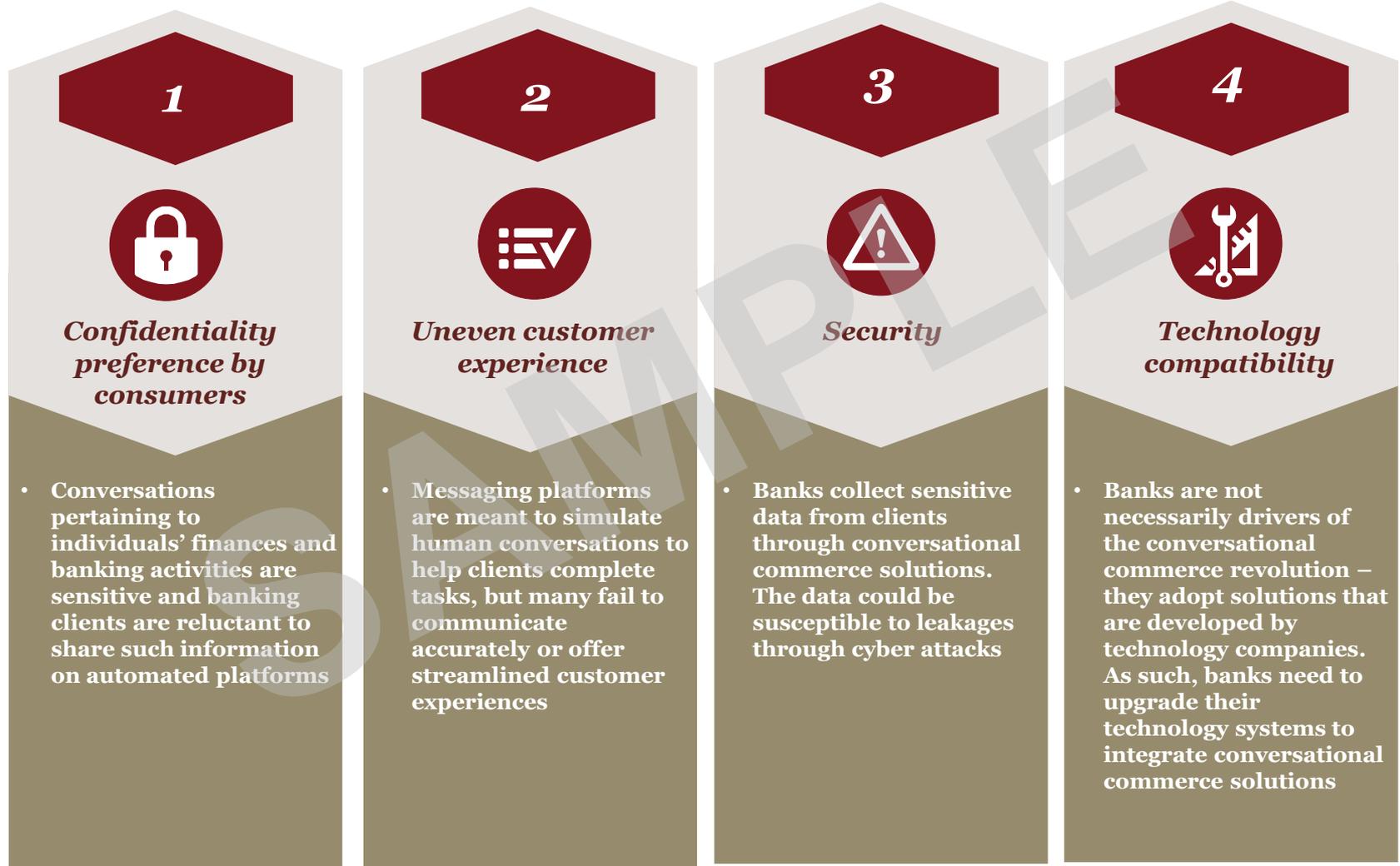
**While some conversational commerce solutions serve customers in one or two channels, the majority are not available in all channels nor integrated across channels (2/3)**

	Solution Offered	Description	Channel				
			Web	Mobile Banking <sup>1</sup>	Mobile App <sup>2</sup>	Phone Banking	In-branch
	Chatbot	Offers an online chatbot, 'Luvo' that integrates with traditional platforms such as the bank's websites or apps and answers customer queries	✓	✓	✓	✗	✗
	Chatbot	Partnered with Gupshup, a chatbot platform to offer 'YES mPower' - a banking chatbot for loan products that can be accessed through Facebook Messenger. YES mPOWER allows customers to get information about loan products such as personal and auto loans and also determines loan eligibility for customers	✓	✓	✓	✗	✗
	Chatbot	Launched Yes Tag, a 'Chat Banking' service that allows customers to carry-out transactions on five messaging platforms, namely, Facebook Messenger, Twitter, Skype, Telegram and WeChat. Yes Tag allows customers to check their balance, mini statement, fixed deposit details and also allows customers to transfer money	✓	✓	✓	✗	✗
	Virtual Assistant	Offers a virtual assistant, 'Erica' that operates via both audio and text and is hosted on Bofa's mobile app. Erica addresses customer queries and also allows customers to access transaction services such as bill payments, balance check and debt settlement	✗	✗	✓	✗	✗
	Virtual Assistant	Offers a virtual assistant, 'Inge' that allows customers to access transaction services such as balance check and payments, within the mobile application	✗	✗	✓	✗	✗
	Voice Recognition	Provides hands-free banking that allows customers to check balances and make payments through a voice control mode in the bank's mobile banking application	✗	✗	✓	✗	✗

**While some conversational commerce solutions serve customers in one or two channels, the majority are not available in all channels nor integrated across channels (3/3)**

	Solution Offered	Description	Channel				
			Web	Mobile Banking <sup>1</sup>	Mobile App <sup>2</sup>	Phone Banking	In-branch
	Virtual Assistant	Offers a voice assistant powered by Amazon Alexa that allows customers to track spending, pay bills and check their account balance. The virtual assistant can be accessed via Capital One's mobile application	X	X	✓	X	X
	Virtual Assistant	Offers a virtual banking assistant, 'Ask Sara' which answers questions posed by visitors on the bank's website. Ask Sara can be accessed through both web and mobile channels	✓	✓	X	X	X
	Robot	Offers customer care through Nao, a multilingual humanoid robot at outlets in Tokyo. The robot provides information about money exchange, ATMs, opening bank accounts and overseas remittances	X	X	X	X	✓
	Robot	Introduced SoftBank's Pepper Robot at bank branches in Tokyo to offer customer care to users. The robot engages customers with games and multimedia and provides basic information about the bank's products	X	X	X	X	✓
	Virtual Assistant, Voice Recognition	Embedded Nuance's virtual assistant, 'Nina' into the iPhone app for mobile banking. Nina answers customer queries and also authenticates users through voice biometrics	X	X	✓	X	X

## ***Banks implementing conversational commerce solutions would need to overcome certain challenges that impact the advancement of these solutions***



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