

ARTIFICIAL INTELLIGENCE POWERED BANKING

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Preface

Artificial Intelligence has been around since 1956. Over the following decades, it continued to be a topic of fascination for corporates, but it never really found its way into real world applications. However, recent developments and maturity of certain underlying technologies meant that AI powered applications became commercially viable. A new generation of emerging businesses and the progressive conventional ones across industries saw this as an opportunity to integrate AI as part of their value proposition. This led to consumers being exposed to a slew of smart virtual assistants, be it Alexa, Siri, Google Home or Amelia redefining how they found answers to some of their everyday questions. Amazon recommended a product that would best match their taste or interest. Even businesses in the industries like healthcare, manufacturing, aerospace and agriculture found that AI offered a better way to operate their business.

The banking domain has not been different here. AI driven start-up ventures are looking to redefine banking and progressive banks have launched AI based pilots, be it in the space of customer services, fraud management, or credit scoring, among others. These ventures and pilots have sprung up because AI powered banking is viable now and it is also seeing acceptance among end consumers. All this has led to banking business and technology leaders agreeing that artificial intelligence is among the hottest banking trends that will reshape banking in 2017.

While there are multiple point of views published every day reiterating this belief, there is a lack of documentation giving a clear direction to a bank on how they should go about their AI journey. This point of view, put together by the Banking Visionaries Council instituted by Infosys Finacle, is an attempt to bridge this gap. This council brings together a select group of senior business and technology leaders from global banking community with a singular purpose - Solve most pertinent problems with the research and collective thought leadership efforts. The objective of the paper is to serve banks as a practical guide in their AI journey. We hope banks find this research useful in crafting their organization's AI adoption strategy.



The Meaning of Artificial Intelligence

In concept, Artificial Intelligence (AI) has been around for decades, ever since John McCarthy defined it as “the science and engineering of making intelligent machines”. But it is only lately that AI technology has undergone rapid evolution and consequently sparked significant interest among enterprises in virtually every industry. Today, there is widespread agreement that AI is one of the hottest trends for 2017.

However, there is less agreement on what AI actually means. This is because AI is not one, but a group of related technologies, which includes among others, big data analytics, machine learning, deep learning, predictive/prescriptive analytics, virtual agents, and avatars (which understand natural language). The fact that everything from robotic process automation to actual robotics falls under that umbrella only complicates the understanding of AI even further.

Actually, Artificial Intelligence is all of these things. When a computer system simulates a process, such as thinking or sensing, which is one of the building blocks of human intelligence, it needs AI to do so.

This Point of View focusing on the commercial application of AI in the banking industry assumes the following definition for AI:

Artificial Intelligence is an area of computer science that emphasizes the creation of intelligent machines that sense, comprehend, reason and act to emulate human behavior. Some of the activities that computers with AI are designed for include image and speech recognition, learning, planning and problem-solving. Examples of applied AI technologies include (but are not limited to): machine learning, deep learning, predictive/prescriptive analytics, virtual agent and natural language understanding technologies (Siri, Alexa, Google Home, Amelia etc.).

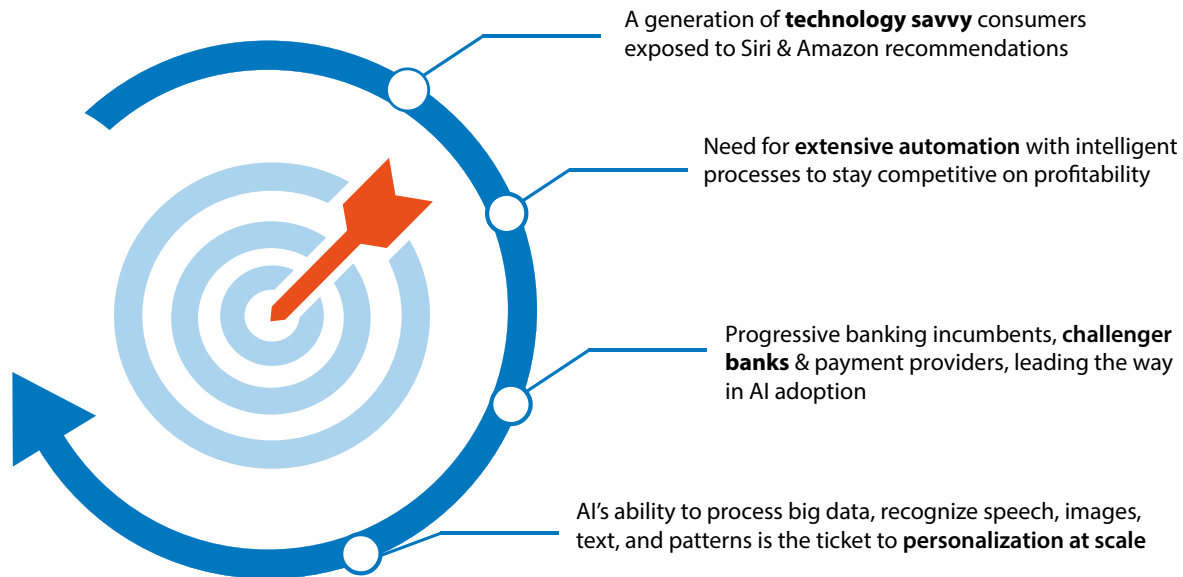
The Drivers of Adoption

AI is poised at a point of inflection, where it is mature enough to step out of the lab and enter the real world. In parallel, banks have also attained a degree of maturity in building digital components,

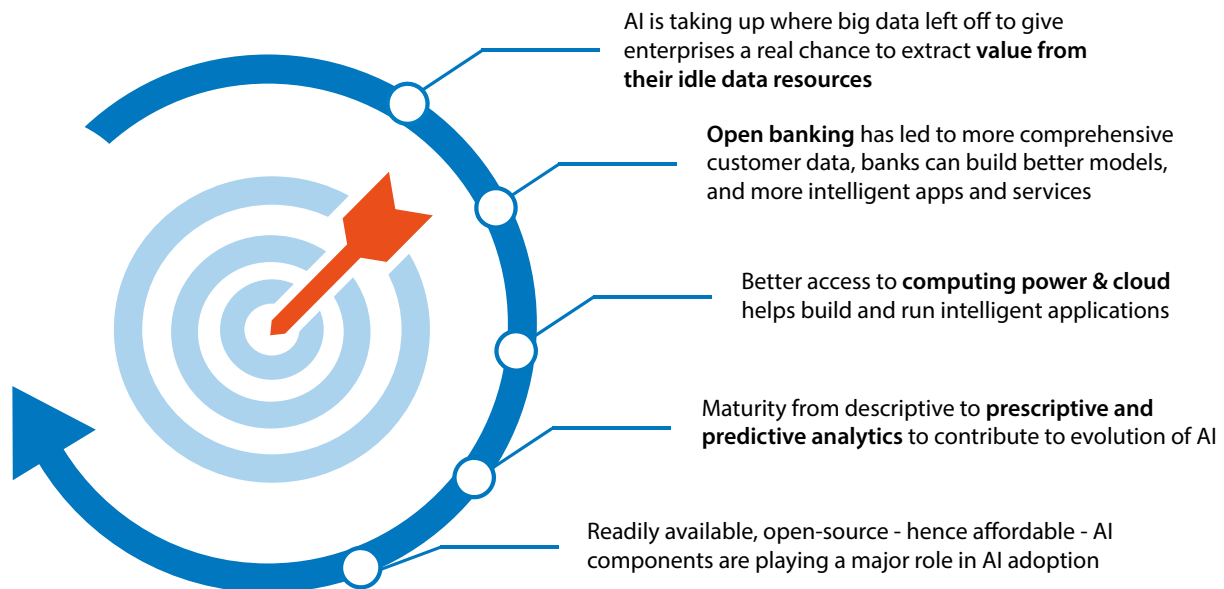
such as big data, process automation and cloud solutions, which is a precondition for a successful foray into AI.

The graphic below summarizes the business and technology factors driving AI adoption today.

Business factors driving AI adoption



Technology factors driving AI adoption



Forces Driving AI Deployment

44 percent of executives participating in an Economist survey said delaying AI implementation would make their business vulnerable to disruption at the hands of startup companies. When Infosys reached out to 1,600 IT and business decision makers, three out of four said that AI was fundamental to the success of organizational strategy. Those currently using or planning to use AI technology anticipated revenues to go up 39% on average by 2020.

This places a great deal of responsibility on senior leadership to drive AI adoption within their organizations. The below graph depicts how respondents to the Infosys survey rate the drivers of AI deployment: clearly considerations such as gaining a competitive advantage, drive by executives and solving business problem are rated as the key drivers for adoption of AI. This goes to say that the drivers are mostly top down currently.

Competitive advantage



Executive-led decision



Solution to particular business/operational/technical problem



Internal experiment



Customer demands



Unexpected solution to problem



Offshoot of another project



Indicates a top down approach

Source: Infosys research 'Amplifying Human Potential: Towards Purposeful Artificial Intelligence'

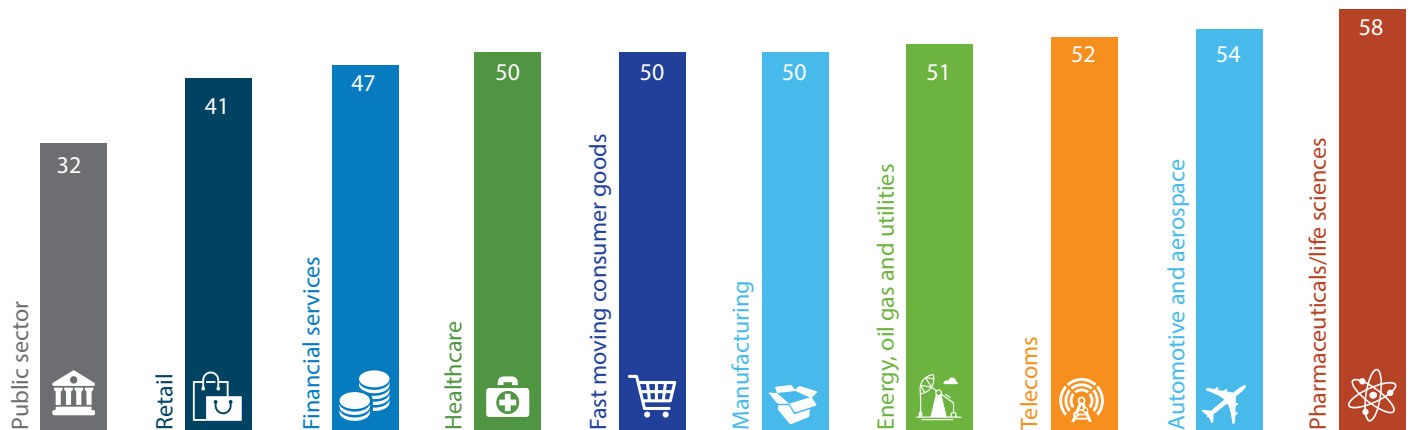
Download the research:



Although the banking and financial services sector is showing interest in AI, our research found that it is clearly not very mature in its journey to adoption, coming in at the eighth position. This is surprising considering that financial services is a data intensive business. Our research, which covered respondents from 10 vertical groups, tried to assess their respective progress in the AI journey with the help of a maturity index, that is depicted in the graph below. On an average, most banks are explorers, with AI related skills on the increase and more initiatives planned in the coming 12 months.



Comparison with other industries



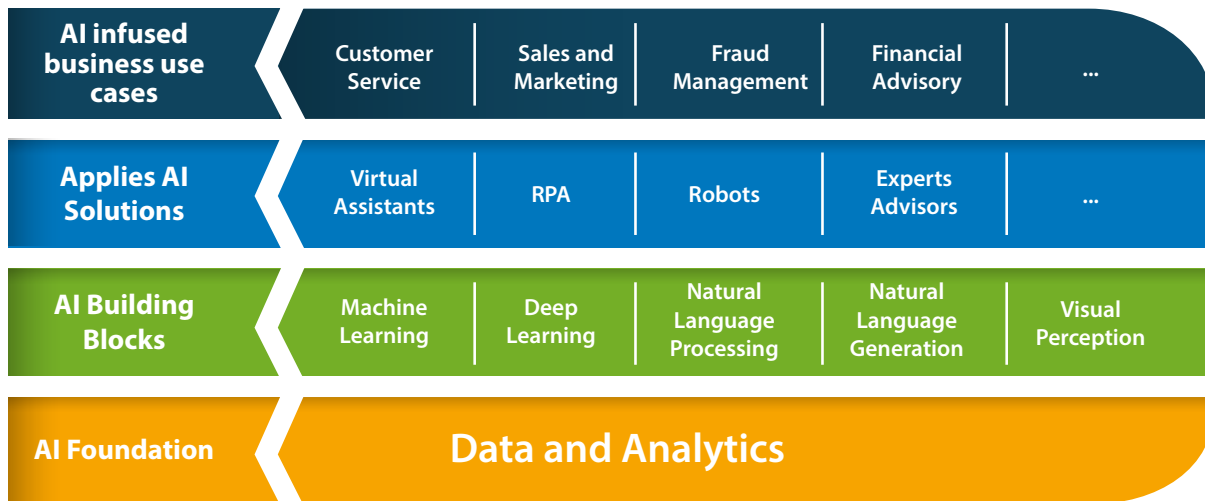
Percentages indicate average maturity score by industry

Source: Infosys research 'Amplifying Human Potential: Towards Purposeful Artificial Intelligence'

The AI Stack

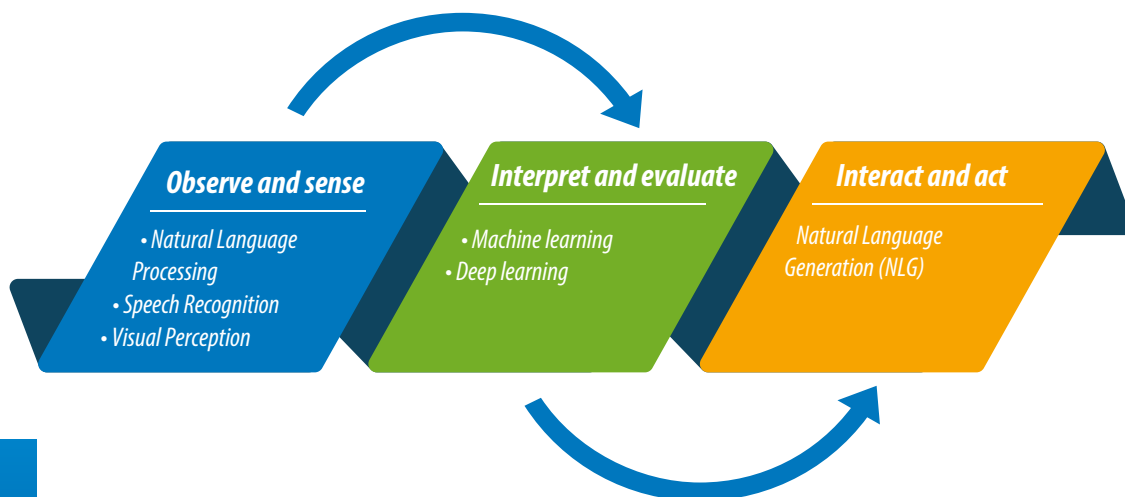
AI applications have proliferated over the past few years, and today there are more than a hundred well-known applications for different industries. These have subtly permeated human life in recent years without our realizing it. Leading this is the virtual agent, better known as Alexa, Siri, Google Home or Amelia, which answers simple queries and executes basic tasks. The recommendation engine probably marks consumers' first brush with AI, as they consulted Amazon on what to read next. And Pittsburgh residents got their first taste of a driverless car service in December 2016 when Uber launched its trial. But it's not

just consumer-facing businesses that are taking an active interest in AI; from aerospace to manufacturing, and healthcare to public sector, every industry is in the fray. It is important to understand that all these applications and business use cases have a combination of technologies under the artificial intelligence umbrella. The schematic below shows a broad AI stack consisting of AI building blocks and applied AI solutions, which go into making business use cases. The next few sections defines each of these technologies, their applications in banking along with case examples of banks leveraging these technologies for the AI initiatives.



Broadly speaking, an organization will use AI to do one or all of the following

1. **Observe and Sense:** View what's happening (Emulate the sensing aspect of human behavior)
 2. **Interpret and evaluate:** Create hypothesis and evaluate whether the hypothesis is right or wrong. Accordingly decide and choose the best response (Emulate the thinking aspect of human behavior)
 3. **Interact and Act-Interact:** with the human / machine and take action (Emulate the action aspect of human behavior)
- The schematic below lists these functions and the AI technologies enabling them.



A Closer Look at the AI Stack

1. AI Foundation: Data and Analytics

Digitization has been a huge factor in the creation of big data – data that is both structured and unstructured, appears in formats ranging from text to speech to video to gesture, and originates in a variety of sources. Modern Artificial Intelligence platforms owe their genesis to the evolution of data/ process automation technologies, and to the quest for a viable way to manage huge amounts of data and massive numbers of processes. Compared to humans, machines are much more competent at processing and deducing patterns from big data, including text, images and speech, from various sources. That makes them a natural fit for banking, which is both data and process-heavy.

Popular applications of big data & analytics in banking:

- Fraud detection and prevention is one of the popular use cases for big data in banking. Banks can now access millions of transactions and non-traditional data sources to identify suspicious activity and fraud.
- Sales and marketing is another popular application. Traditionally, banks have had access to all the financial information about their customers. Augmenting this with a consumer's behavior, banks are well placed to personalize customer communication and offers.
- For credit scoring, banks need to expand the number and quality of data sources required to assess customers' creditworthiness based on varied data, including past behavior.

Case example: Fidor Bank

Fidor Bank leverages data analytics to create a community rating, Fidor Karma, based on a customer's activities, connections and interactions. This enables Fidor to offer products that are linked to customer behavior. Fidor Karma creates a banking profile by integrating community contribution, raised questions, answered questions, social media profiles and connections with other community users.



2. AI Building Blocks

In this section, we will briefly talk about the six key technology building blocks for AI powered solutions. Some of these technologies are inter-connected, as you will discover while going through this section.

2.1 Machine Learning

Machine Learning is simply, the ability of computers and other smart machines to learn without being “taught” or programmed. It is at its heart, computer programs which change with data. The machine learning process has some similarities to data mining. Both search and identify patterns from data, but where data mining presents the findings to human beings for their attention, machine learning adjusts its program and actions on its own.

Popular applications of machine learning in banking:

In banking, machine learning finds application in pretty much everything such as customer service, personal financial management, wealth management, and fraud/risk management.

For instance, machine learning can be used to identify fraud or proactively assess its payment systems’ vulnerability. A computational algorithm will process the payment transactions under assessment, identify patterns from the data, and flag any inconsistencies or anomalies. Basis feedback from human on the anomalies identified, the program readjusts its logic dynamically. Machine learning’s impact can be felt everywhere – front, middle, or back office – by way of fewer errors, higher efficiency, better decisions, and great customer experience.

2.2 Deep Learning

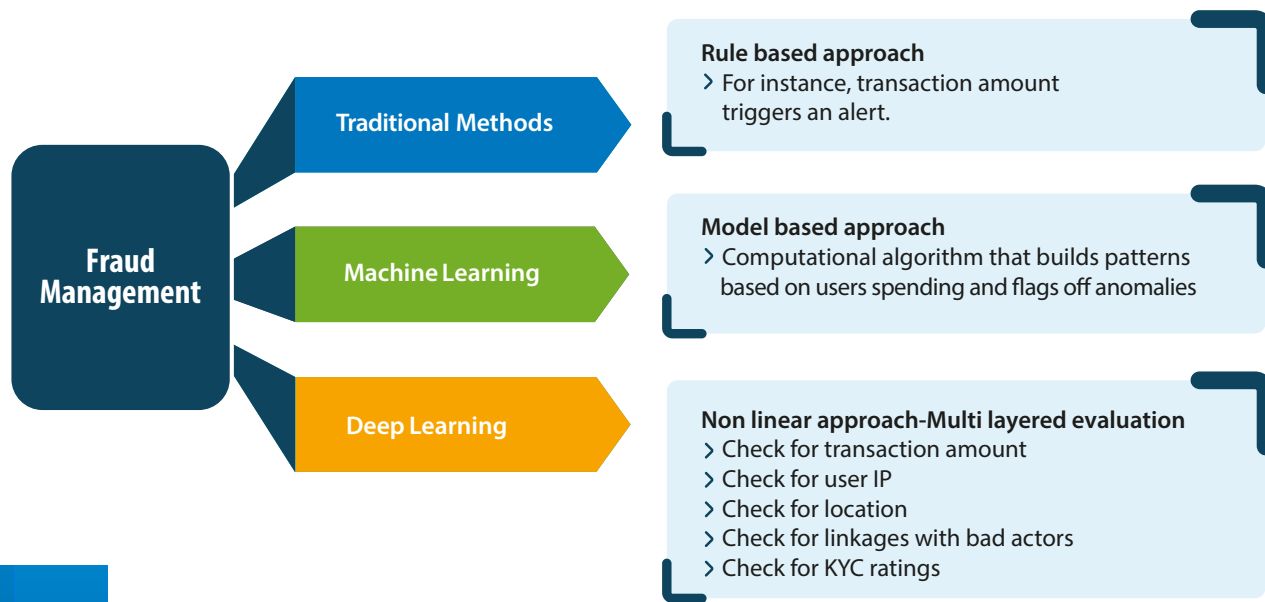
Deep Learning is a subset of machine learning, accomplished through a hierarchy of artificial neural networks, which resemble human brain architecture, complete with a web of neuron nodes. Where traditional programs take a linear approach to building analyses, deep learning systems mimic the human brain and its non-linear style of working.

Popular applications of deep learning in banking:

Like machine learning, deep learning again has multitude of ways in which it can be applied in banking processes. For instance, deep learning can be used to check fraud. The traditional approach bases its judgment largely on the amount of the transaction, while deep learning also considers typical behavioral patterns of the users too. PayPal is a good example of an organization that claims to use deep learning to combat fraud.

Deep learning is also useful for finding new business opportunities. With an increasing amount of business promotion happening in social media, deep learning can help banks access relevant customer information and behavior on social networks to identify opportunities from their likes and preferences. Several internet majors like Amazon and Alibaba are trying to leverage deep learning to make relevant offers to the users in real-time.

The below schematic offers a useful comparison of these different approaches:



A major benefit of course is better decision making, closer to the human variety. Deep learning can be implemented for recollecting previous interactions that have a bearing on the current decision that assist in drawing conclusions independently while rapidly processing large quantities of data from highly diverse sources.

2.3 Natural Language Processing (NLP)

Natural Language Processing (NLP) is a technique computers use to analyze, understand, and make sense of text and human language. Developers can leverage NLP to organize and structure knowledge for automatic summarization and answering, translation, speech or entity recognition, extracting relationship, text mining, and sentiment analysis. Important use cases include consumer sentiment analysis and in virtual agents and intelligent bots.

Popular applications of NLP in banking:

Sentiment Analysis: Banks can use NLP to discover and parse customer sentiment about their offerings and brands from social media conversations.

Virtual Assistants and Intelligent Bots: The largest bank in the United States offers an NLP solution with customized content to clients. There is also a virtual agent supporting the loans, banking and credit cards sections of the website. Capital One has a chatbot called Eno, which uses NLP to render consistent, personalized service to customers.

NLP can lead to faster and more efficient customer service rendered through AI-based digital assistants. Eventually, the system would learn enough from customer and agent behavior to resolve certain issues automatically.

Case example: DBS Bank

Singapore's DBS Bank is using an Artificial Intelligence (AI)-powered Virtual Assistant called KAI to enhance the experience at digibank, its mobile-only bank in India. KAI – which can understand language the way humans speak it, and is endowed with learning ability – will help digibank to anticipate and reply to thousands of customer queries, and customers to fulfil banking transactions in real-time, at any time, anywhere.

When it was launched a year ago, the Virtual Assistant could anticipate and answer about 10,000 typical queries, and was learning more each day. Another example of AI in use at digibank is the intelligent budget optimizer, which helps customers budget, track and analyze expenses. It is smart enough to understand customer preferences and provide suitable recommendations, for instance, based on spending habits, suggest the right marketing offers, or guide overspending customers on how to manage their resources better.

2.3.1 Speech Recognition

Speech Recognition technology endows machines and programs with the ability to identify words and phrases used in spoken language and change them into a machine-readable format. Early stage speech recognition software had limited vocabulary, and could only identify words that were spoken very clearly. Current solutions are much more sophisticated and are able to understand natural speech.

Acoustic and language modeling algorithms are what make speech recognition possible. The former represents how units of spoken language and audio signals are related, while the latter matches sounds with word sequences to tell similar sounding words apart.

Popular applications of speech recognition in banking:

Speech recognition technologies can help banks in providing a frictionless customer service and enable more efficient authentication. Barclays offers a voice banking facility to customers, which, by recognizing customers' unique voice patterns obviates the need for other security measures. HSBC and First Direct are among those offering a voice and touch ID option to customers.

Speech recognition technology, with its ease of use, is a natural fit for securing mobile payments, wearable devices and devices connected to the IoT. More than 26 million users of a South Korean financial service provider's mobile payments app can simply talk into a phone to authenticate transactions.

2.4 Natural Language Generation (NLG)

Natural language generation (NLG) is a set of technologies generating natural language from a machine to converse and interact intelligently with humans, and provide information, insights, and advice in the same natural language. NLG is currently implemented in customer-facing and business-user facing applications.

Popular applications of NLG in banking:

NLG is mostly used in places where data from a lot of sources has to be combined to generate insights in an understandable format. Cognitive agents, such as Amelia, implement NLG to converse intelligently with customers and provide them with insights to transform customer experience. Raw data can be tied up in a story by using NLG – for example Quill software by Narrative Science is used by financial institutions such as Credit Suisse. Quill is mostly used to generate portfolio reviews.

2.5 Visual Recognition

Visual Recognition, as the name suggests, is the recognition of images and their content. Employing deep learning, visual recognition (VR) technology is capable of finding faces, tagging images, identifying the contents of a picture, and spotting similar images from a large set.

Popular applications of visual recognition in banking:

Very similar to speech recognition, visual recognition technologies also enable frictionless customer experience. Westpac was the first Australian bank to allow customers to activate a new card through their smartphone cameras.

Visual recognition enables bank customers to pay bills by simply taking a picture on their smartphone camera, and also restaurant users to quickly pay up by scanning their bills. UK's Santander and South Africa's ABSA Bank are among those to use ID scan to authenticate documents.

Several banks, including Bank of America, Citibank, Wells Fargo, TD Bank etc. offer remote check deposit via mobile, which is an application of VR technology.

2.5.1 Optical Character Recognition

Optical Character Recognition is a field of research spanning pattern recognition, artificial intelligence and visual perception. It involves conversion of handwritten, typed or printed text into machine encoded text. Leveraging machine learning can help banks to improve accuracy and automate the process of converting physical documents into fields in systems, leading to an intelligent OCR. OCR with machine learning will go a long way in enhancing customer experience, automation and compliance for banks.

3. Applied AI Solutions

In this section, we will cover some of the most popular AI solutions which are designed using the six technology building blocks discussed in the previous section. It's important to note that these are just few examples of variety of AI solutions which can be created through the combination of multiple underlying AI technologies.

3.1 Smart Virtual Assistants (SVAs) and Bots

Smart Virtual Assistants and Bots are software that can interact, receive and deliver information, and act on human commands. SVAs help perform day to day tasks, such as making an appointment, finding information or taking actions on a customer's behalf. A common application is the chatbot, which can converse with people. One can find chatbots in many places, and especially in messaging apps. SVAs and bots offer banks a number of benefits, including 24/7 customer service, cost savings, and personalized & targeted content delivery.

Case example: RBS Luvo

Royal Bank of Scotland has launched "Luvo", a chatbot that assists customers online. Luvo appears as a web chat tool that pops up to ask customers if they need help. It frees bank staff from wasting time on addressing simple queries, so they may devote themselves to more complex issues. Luvo understands natural language, which means customers can actually write to it in their own words rather than choosing from a menu. Eventually, the bank hopes to deploy Luvo to improve personalization and detect problematic issues before they surface.

3.2 Robotic Process Automation (RPA)

Robotic Process Automation (RPA) is the use of software and machine learning to automate highly repeatable, high volume tasks, thereby enabling the human workforce to focus on high-value tasks. The difference between IT automation and RPA is that the RPA system learns continuously by observing human actions and uses machine learning to adjust its responses according to changing circumstances.

Robotic Process Automation (RPA) can be used across a multitude of processes such as customer onboarding, workflow acceleration, data entry, validation and reconciliation.

Popular applications of RPA in banking:

Robotic Process Automation (RPA) can be used across multitude of processes such as customer onboarding, workflow acceleration, data entry and validation, reconciliations, data enrichment – pretty much every banking process which contains highly repeatable tasks.

Case example: ICICI Bank

India's ICICI Bank has deployed software robotics in more than 500 business processes, covering a million banking transactions every day. It is the first bank in India to do so.

The use of software robots has cut the time taken to respond to customers by 60% and increased accuracy to 100%. The robots, which are working in a variety of retail banking operations, as well as in treasury and human resources management among others, capture and interpret information, recognize patterns and run processes to perform functions like data entry and validation, automated formatting, text mining, reconciliation and exchange rate processing etc.

3.3 Robots

A robot is an electro-mechanical or bio-mechanical device that can perform autonomous or pre-programmed tasks. Until a few years ago, robots were mainly used to perform tasks that were too dangerous or difficult for humans, such as cleaning radioactive waste, or to automate repetitive tasks, such as automobile production. With AI technologies maturing, we are likely to see robots entering the mainstream.

Robots take on many different forms, ranging from humanoid, which mimic the human form and way of moving, to industrial, whose appearance is dictated by the function they are to perform. Robots can be used to provide customer service in brick-and-mortar bank branches. Mizuho Financial Group and Mitsubishi UFJ Financial Group are using humanoid robots for this purpose.

Popular use cases of Robotics in banking:

Robots can be used to provide customer service in brick-and-mortar branches for banks; this will allow human customer service agents to focus on more complicated and priority tasks. For example, Pepper, in Mizuho Financial Group Inc Bank, greets customers and is able to recognize facial expressions. Mitsubishi UFJ Financial Group has also trialed a humanoid robot, "Nao", to provide customer service.

3.4 Expert Systems

Expert systems are similar to SVAs they collect and assimilate all the relevant content in a chosen domain area, and then provide users with recommendations and answers. This is done both proactively and reactively, based on the circumstances and the systems' understanding.

Expert systems are used extensively in the financial services industry, especially for providing investment advice.

Popular use cases of expert systems in banking:

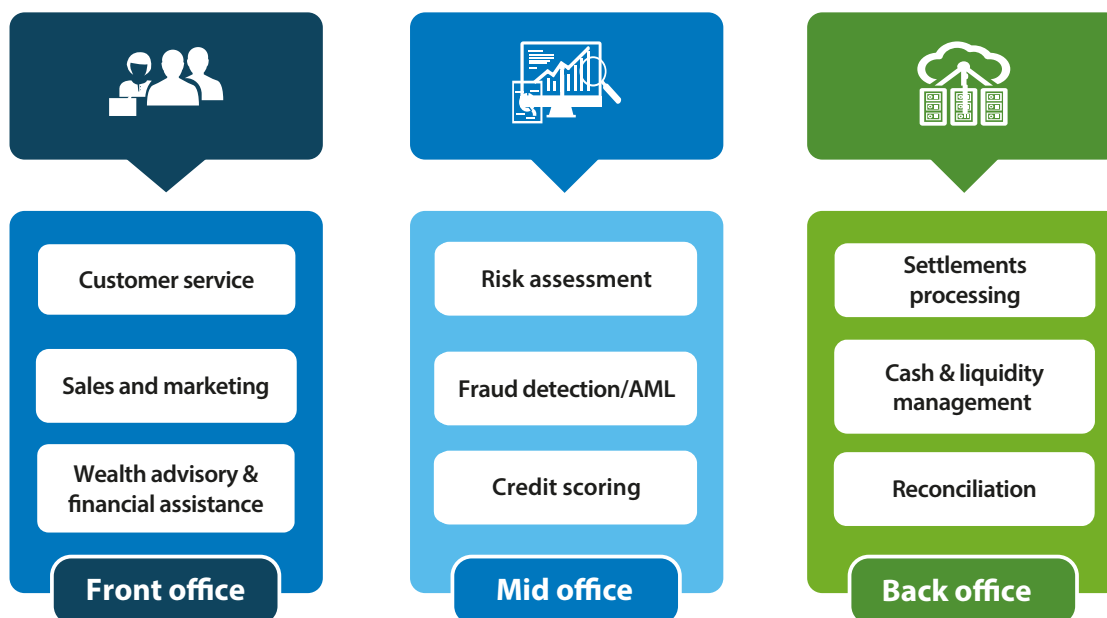
Expert advisors are used extensively in the financial services industry, especially for providing investment advice. Wealthfront and Betterment are examples of two fintechs that have deployed software that work as expert advisors. These platforms take into account a user's demographic and savings goals, and then analyze the current environment. Following this, they design an investment portfolio that is tailored specifically for the user's financial goals

Clearly, this is not limited to wealth management space. One can train advisory on other domains such as compliance, internal policies, tax management etc.

Key Areas of AI Application

From the above discussion it is clear that AI technologies can be infused into several banking processes to great advantage. In fact, advancement in AI technologies offers an opportunity

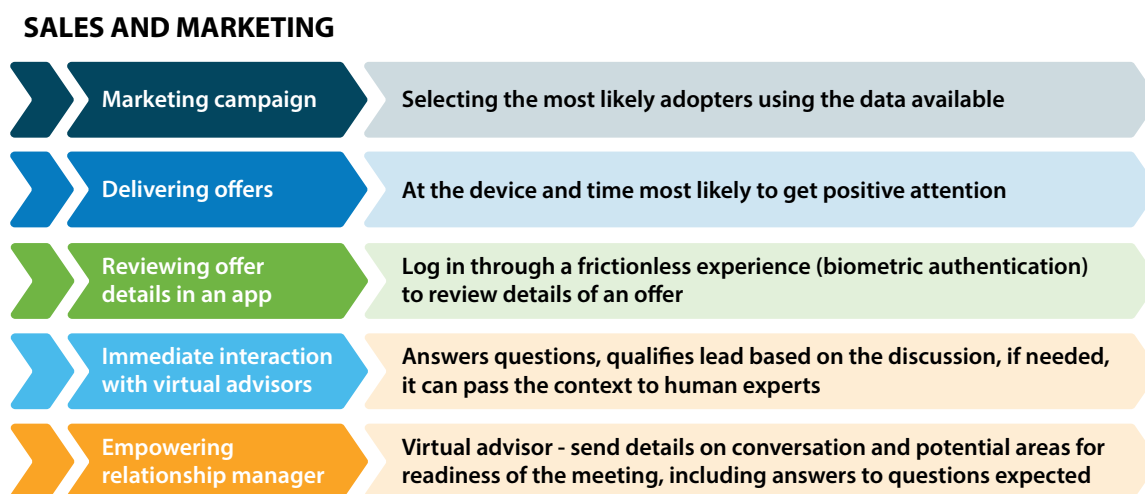
to completely reimagine banking processes and gain unprecedented efficacies in the front, middle and back office. The figure below gives a snapshot of some of these processes.



Following are three examples of how banks are deploying AI in the front, middle and back office.

Front Office: Sales and Marketing

The schematic given below captures how the process of sales and marketing can be re-imagined with AI technologies.



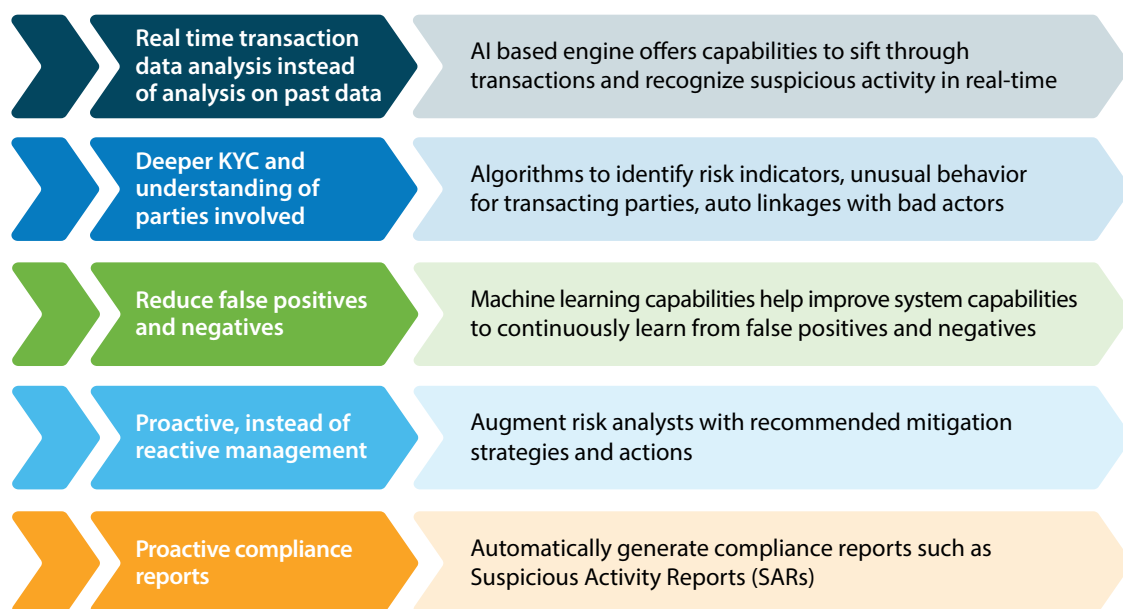
Front Office Case Example: Swedbank Nina

At Swedbank Group, an intelligent virtual assistant named Nina is rendering conversational customer service to help customers and agents help themselves. Customers type their queries via the website and Nina helps them find answers and also products and services best suited to their needs.

The Bank's service agents are also leveraging Nina to find information for customers quickly. This has improved the experience for both parties, and within the first three months of deployment, taken first contact resolution to 78 percent. Customers have been positive about Nina, using the virtual assistant for 30,000 conversations per month within the first 3 months of introduction. Nina is already answering 80% of questions from Swedbank customers.

Mid Office: Fraud Management

The figure on the right gives a snapshot of how AI can be leveraged to redefine the process of fraud management spanning Anti Money Laundering (AML), Know Your Client (KYC), fraud detection and regulatory compliance.



Middle Office Case Example: Finance

ZestFinance is a fast growing American fintech firm, which leverages big data technology in credit underwriting. With the help of machine learning, ZAML™, its proprietary platform, crunches massive volumes of data traditionally ignored by credit underwriters to identify underbanked creditworthy prospects as well as mitigate the risk in credit decisions. ZestFinance's value proposition is to help many borrowers, like millennials for instance, who had no access to credit earlier to now be able to avail loans.

ZAML™ uses the same variables as FICO, along with non-traditional "meta-variables" to understand borrower credentials. It collects as many as 10,000 data points to work out the APR and the platform takes just a few seconds to arrive at its decision. ZestFinance allows neither rollovers, which inflate the APR, nor a second loan when the

first is still unpaid. As per Zest Finance, this strategy has paid off by bringing the default rate down to 15%, half that of a payday loan.

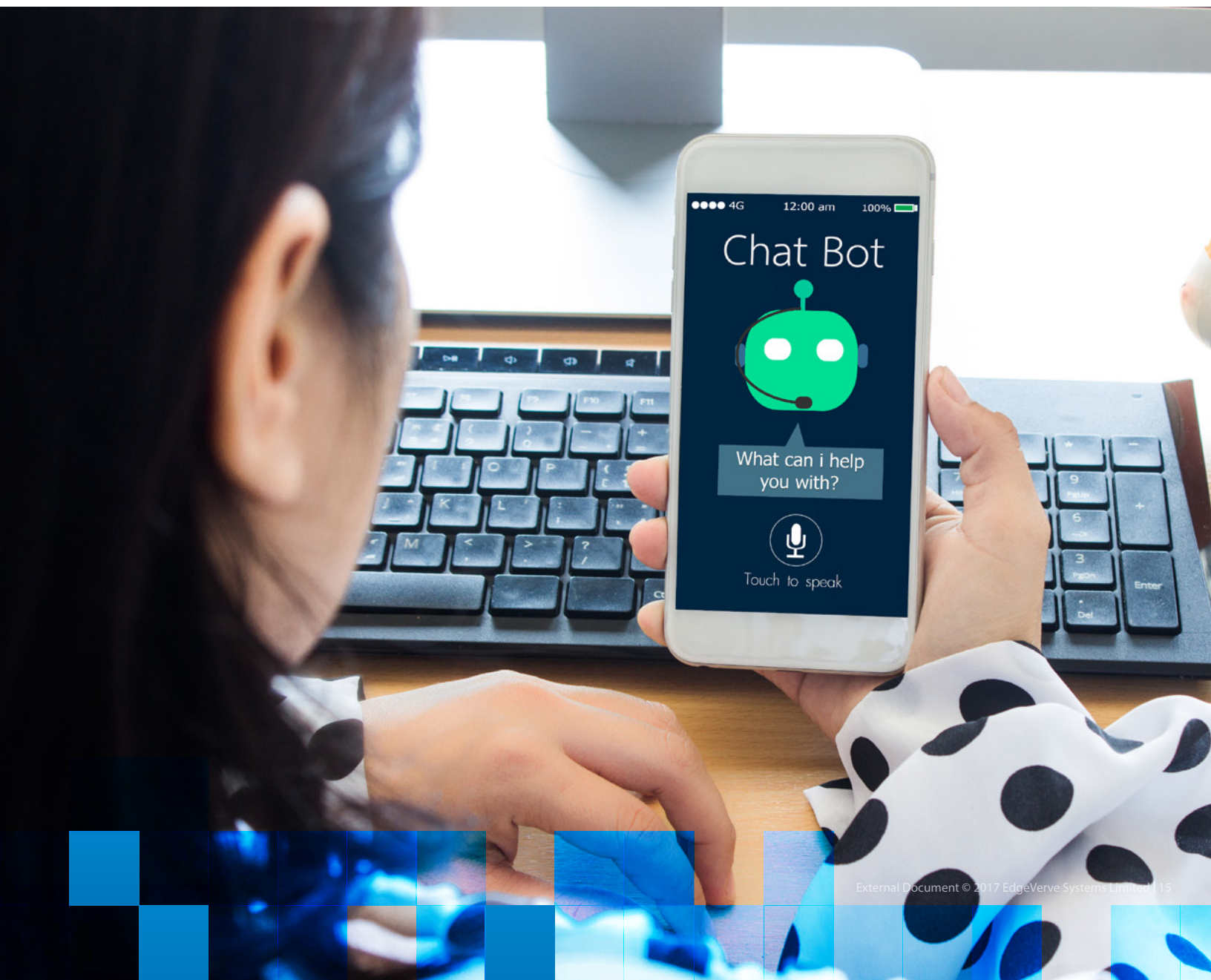
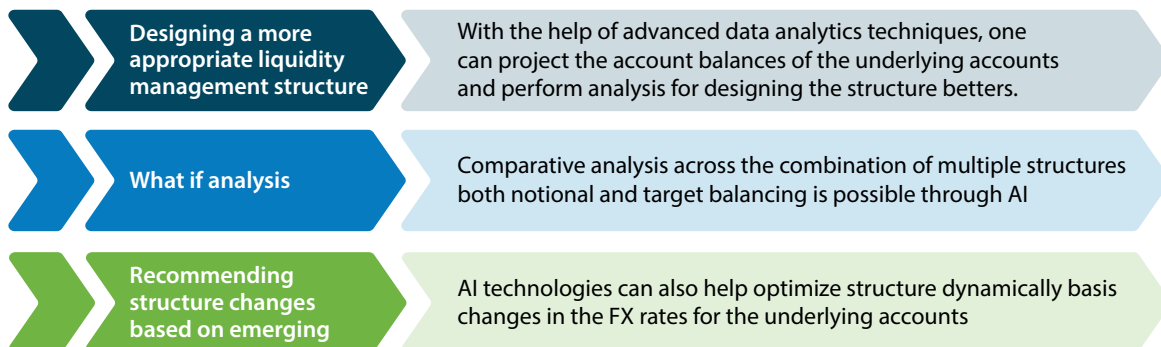
- Data assimilation - Rapidly discover, acquire, and onboard data sources at a massive scale.
- Modeling tools - Train, assemble, and productionalize machine learning models in one streamlined workflow
- Modeling expandability - Unpack the "black box" of machine learning models to clearly communicate economic value and support compliance
- Safely grow the lending business - Increase approval rates by leveraging machine learning to dredge through non-traditional credit data sources
- Cut credit losses, without losing borrowers - Improve underwriting by accurately identifying genuine borrowers, and cutting out the high-risk ones

Back Office: Cash and Liquidity Management

The schematic below shows how a bank can leverage AI technologies to redefine back office processes like liquidity management. The

focus here is on the most popular liquidity management tools including target balancing and notional pooling.

CASH AND LIQUIDITY MANAGEMENT



Preparing for AI

AI adoption in banking is a mixed story so far. Our research shows that banks are the biggest investors in this technology, yet financial services ranks third from the bottom on the AI maturity index.

For the respondent organizations in our survey, the priority of deployment is as follows: Big data automation heads the list, with 65 percent of organizations having already deployed or planning to do so. About half the respondents are considering predictive analytics (54 percent) and machine learning (51 percent), 44 percent are investing in expert systems and 31 percent in neural networks.

Organizations are readying themselves to deploy these technologies by making investments in IT infrastructure (60 percent) and developing the required knowledge and skills (53 percent). However, they are also seeking outside help from experts in areas such as planning (46 percent) and knowledge gathering (40 percent).

65%

of respondents say that their organization has deployed or plans to deploy big data automation for collecting, processing and storing data



54%

are looking at predictive or prescriptive analytics



51%

are looking at machine learning



60%

are investing in supporting IT infrastructure



53%

Source: Infosys research 'Amplifying Human Potential: Towards Purposeful Artificial Intelligence'

Deployment Options

Banks can choose between platforms, applications and cloud services for deploying AI. It is generally accepted that a combination of all three is both practical and desirable.

However, the decision should be based on the overall purpose of the AI strategy. For integrity and robustness, the platform is best. Yet another view is that the option that best delivers end consumer expectations is the right one.

Are you Ready for AI?

Internal readiness

How successful a bank is in pursuing AI depends on its prior experiences in integrating new technological innovations. AI-powered banking needs a group of technologies and a vast array of digital components-from big data to cloud-based solutions. The bank also needs to figure out if it is ready internally, but before that it needs to answer certain questions – questions, such as whether it really needs AI, and if so, whether it should build or buy it. The bank should then determine if there is a non-AI solution that presents a better business case as compared to an AI solution.

For developing artificial intelligence capability completely in-house, a bank should consider the following:

Business vision and differentiation

In-house skills

Tech readiness

Timelines

...

What is your bank's vision and strategy ?
Where does AI fit into that ?

Does your bank have a business case where AI can deliver differentiated results?

What are the timelines for delivering the AI solution?

Does your bank have the necessary in-house skills and investments required to not only develop and deploy AI solutions internally, but also maintain and scale the technology in future?

What has been the rate of success for deploying and integrating new technologies in your organization?

Does your organization have a framework to measure the project's ROI?

For external partners

There are many technology providers with fairly mature offerings and services in Artificial Intelligence. When choosing a technology

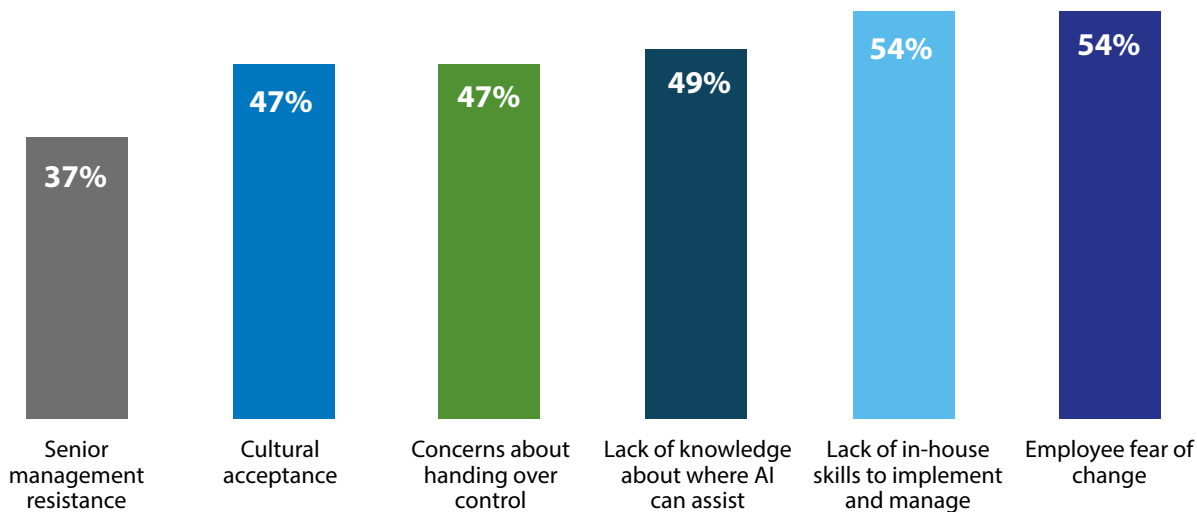
partner, a bank should evaluate the following criteria:



Key Barriers to Adoption

Lack of adequate infrastructure and skills is the biggest barrier to AI adoption. Other key barriers stem from cultural issues including

concerns about ceding control, (lack of) acceptance and resistance from the top.



Source: Infosys research 'Amplifying Human Potential: Towards Purposeful Artificial Intelligence'

Ethical Implications of AI Implementation

An obvious question is what AI will do to existing jobs. No doubt AI will take over many of the routine, repetitive jobs performed by humans today. It will also fundamentally transform the finance function performed by banks over the next few years. Robotic

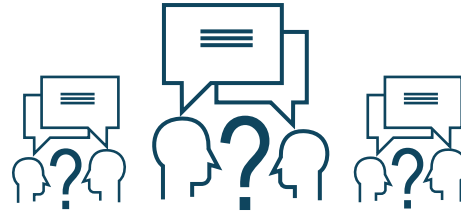
But it is also clear that AI will never replace human beings; on the contrary, it can actually augment human abilities. For instance, people engaged in tasks that will be performed by AI in future can devote their time to more valuable pursuits such as creative

43%

employees have concerns around safety of data

34%

believe increased impact on privacy to be among the chief area to address



28%

believe that AI's impact will go beyond concerns about the day-to-day job and will also have an impact on their employees' human dignity, such as their sense of self-worth

With employees tasked with the successful implementation, management and use of AI technologies, these are fears that cannot be ignored

Source: Infosys research 'Amplifying Human Potential: Towards Purposeful Artificial Intelligence'

Process Automation is a natural fit for processing data for reporting and compliance, a function that requires a large workforce today. Going forward, banks could use AI to build or redesign their operating models and processes.

thinking, problem solving and innovation, which only they are capable of. Our research shows that most organizations know this – of the 75 percent of respondents planning to replace the workforce with AI, the majority (80 percent) was going to retrain and redeploy the impacted employees.

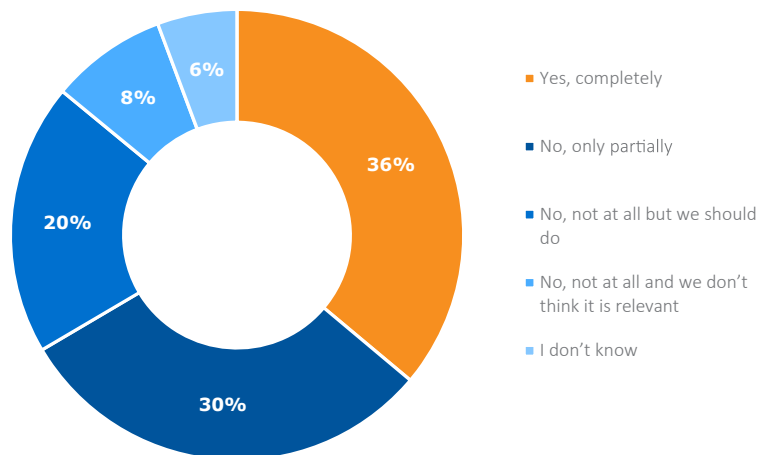
53%

believe ethical concerns stop AI from being as effective as it can be

36%

believe that their organization has completely considered the ethical issues relating to the use of AI

Consideration of AI ethics



Source: Infosys research 'Amplifying Human Potential: Towards Purposeful Artificial Intelligence'

Readiness of AI for Banking

Even though there is lot of excitement when it comes to implementation of AI for banking, there is still a lot of ground to cover when it comes the readiness of AI technologies and solutions for business.

As per our analysis, following is the relative readiness of various technologies and applied AI solutions for the banking industry.

The excitement surrounding AI needs to be tinged with an air of caution as the technologies are supporting AI solutions are probably not as ready for real-time use as the hype suggests. It's critical to set the realistic expectations for AI programs within the organization. While the AI technologies hold great promise, many of them need more time to mature to deliver on the expectations.

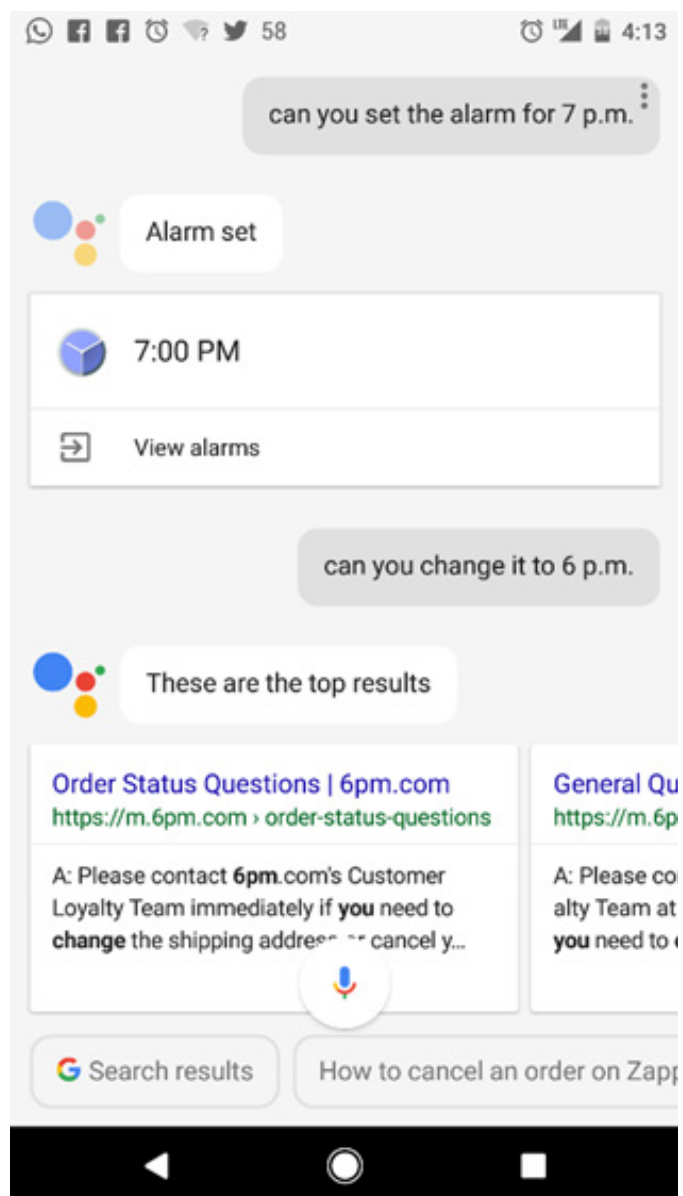
AI Foundational Technologies	Readiness for business use	Potential for banking
Machine Learning	Medium	High
Deep Learning	Low	High
NLP	Medium	High
NLG	Medium	Medium
Visual Perception	Medium	High

Applied AI Solutions	Readiness for business use	Potential for banking
Virtual Assistants	Medium	High
Robotic Process Automation	High	High
Robots	Low	Medium
Expert Systems	Medium	High

For instance, many chat engines aren't great in keeping context of the conversations where multiple commands are given. E.g. we tried giving simple commands as following to some of the popular assistants available on the smart phones.

- Can you set an alarm for 7 PM
- Can you change to 6 PM

While few assistants followed the thread of conversations, many others did not understand that the second command was associated with the first one.



Conclusion

While the concept of Artificial Intelligence has been around for decades, it is only recently that the AI fantasy has started to turn into reality. Many of the technology pieces are already in place, albeit in varying stages of maturity. What's left to do is stitch together these components to re-think banking processes and experiences. Many banks have made a start by incorporating several AI components into their processes and have experienced early results.

While the technology's evolution is both rapid and impressive, banks, and indeed, all enterprises, should ground their adoption strategies and expectations in reality. Nevertheless, regardless

of initial hiccups and gestation times for expected results, banks should waste no time in executing their AI plans. Because AI is evolving so quickly, it does not allow banks the luxury of waiting till it matures, and those who do, risk never being able to catch up with the leaders. Quick movers have another advantage in that their AI systems will start learning earlier than others, and will therefore evolve faster as well.

With AI, the industry will go through a long voyage of reimagining banking, spanning several years, many milestones and at least a few challenges.



About Banking Visionaries Council (BVC)

Banking Visionaries Council has been constituted by Infosys Finacle to collaborate with senior business and technology leaders from banking community to develop actionable point-of-views around contemporary themes within the industry. The purpose of this

council is to solve most pertinent problems with research and collective thought leadership efforts. Currently, the council has twenty members strong board with representation from eleven countries across six continents.



This point of view paper is an abridged version of the collaborative research work done by the council. For more information on the council, please reach out to finacle@edgeverve.com.

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About Infosys Finacle

Finacle is the industry-leading universal banking solution from EdgeVerve Systems, a wholly owned product subsidiary of Infosys. The solution helps financial institutions develop deeper connections with stakeholders, power continuous innovation, and accelerate growth in the digital world. Today, Finacle is the choice of banks across 94 countries, and serves over 848 million consumers – estimated to be nearly 16.5 percent of the world's adult banked population. Over a billion bank accounts are powered by Finacle globally.

Finacle solutions address core banking, online banking, mobile banking, payments, treasury, origination, liquidity management, Islamic banking, wealth management, and analytics needs of financial institutions worldwide. Assessment of the top 1000 banks in the world reveals that institutions powered by Finacle enjoy 50 % higher returns on assets, 30 % higher returns on capital, and 8.1 % points lesser costs to income than others.



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