

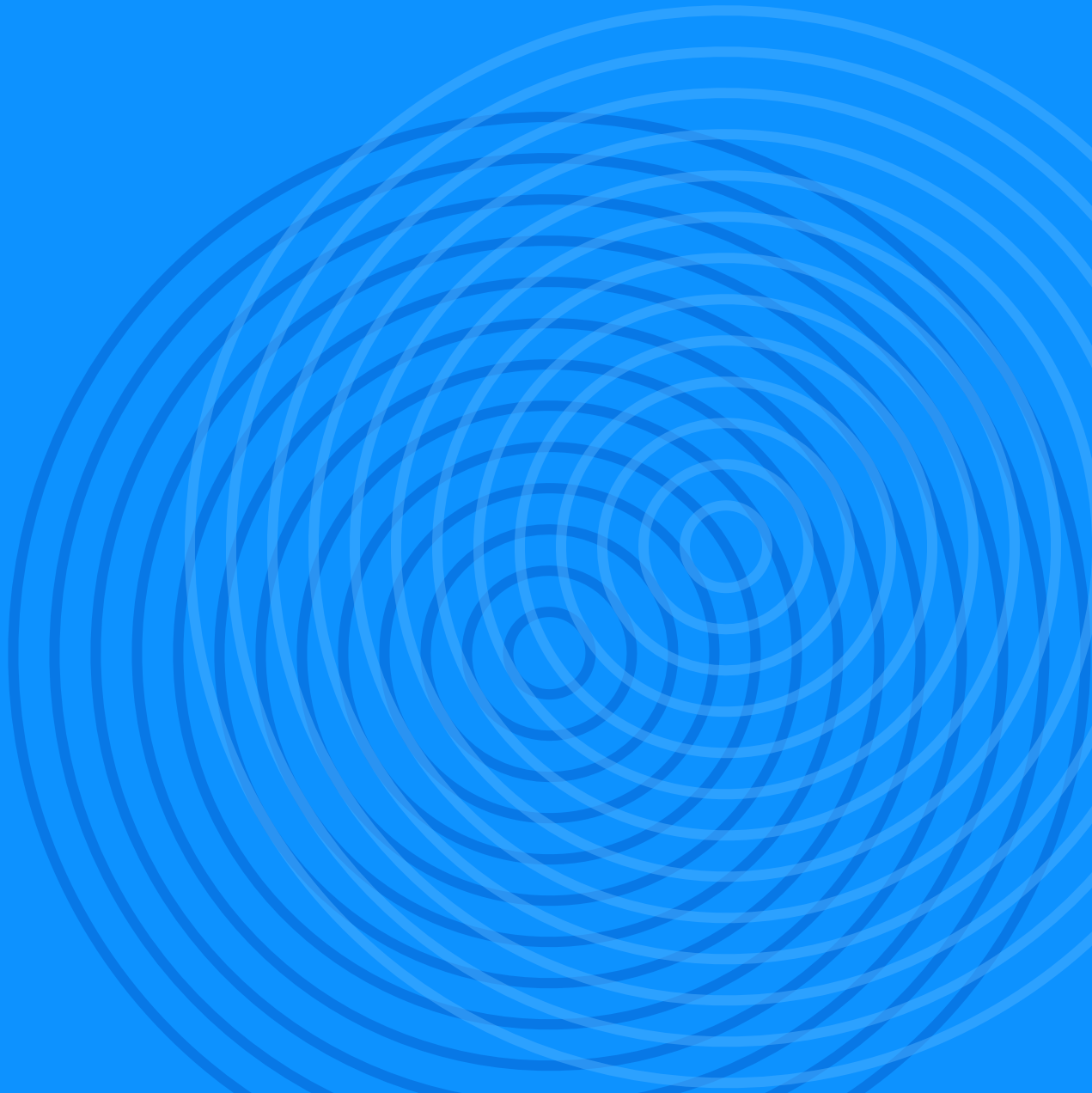
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Microsoft Services

# **Making banking personal again**

Augmented intelligence in banking and capital markets



We are not simply building individual tools, but rather designing an **intelligent fabric** based on four principles—**collaboration, mobility, intelligence, and trust.**

**Satya Nadella**  
CEO

Microsoft 2016 Annual Report



# What's inside

03 Introduction

05 Science nonfiction

06 Beyond analytics

07 A challenging landscape

08 Three paradoxes

16 Foundations for the future

17 What's next?

18 Bylines

s inside

02

# Introduction

MICROSOFT'S MISSION is **to empower every person and every organization on the planet to achieve more.**

While popular culture has defined AI as *artificial intelligence*, when viewed through the lens of our mission, we believe the term *augmented intelligence* is far more accurate. The combination of machine learning, deep learning technology, bots, and intelligent agents on a powerful cloud computing platform has ushered in a new era of computing that's defined not so much by what machines can do independently or as human substitutes, but rather by how they can amplify human will and action as tireless auxiliaries in countless arenas.

We must recognize this new kind of computing both for what it is and what it is not.

**AI is not merely a new tool.** It's a radical shift that makes technology what it always should have been—ubiquitous yet invisible and intuitive to use.

**AI is not about replacing humans.** It's about harnessing humanity's collective knowledge and experiences to make better decisions and enrich how we understand and relate to each other and our shared world.

**AI is not about robots.** It's about making life easier with intelligent services that anticipate our needs, organize our environment, and perform time-consuming repetitive tasks, freeing humans to be more creative and productive.



## AI innovation principles



### Be empowering

Join the creativity and empathy of people with the speed and power of technology to conserve our most valuable resource: time.



### Be trustworthy

Privacy, security, and transparency must be balanced with the desire for efficiency to foster trust among businesses, customers, and machines.



### Be respectful and inclusive

Experiences must be designed to include all the world's cultures, situations, and abilities in our complex, global environment.



Disruption will not be a one-time event, rather a continuous pressure to innovate that will shape customer behaviors, business models, and the long-term structure of the financial services industry.

Most people don't understand just how quickly machine intelligence is advancing; it's much faster than almost anyone realized, even within Silicon Valley.

Elon Musk

Vanity Fair's New Establishment Summit,  
October 2014

99

# Science nonfiction

FIFTY YEARS AGO, MIT introduced the world to ELIZA, the ancestor of today's chatbots. ELIZA captured the imagination of millions and ignited a revolution in human-computer interaction. Fast-forward to 2016. Microsoft and other industry leaders have made significant advances in AI. For example, Microsoft's **deep learning-based language translation in Skype** was recently named one of the seven greatest software innovations of the year by *Popular Science*.

## A brief history of AI

### The past 20 years

The first commercially available **voice interface** is introduced by Nuance.

Microsoft launches Kinect, an immersive **natural user interface**, reimagining how humans control machines.

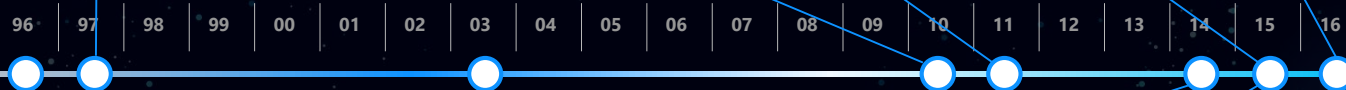
Apple launches Siri, a **conversation interface** and **intelligent agent**.

Facebook M, the social network's **text-based virtual assistant**, is released.

Using neural nets, a **computer vision system** developed by a team from Microsoft outperforms a human on the ImageNet challenge.

An MIT algorithm passes the **Auditory Turing Test**.

Microsoft rolls out the first **Bot-as-a-Service** offering.



IBM's **Deep Blue** defeats **Garry Kasparov** in a 6-game set, the first time a computer defeated a reigning world champion in regular play.

Toyota brings Intelligent Parking Assist to market, providing a glimpse of our **autonomous vehicle** future.

A **chatbot** passes the **Turing Test** by convincing 1 in 3 judges that it was a 13-year-old non-native-English-speaking Ukrainian boy.

Amazon launches Echo, a **voice-controlled, internet-connected hub** for the home.

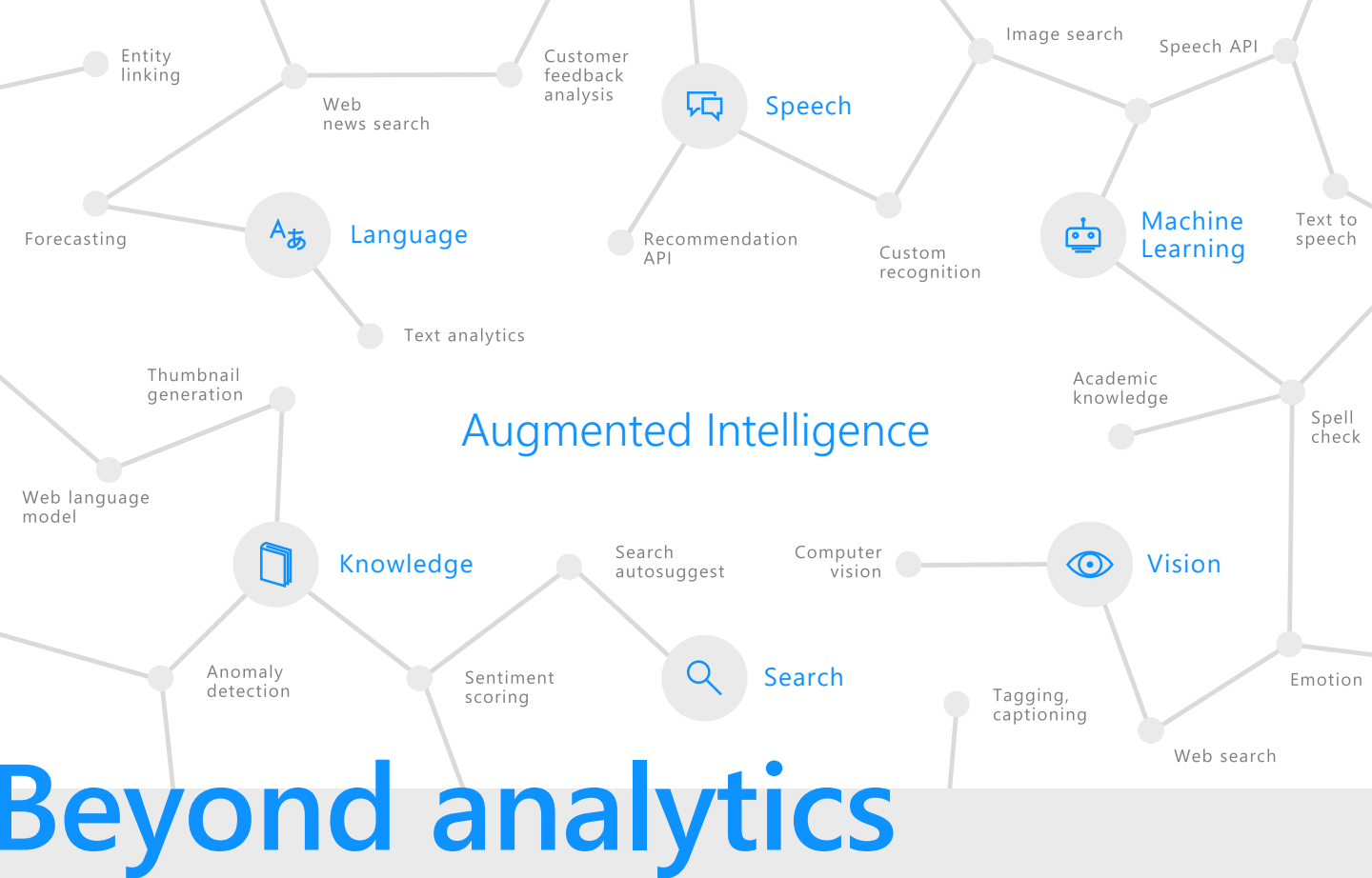
MIT develops **Machine Vision** that can identify **human emotions** through facial expressions.

Researchers at MIT, NYU, and the University of Toronto develop a **computer system** that passes the **Visual Turing Test**.

Microsoft researchers create a system that reaches human parity in **conversational speech recognition**.

Microsoft launches **real-time language translation** as part of Skype.

05



# Beyond analytics

FINANCIAL SERVICES ORGANIZATIONS have been tangling with data since the very beginning, pioneering the use of analytics to derive insights for creating better, more profitable business models. But as we look ahead, the most impactful data-driven solutions will go well beyond analytics, and will include **built-in intelligence based on deep learning technology** that augments an organization's capabilities in compelling new ways. Solutions that **see, hear, speak, and understand** our needs and emotions—using natural methods of communication, enhanced by vast amounts of data from sources as varied as search engines, news, videos, and more—will transform every aspect of the business.



## See

Identify faces, text, and objects to empower machines to continuously survey their surroundings.



## Hear

Recognize voices, languages, key phrases and topics to rapidly convert speech to text.



## Speak

Seamlessly convert text to speech to enable a natural two-way dialog with technology.



## Understand

Contextually infer intent and sentiment to personalize interactions and recommendations.

At Microsoft, we are investing in AI and machine learning and making it the core of our strategy. We recently created a new **AI and Research group of more than 5,000 researchers and engineers** dedicated to developing advances in AI that will build on nearly two decades of progress in machine learning and natural language processing.

To put the maturity and power of Microsoft's AI infrastructure into perspective, it can translate *War and*

*Peace* from Russian to English in 2.6 seconds, an eight-fold improvement over non-AI powered technology.

Our ultimate goal, however, isn't to develop AI that does neat tricks. It is to empower every person and organization on the planet to use AI to **solve the most pressing problems of our society and economies**. Because of this, we are working closely with business leaders in financial services and other industries to identify the scenarios where AI-based solutions can make the greatest difference.

06

# A challenging landscape

GLOBAL DIGITIZATION combined with unprecedented disruption to the financial services business model are mandating action. Game-changing technologies are fueling transformation and enabling a wave of innovation to meet new client expectations, improve transparency, and create sustainable competitive advantage vis-à-vis non-traditional industry entrants.

**Empowered customers are clearly a part of today's industry landscape.** Retail and institutional customers are more informed than ever, increasingly mobile, and expect consistent service across channels. Trust has also been eroded. As a result, there is increased pressure for new customer engagement models, transparency, and the ability to demonstrate business integrity.

**It is an unprecedented time for the industry with extremely high regulatory scrutiny.** As the financial services sector seeks ways to drive product, service, and business model innovation and address the cost reduction imperative, the cloud clearly offers a compelling opportunity for a new era of agility, especially given its potential to scale on demand. But at the same time, trust is a critical concern. Cloud solutions must meet the sector's high standards for data security, privacy, and regulatory compliance, just as the frequency and sophistication of cyberattacks grow and become the "new normal."

**Technology is an intrinsic part of the financial services business.** However, the gap between customer expectations and adoption of new technology (while maintaining current system capabilities) is widening. Financial institutions are also finding it increasingly difficult to compete with new entrants from adjacent industries such as internet-only services, telecommunications, and retail. Indeed, new entrants are pushing the innovation envelope, offering lower pricing and improved customer experiences by capitalizing on technology.



# Three paradoxes

HOW ARE FINANCIAL INSTITUTIONS to make sense of these trends, the inherent contradictions of which appear to defy resolution? How are they to engage customers without increasing costs, reestablish trust through personal interactions at scale, and drive innovation with more confidence and less risk? It may be paradoxical, but with AI it is increasingly possible for financial services organizations to have it both ways—and ultimately achieve new growth and prosperity.

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## The digital and branch experiences are merging.

While customers are increasingly global and mobile, they expect transparent, intuitive, and consistent service anytime, anywhere. This means today's leading financial institutions must find ways to better understand their customers and efficiently expand services if they want to be industry leaders tomorrow.

According to a 2015 Capgemini report, 65% of affluent individuals will leave their current wealth management firm if an integrated channel experience is not provided.

### PARADOX ONE

Increasing the level of customer engagement without increasing costs.

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## Trust is returning—but is still relatively low.

Due to the global financial crisis of 2007 and 2008, financial services organizations are experiencing a significant trust gap. Because trust is the foundation of long-term customer value, leading financial institutions must return to their roots by privileging personal relationships to earn back trust.

Per the 2016 Edelman Trust Barometer, from 2012 to 2016, global trust in financial services has risen by 8% to 51%—the largest increase of any industry surveyed—but it remains the lowest overall.

### PARADOX TWO

Making every interaction personal, relevant, compliant—and at scale.

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## Innovation and agility have become imperatives.

As competitive pressures increase and technology cycles accelerate, financial institutions need to rapidly enter new markets, engage new customers, and develop new business models. To do so, legacy technology must be transformed and integrated thoughtfully to avoid incurring costly technical debt.

In the U.S., 23.5 million households were unbanked or underbanked in 2015 (FDIC), while a staggering 2 billion adults globally were found to be unbanked in 2014 (World Bank).

### PARADOX THREE

Investing in new markets and business models with less risk and more confidence.



How wonderful that  
we have met with a  
paradox. Now we  
have some hope of  
making progress.

Niels Bohr



How wonderful that  
we have met with a  
paradox. Now we

# Paradox ONE

Increasing customer engagement without increasing costs

**Great customer experience and efficient operations are not mutually exclusive.** Bots and intelligent assistants are natural solutions for the first wave of customer contact. Much like how interactive voice response (IVR) transformed inbound service calls, AI can intercept and handle common, straightforward issues through chat and messaging services so customers can quickly and independently resolve simple issues that would otherwise have required human intervention.

**Conversation is now a service near you.** Imagine, instead of looking through multiple apps or pages of websites, you could simply ask a question through a conversational interface you already use. Think of these services as bots. Bots are the new apps, and digital assistants are the new browsers. In this way, all interactions are infused with intelligence. A bot can be built once and connect across multiple communication services such as text messaging, email, LinkedIn, Facebook, Skype, Slack, kik, web chat, and Office 365.

**Reach people where they are and engage them conversationally, contextually, and naturally.** By gathering information through dialogue and understanding context via emotional cues, bots can easily escalate and route the most complex and sensitive conversations to humans for resolution.



**89% of consumers want to engage in conversation with virtual assistants to quickly find information instead of searching through Web pages or a mobile app on their own.**

Source: Opus Research and Nuance Communications, 2016



# Increasing customer engagement without increasing costs

WE ENVISION A RICH ECOSYSTEM of conversations: people communicating with other people, people communicating with personal digital assistants, people communicating to bots, and even personal digital assistants calling bots on your behalf.

When bots and customer service reps work together to help customers answer their questions, they improve customer experience and loyalty. And because **AI scales to meet demand virtually without limit**, employees can spend more of their time on higher priority customer interactions, resulting in both cost savings and service quality benefits. What's more, according to the latest research, **people actually prefer engaging with machines instead of people** in certain scenarios. This is how we tackle our first paradox, producing a win-win for customer engagement *and* the business bottom line.

The financial services industry is already realizing how bot applications can bring value to several aspects of customer engagement, such as those listed below. Anticipate a future in which bots, whether out in front or behind the scenes, underpin the vast majority of interaction points along the customer journey. For example:

- **Internal knowledge base bots** that help employees search documents, policies, and locate customer information.
- **Transactional bots** that answer simple questions and send alerts for flagged events, such as when a mortgage payment is due or when a trading order closes.
- **Secure authentication bots** that handle automated authentication through secure channels to complete transactions.
- **Self-service chatbots** that answer customers' questions and direct them to the best resources for further assistance in scenarios such as customer onboarding, fraud prevention, and credit card loss.
- **Recommendation bots** that ask decision-tree questions such as "What are you saving for?" or "How much do you want to save each month?" to propose savings products to customers.
- **Loyalty card bots** that send alerts to help customers manage status points and take advantage of special offers.

# Paradox TWO

Making every interaction  
personal, relevant,  
compliant—and at scale

TODAY'S FINANCIAL SERVICES CUSTOMERS, especially the millennials among them, have come to expect highly personalized experiences, which are hard to support with disconnected channels and systems. With the rising bar of customer expectations, the need for **quick, secure, and highly personalized solutions in personal finance management** is paramount.

Financial services organizations increasingly require advanced intelligence capabilities for sales and service personnel that enable customer insights and pull data across widely used CRM, web, social, and IoT sources to provide a **360-degree view of the customer**, as well as to **offer automatic suggestions to improve engagement**. Tools such as sentiment analysis further augment the ability of the financial services sales professional to assess the likelihood of deal-closing and the next best action to take.

**Contextual insights can be delivered at scale to employees** to help them prioritize their day, engage customers, identify opportunities, and remain compliant. This empowers them to do what they do best: build long-term rapport and trust by confidently helping customers solve their most important financial challenges.



**Most consumers (79%) define their banking relationship as transactional—a perception that has grown by 8% in just one year. This trend is bad news for banks, and worse news if it continues unchecked.**

Source: Accenture, *Banking Shaped by the Customer*, 2015



# Making every interaction personal, relevant, compliant—and at scale

THIS BRINGS US TO OUR SECOND PARADOX: despite the increasing speed, complexity, and scale of the financial services industry, solutions are at hand to bring it under control and make it all personal and relevant again.

Consider the following financial services scenarios:

- **Obtaining a 360-degree view of the customer and using automatic suggestions to improve or advance engagement.** The *next best action* capabilities that make this possible leverage advanced machine learning algorithms to consume customer data from CRM systems, understand customer sentiment, and generate relevant and targeted offers with full omni-channel orchestration.
- **Accessing immediate status of customer relationships, preferences, and needs.** Solutions for real-time insights incorporate tools such as sentiment analysis to help you assess the likelihood of a deal closing or the level of a customer's loyalty. Personally tailored encounters can engage and delight customers with information and offers that are relevant to them. Additionally, they can generate cross-sell and upsell opportunities with a higher likelihood of acceptance, resulting in increased wallet share.
- **Managing regulatory changes and compliance.** Automate legal and disclosure communications, documentation, and record keeping via voice-to-text to ensure timely notifications in the customer's preferred communication channels.
- **Mitigating false alarms with AI-enabled fraud-prevention.** When a positive fraud event is triggered via an AI model, bots send alerts to customers that corrective measures are being taken.
- **Optimizing management of non-performing loans (NPLs).** AI can streamline forecasting, flag corrective actions, and automate communications to customers.



# Paradox THREE


Investing in new markets and business models with less risk and more confidence

NEW TECHNOLOGIES are disrupting traditional models for financial advice and wealth management services. Many investment banking customers—the younger generations especially—are less willing to pay fees for managed portfolio services. But for those institutions that learn to embrace change, there's every reason for hope.

With AI, banks and other financial services institutions can develop new business models, create new products and services, and make data-driven decisions faster than ever before.

For example, new wealth advisory services that incorporate AI—which enables quality advice at a much lower cost—as an adjunct to human advisors promise an optimal mix of technology and human intelligence.





**Robo-advisors are improving accessibility to sophisticated financial management and creating margin pressure, forcing traditional advisors to evolve.**

Source: World Economic Forum



# Investing in new markets and business models with less risk and more confidence

WITH THE OPERATIONAL COST SAVINGS and employee productivity gains realized from deploying an AI-powered infrastructure, organizations can begin to expand their services into previously unserved or underserved communities and foster new revenue streams. And, with the real-time insights provided by AI, these new services can be tested quickly to validate the business case prior to commercializing them at scale.

Consider the following financial services scenarios, rapidly being made real through technology:

- **Omni-lingual, instantaneous localization**, which can radically simplify how existing services expand into new geographies globally or into previously underserved communities domestically. Such services will dramatically shorten time-to-market for new capabilities, providing even more capital to invest in innovation.
- **Advisory services augmented with robo-advisors**, which more and more investors are turning to for essential investment needs because of their convenience, ease of use, affordability, and transparency.

They can provide a range of advisory services, from personalized, automated, algorithm-based portfolio management to sophisticated tax strategies and risk management, all at a markedly lower cost than the traditional advisory model.

And while they won't replace the traditional advisor any time soon, they will give human experts far greater reach, enable them to better harness relevant information sources, and provide them with much-needed support for entry-level investment needs. In this way, wealth management services

become much more accessible to mass markets, giving those of more modest means the tools they need to build wealth for the long run.

- **Emerging credit-scoring methodologies** powered by AI, which can provide behavioral-based, predictive, and preventative solutions for instant credit-scoring services.

Thus, by using all of the structured and unstructured data available, financial institutions can not only make complex decisions faster, but also improve the customer experience.



# Foundations for the future

AT MICROSOFT, we have an approach that's both ambitious and broad, and one that speaks to our mission to empower every person and every organization on the planet to achieve more. As we think about the future of technology and how we can resolve the conflicting imperatives of business, we believe the answer resides in the notion of intelligence. **Our approach seeks to release AI from the ivory towers and make it accessible for all—to democratize AI for the benefit of every person and organization.**



## AGENT

**We're harnessing AI to fundamentally change how we interact with the ambient computing, the agents, in our lives.**

With Cortana, Microsoft's digital agent, interacting with technology is as easy as having a conversation. It works across devices—including iOS- and Android-based—and surfaces information about your daily tasks in work and life, often before you know you need it. And, the more you use it, the more personalized your experience will be. To date, there have been 12 billion queries or questions asked of Cortana, and over 145 million active users.



## APPLICATIONS

**We're going to infuse every application with which we interact, on any device, at any point in time, with intelligence.**

We are building applications core to your productivity and communication, as well as business processes—and infusing them with intelligence—to empower employees to focus their attention on what matters most. When all applications are powered by shared intelligence, entire organizations can act in an integrated, harmonious way, using a rich data model that can infer intelligence from everywhere.



## SERVICES

**We'll make these same intelligent capabilities that are built into our own apps available to every application developer in the world.**

Every interface that humans use to interact with technology and the world around them matters. As we build intelligence into everything, whether it's your keyboard, your camera, or your business applications, we are teaching applications to see, hear, predict, learn, and take action. The fruits of years of pioneering R&D work on speech and vision can be found in Skype Translator, Cortana, our cognitive services APIs, and the Bot Framework.



## INFRASTRUCTURE

**We're building the world's most powerful AI supercomputer and making it available to anyone.**

AI requires a complete transformation of underlying infrastructure from the silicon all the way up to the cloud. As we improve the performance, scale, and sophistication of our global, hyper-scale, cloud infrastructure, we're enabling scenarios that were simply not possible before.



# What's next?

No matter where you are on your digital transformation roadmap, Microsoft can help.



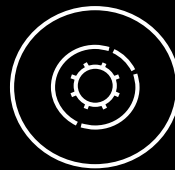
## Engage your customers

Reimagine the client experience for a digital world and deliver more value through insights and relevant offers by engaging clients in natural, highly-personal, and innovative ways throughout the customer journey—driving increased relevance, loyalty, and profitability.



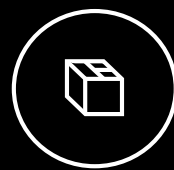
## Empower your employees

Empower a high-quality and committed digital workforce to work and collaborate as a team anywhere on any device with modern productivity tools that provide seamless access to your data—helping you innovate faster, meet compliance requirements, and deliver exceptional client experiences.



## Optimize your operations

Gain breakthrough insight into risk and operational models with advanced analytics solutions and act on real-time intelligence to optimize risk management and meet regulatory requirements.



## Transform your products

Drive agility with open and connected systems and highly-automated digital processes to support new product development and optimize distribution channel strategies, while meeting the security, privacy, and transparency expectations of customers, regulators, and shareholders.

Contact us today for more information.

# What's next?



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Microsoft Services empowers organizations to accelerate the value imagined and realized from their digital experiences.

Imagine.  
Realize.  
Experience.

[microsoft.com/services](https://microsoft.com/services)

