

# NTT DATA

# Technology

# Foresight

# 2018



*Looking ahead : Technology trends driving business innovation.*



**NTT DATA**

# *Technology will drive the future of business.*

Digitization has placed society at the beginning of the next social revolution. The constant innovation in technology will continue to drive social structures toward the future, transforming existing business models and bringing them to new levels.

To make optimal business decisions, it is critical for leaders to identify and understand future changes and to determine the best course for sustainability.

At NTT DATA, we continually investigate advanced technologies and social trends that we believe will impact businesses over the next three to ten years, and we publish these findings on an annual basis for the benefit of our clients.

***IST***

*Information  
Society Trend*

Four key trends impacting  
social development  
in business

***TT***

*Technology  
Trend*

Eight technology trends  
spearheading development  
of an information society

# Information Society Trend

IST 01-04

Four key trends impacting social development in business

## Power of the Individual

The growing influence of individuals and startup businesses are transforming established systems in societies and industries. Individuals with greater independence and unfettered actions, leveraging new ideas and modes of expression, will enjoy a more flexible society with limitless options.



IST01

IST02

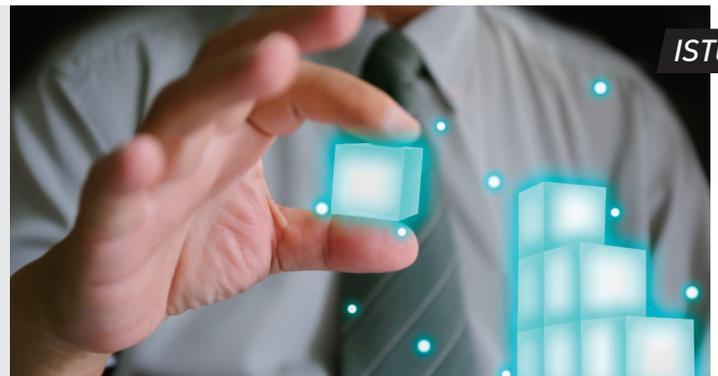


## Decentralized Collaboration

The transition of various systems from a centralized and hierarchical structure to a decentralized and networked structure will drive new innovation. Dynamic, digital ecosystems will emerge in which constituents will interact collaboratively and autonomously.

## New Data-Driven Economy

Real-time and predictive data has become a valuable resource driving growth and innovation. Exploiting the benefits of data through analysis and application will generate new value. This will transform the frameworks of industries and competition, prompting new business models.



IST03

IST04



## Physical Digital Convergence

The natural convergence of the physical and digital world is near. Ubiquitous artificial intelligence will impact people's thoughts, behaviors, relationships and more, prompting the reexamination of societal rules and norms.

# Technology Trend

## Pervasive Artificial Intelligence

The barriers to using AI are being overcome by its accelerating evolution. Companies without massive data or experts in machine learning can also have opportunities to use AI. Furthermore, the development of algorithms and hardware for mobile and IoT will bring about the pervasiveness of autonomous AI in every dimension of life.



TT01

## Harmonious Automation

Hardware- and software-based robotics have improved human productivity by automating routine tasks. These are being extended to non-routine tasks using AI. As full automation cannot be achieved in all areas in the near future, designing the interface between robots and humans and enabling each to share complementary assignments to create optimal interaction remains the challenge.



TT02

## Intuitive UI

Smart speakers and AR/VR headsets brought innovative experiences and enabled users to access computers intuitively. More devices will enable machines to discern human behavior and replicate human senses more precisely, minimizing the human-IT frictions. The interaction will be naturally integrated with the surrounding environment providing intuitively augmented experiences to users.



TT03

## Data Sustainability

As data volume continues to grow, AI has enabled the extraction of sustainable value from non-standardized data and allowed prompt action through high-level prediction. Concurrently, massive counterfeit data and technologies which deceive AI threaten the foundation relying on data. Securing the reliability of data and sustainability of AI is key to future data utilization.



TT04

## Hacking Life

High-precision biological information, which can be obtained easily and continuously, can be analyzed with AI for the early discovery and prediction of future illnesses. The pursuit of a healthy lifestyle, coupled with technological advances in healthcare, will drive ongoing research into the current issues of an aging society and challenge the constraints of life itself to enhance physical abilities and improve human productivity.



TT05

TT06

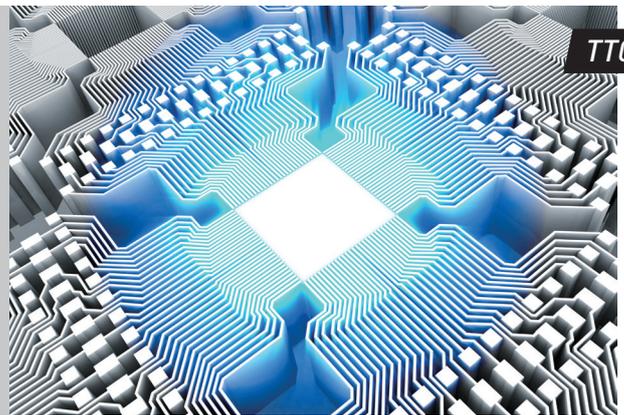


## Security Intelligence

Cyberattacks will further intensify, causing leaks of highly valuable information, broadening accessible targets. The industrialization of cyberattacks has also progressed. Advanced technologies, including AI, to counter intensifying attacks are imperative, and ensuring the proper use of technology and the accumulation of information vital for cyber defense is required.

## Diverse IT Infrastructure

In response to the continuing demands of evolving AI, diverse hardware and software solutions are being developed. To process staggering amounts of data and to enable IoT device networks, cloud-based distributed architectures are being implemented. IT infrastructure is also evolving in diverse ways to achieve ease of access and respond to user's changing needs.



TT07

TT08

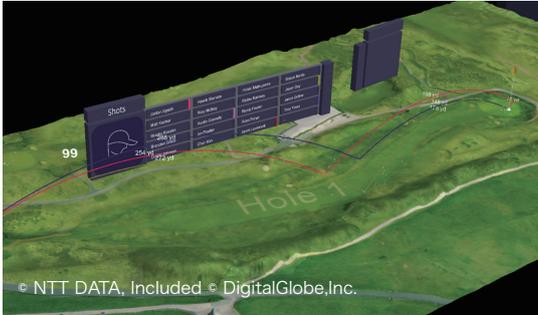


## Perpetual Design

Business use of APIs and IoT platforms to accelerate products and services has become commonplace. Design, in combination with IT and business strategy, must now provide products and services personalized for one and to applicable millions to address the demands. Processes where IT strategies and design act as a whole to continuously improve business and produce added value will be sought to resolve this conundrum.

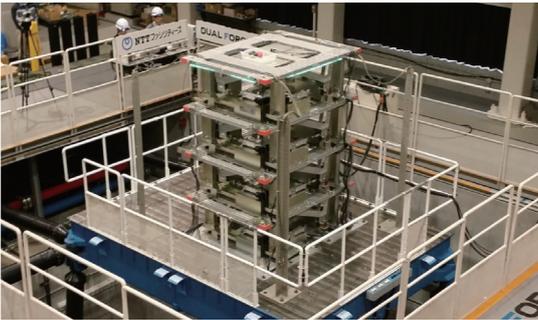
# Case Study

## AR for The Open Championship



In cooperation with NTT DATA Italy, we have developed an application that lets golf fans view game data for The Open Championship on a 3D map when wearing AR headset. By combining NTT DATA's own Digital 3D Map (AW3D) with AR technology, we enable an AR experience of this 150-year-old golf tournament like no other. NTT DATA is an Official Patron of The Open.

## AI for Building Protection



NTT Facilities, in cooperation with NTT DATA Mathematical Systems, is developing an active vibration control system for super high-rise buildings. Using AI, this technology will determine the optimal vibration control needed in response to an earthquake through Deep Reinforcement Learning, and will adjust the dampers inside the building using electric actuators. Vibration experiments using large test models confirm that this new technology could reduce building movement by more than 50% as compared to traditional technologies.

## Sign Language Robophone



Sharp and NTT DATA SBC joined forces to develop an application that enables phone conversations for the hearing impaired by translating sign language to voice on Sharp's mobile Robophone. Robophone uses Deep Learning to recognize and analyze sign language movements, then speaks the words in Japanese to display the conversation on a smart phone, thus enabling communication.

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### NTT DATA Technology Foresight

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