

# Material 1

**Provisional Translation  
by the Secretariat**  
Please refer to the original  
material in Japanese

Panel of Experts on FinTech Start-ups

## Major Trends of Overseas Digital Innovation

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**NTT DATA**



## 1. Digital Innovation

## 2. Major Financial Institutions' Innovation Initiatives

- Wells Fargo
- Master Card
- BNY Mellon
- DBS
- Umpqua Bank

## 3. Summary and Consideration

- (1) Stages of Digital Innovation Development
  - (2) Utilization of Cloud Services
  - (3) Ecosystems and APIs
  - (4) Expansion of Ecosystems
  - (5) Achieving Unique Innovation in Japan
- (Reference) Differences in System Reliability Required in Japan and the United States

**Note:** The information and opinions contained in these materials are personal and do not represent the official positions of the organization which employs the presenter or its group companies.

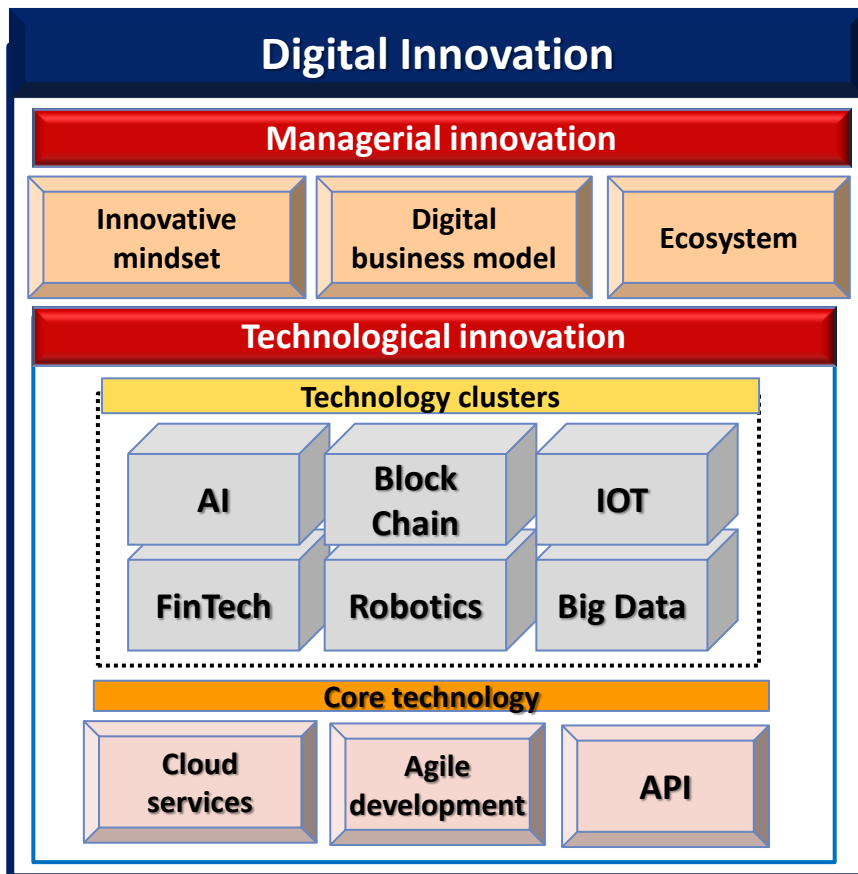


# 1. Digital Innovation

Financial institutions overseas have been strategically using IT to create new business models by introducing “Digital Innovations” in management and technology.

## “Digital Innovation”: the Big Picture

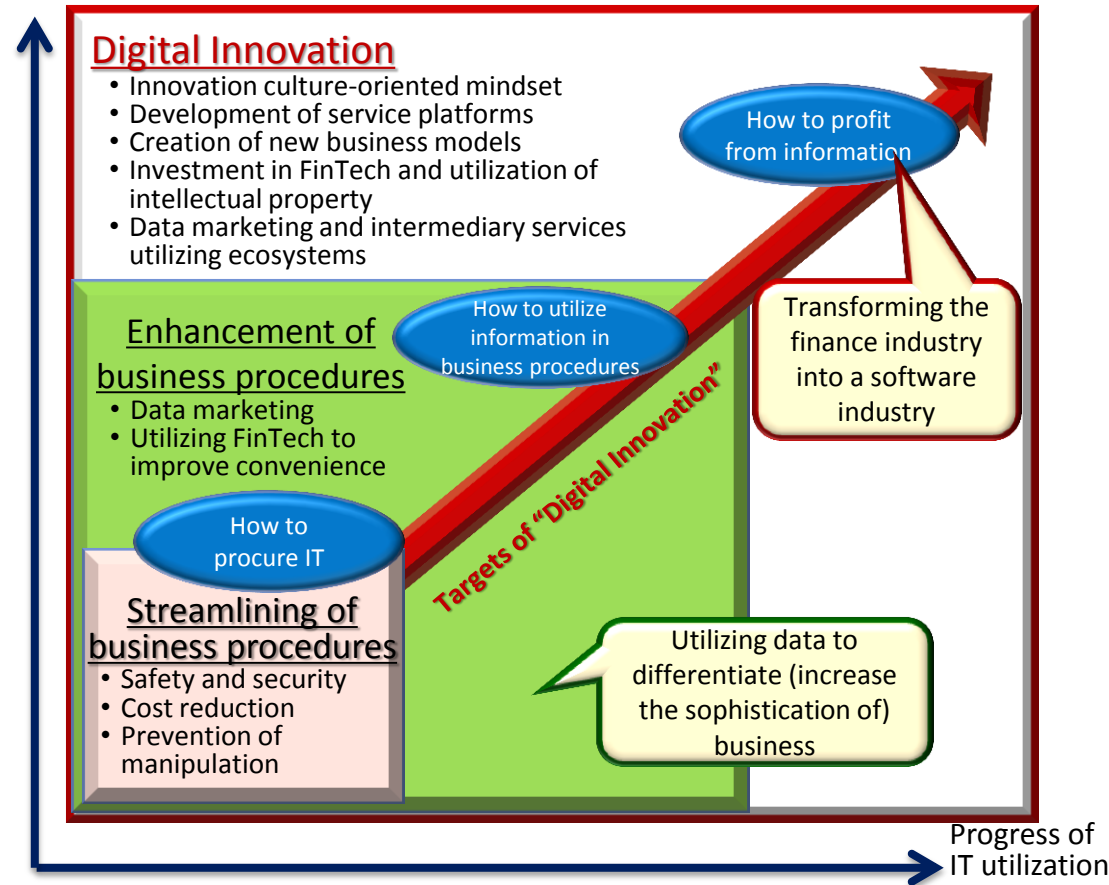
“Digital Innovation” includes both managerial and technological innovation.



## Path to Strategic IT Utilization

“Digital Innovation” means innovating throughout the banking industry to reduce costs and increase monetization by strategically utilizing IT.

Objectives of IT investment



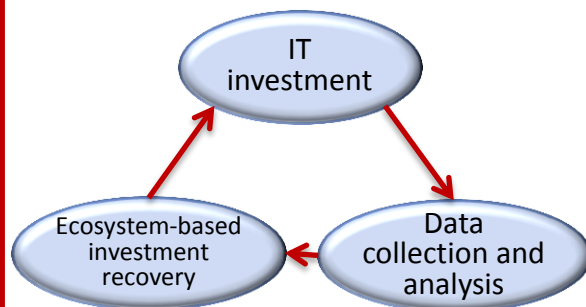
Financial institutions overseas are striving to incorporate new ideas, change their internal cultures in addition to changing the services they provide, and reform themselves. They have reached the stage of creating new business models. As a result, major foreign financial institutions are newly defining themselves as “**software providers**” rather than conventional financial service providers. This is now spreading from major banks to local banks.

## Foreign Financial Institution Business Model Innovation through Digital Technology

### Strategic utilization of IT

Financial institutions are seeking to cultivate new business models through innovation by strategically utilizing IT to transform IT investments – previously seen only as a business expense – into services, and profit by acting as software providers.

### Transformation of banks into software providers



**Commercial bank**

**WELLS FARGO**

The bank provides merchant at which its credit cards can be used with various free applications, enabling them to start mobile commerce businesses with the goal of increasing fee income by increasing the business at the merchant.

**Security Processing**

**BNY MELLON**

The corporation provides a cloud platform, “NEXEN,” which improves access to clearing functions, and offers the infrastructure to facilitate recording of investor securities trading, analysis of repurchase transactions, and risk management.

**Credit card company**

**MasterCard**

Based on the credit-card payment system, the company, in collaboration with clients, developed commerce applications that connect people and machines expanding around client merchant, thereby creating new merchant and strengthening the network.

**Local bank**

**UMPQUA B · A · N · K**

This bank in the United States made capital contributions to entrepreneurs with new business ideas and established joint ventures. The bank provides client data and regulatory know-how and acquires returns through businesses of ventures.

Creation of ecosystems by supporting clients' businesses

Expansion of fee-based business

Strengthening of existing network



## 2. Major Financial Institution' Innovation Initiatives



# Wells Fargo: Fashion town App

Together we'll go far

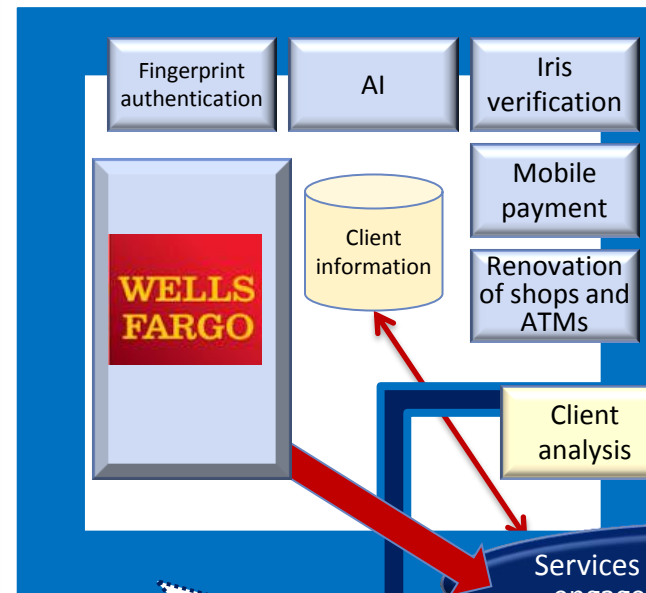


## Wells Fargo Striving to Shift to a Customer-first Business Model

Through the efforts to renovate the digital experience of clients, Wells Fargo is striving to change its business model based on the strategy to facilitate its own growth.

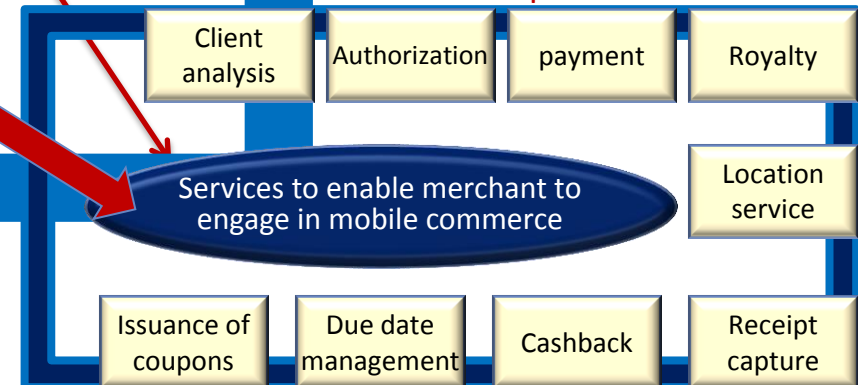
- (1) First, build a mechanism to facilitate clients' access to the bank and deepen engagement with them
- (2) By extension, build a mechanism to support businesses of the clients (merchant)

### (1) Mechanism to deepen engagement with clients



- The bank provides services and does maintenance work.
- merchant assume responsibility for the provision of services. However, the bank can refer to client data.

### (2) Mechanism to support businesses of client companies



Mechanism to ensure clients with safe and easy access to the bank and deepen engagement with them

Wells Fargo issues credit cards and offers business support to merchant to help them increase business performance, which eventually leads to increase fee income of the bank.

- (i) Sales increase of merchant of Wells Fargo cards → Increase of fees from merchant → Increase of earnings of the bank
- (ii) Further enhancement of services provided by WF through the analysis of client data



# Wells Fargo Accelerator Program



Wells Fargo has made minority investments to nine companies since 2014 under its Accelerator Program. Most were **investments for bringing innovation to the digital experience of clients**, with the exception of one case which targeted a finance-related venture.

## Wells Fargo's Investment Targets

Class of Fall 2015		
 <b>Gridspace</b>	 <b>ROOSTIFY</b>	 <b>splice MACHINE</b>
San Francisco, CA www.gridspace.com	San Francisco, CA www.roostify.com	San Francisco, CA www.splicemachine.com
Harnesses the power of voice communications by making them searchable, organized, and accessible	Developer of automated real estate transaction technology that seeks to improve the customer experience and conversion rates	The Hadoop RDBMS, a next generation database that is 5 ten times faster at one-fourth the cost of traditional database
Class of Spring 2015		
 <b>BRACKET COMPUTING</b>	 <b>context360</b>	 <b>MOTIONSAVVY</b>
Sunnyvale, CA www.brkt.com	San Mateo, CA www.context360.com	Rochester, NY www.motionsavvy.com
Harness the public cloud to run enterprise applications	Predictive modeling and machine learning	The world's first two-way communication software for t
Class of Fall 2014		
 <b>EyeVerify</b>	 <b>KASISTO</b>	 <b>Zumigo</b> Mobile in Context
Kansas City, KS eyeverify.com	New York, NY www.kasisto.com	San Jose, CA www.zumigo.com
The creator of EyePrint ID™ that transforms your eye into a key	Artificial intelligence that improves consumer mobile experience through intelligent conversation	Mobile services that use location and mobile identity to secure commerce conversation

## Only One Case of FinTech Company-related Investment and Most Cases Targeting Companies with Specific Technologies for Deepening Digital Experience of Clients

Most of the ventures in which Wells Fargo has invested as an accelerator have specific technologies for deepening engagement with clients.

As a “moonshot,” Wells Fargo will seek to achieve growth by bringing innovation to the digital experience of clients to support and grow their businesses.

\* John F. Kennedy challenged the United States to land a man on the moon. Since then, companies have often referred to very ambitious, high risk innovation goals as “moonshots” (e.g., development of a self-driving systems and Google Glass by Google Inc.).

## Outline of Portfolios of Companies in which Wells Fargo has Invested

- 2014: Iris verification; AI to enhance client experience; mobile location services
- 2015 (i): Cloud services; AI machine learning; communication aids for the hearing impaired
- 2015 (ii): Voice communication; mortgage transaction rate calculation; Hadoop RDBMS



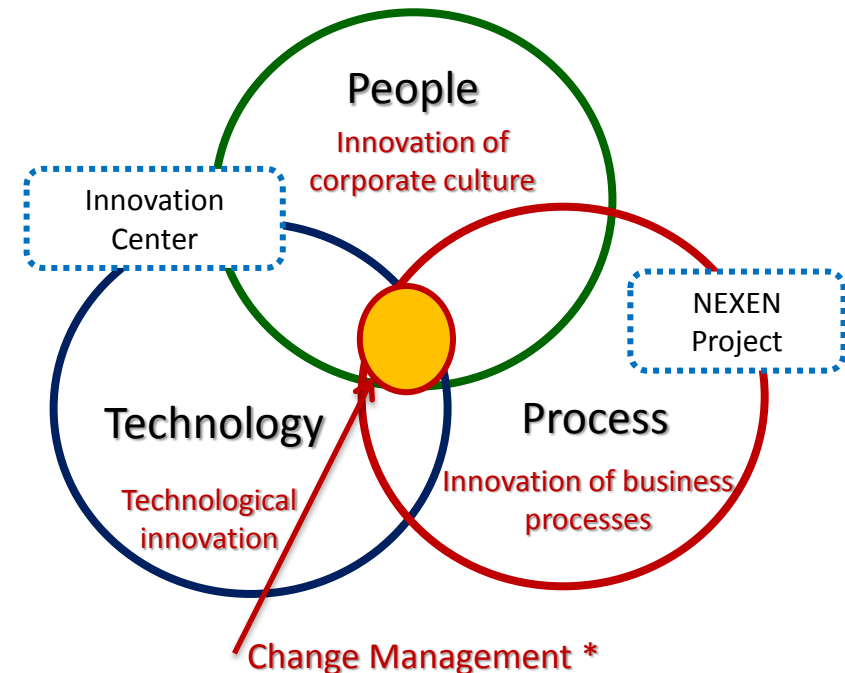
The emergence of digital technologies has caused companies such as Uber and Airbnb, which have no assets, to be valued higher than ordinary companies with tangible assets. BNYM recognizes the possibility that blockchain technologies and other new technologies may threaten its existing business. As a countermeasure, the BNYM Innovation Center **aims to restructure the company to maximize the value of its strategy and operations**, and considers it **necessary that the company act like a software provider** (to rival Amazon.com, Inc.).

## Consensus Building through Experience in Silicon Valley

- BNYM came to this company-wide recognition after the present CIO, who assumed office four years ago, began reforming the IT department to respond to the future transformation of ordinary companies into software companies.
- Two years ago, BNYM invited its executives to Silicon Valley to hear lectures by Mr. Marc Andreessen\* and other representatives of such companies as Ripple Inc. and eBay Inc. The executives recognized that over-the-counter repurchase transactions may be threatened in the future, and reached a consensus that **BNYM needs to create, as its core competency, a technological ecosystem for clients providing advanced technological solutions.**
- This company-wide consensus triggered the establishment of the Innovation Center and the commencement of the NEXEN Development Project to create a next-generation technology platform (ecosystem).

## Digital Transformation of the Organization

BNYM **transformed the entire bank** through three types of innovation.



\* Founder of Andreessen Horowitz and Netscape; He predicted a future in which all industries would be transformed into a software industry in his essay, "Why Software is Eating the World" (WSJ2011).

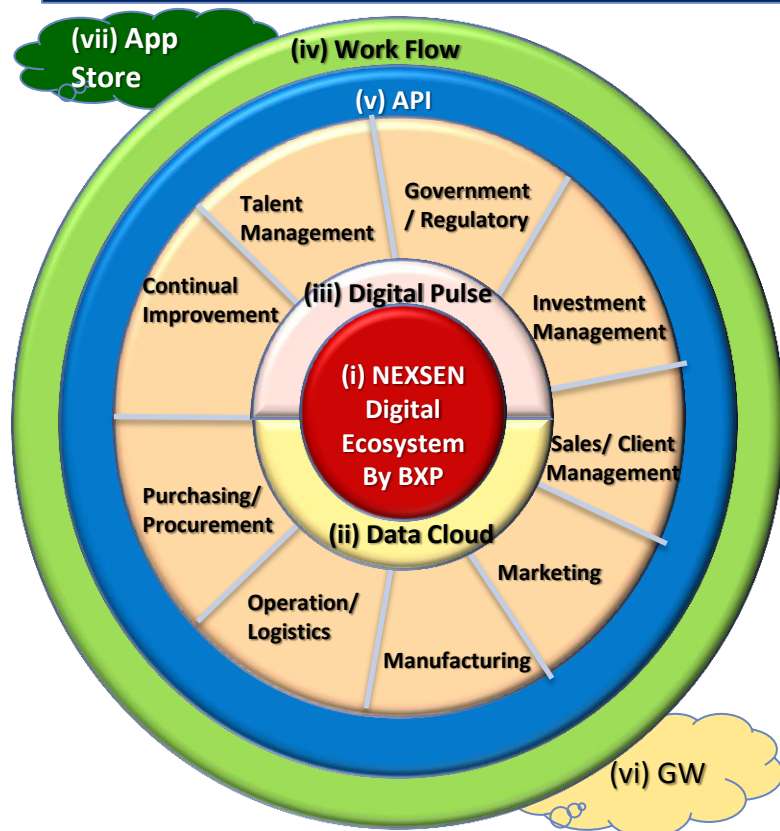
\* 13,000 of BNYM's 50,000 employees are developers. It is urgently necessary to enhance the productivity of these developers (e.g. by adopting development methods employed in Silicon Valley).

## NEXEN: Innovation Platform

*With NEXEN we are redefining the future of finance by building a new technology ecosystem from the client's perspective BNYM*

NEXEN eliminates inefficiencies and mismatches caused by the collection and use by clients of data from different solution services and DBs. It **provides a superior client experience irrespective of products, services, and regions through the use of the BNYM platform**. Through technological innovation, BNYM aims to become an internet accessible bank, like Amazon Web Services (AWS), by creating a service platform for its banking system through the use of cloud computing technology.

### Core NEXEN Services as a Digital Platform for Clients



#### (i) Platform

- The cloud-based platform reduces cost, ensures continuity, and strengthens security for BNYM while enhancing scalability and expediting market entry. It can also be connected to client cloud systems.

#### (ii) Data Cloud

- Access to various types of integrated and linked business data held by BNYM helps decision making and enhances data reusability.

#### (iii) Digital Pulse

- By utilizing and analyzing data concerning BNYM transactions in various fields, prediction analysis knowledge and new services have been developed (information on sensors, IOT and events is processed using Work Flow or various other devices to assist sales activities and client analysis; service improvement through the monitoring of SLA or other services).

#### (iv) Work Flow

- This service provides clients with a continuous approach to the client experience by enhancing the transparency of process status (opening of an account → acquisition of trade information → tracking of processing status at an intermediary office).

#### (v) API

- API seamlessly integrates services provided by BNYM and by clients (or third parties) (at present, 50, with an ultimate goal of approximately 300) and enables the development of new services.

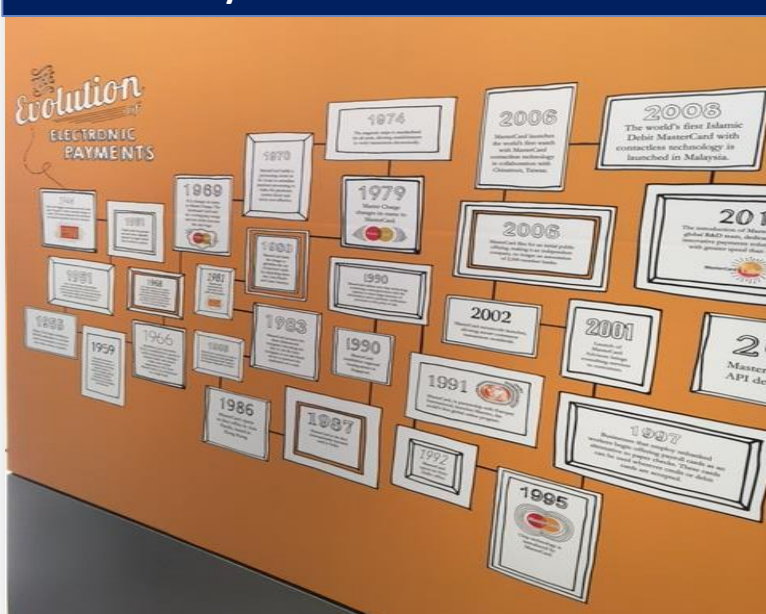
#### (vi) Gateway

- This provides personalized, integrated solution services and data across all devices.

#### (vii) Application store

- A wide variety of providers offer options suited to client needs.

## History of MasterCard Innovation



## Concept of Innovation Laboratories Based on the Expectation Economy

MasterCard is interested in the effects of technology on clients. In particular, during the transition from a supply-driven to a demand-driven economy, the company considers an **economy driven by expectations**, which emphasizes the sharing of experiences with clients, will be the mainstream in the future. In this new economy, MasterCard will **define itself as a system provider** and no longer merely as a payment service provider.

MasterCard, which has provided various payment solutions since its foundation, established a laboratory in the United States six years ago. The company established another laboratory in Singapore four years ago. In light of the fact that other US banks have only begun establishing laboratories within the last year, MasterCard showed great foresight in commencing its initiative long before the term “FinTech” even existed.

## Eight Innovation Laboratories Worldwide



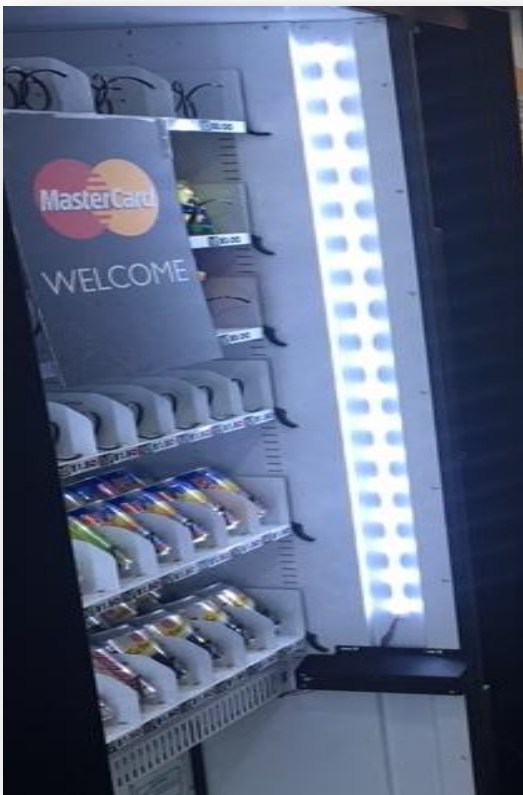
## Eight Laboratories Throughout the World Carry out Integrated Activities

- Dublin and Singapore: These laboratories mainly cover the company's core business, and focus on engineering.
- New York: This laboratory focuses on technology and has relationships with technology companies on the east coast of the US.
- Sidney: This laboratory focuses on technology and has relationships with technology companies in Australia.
- Miami: This laboratory serves as an outpost, conducting interactive experiments in response to local needs.
- Silicon Valley: This laboratory serves as a contact point with Silicon Valley startups.
- St. Louis: This laboratory is situated in a relatively remote location, but is suited to interact with blue-chip companies like P&G which are located nearby.
- Nairobi: This laboratory promotes research specialized in financial inclusion in collaboration with the Bill & Melinda Gates Foundation.



MasterCard has conducted various IoT experiments aimed at improving consumer convenience by increasing the number of merchant that provide new services on the card network it operates. The goal is to eventually increase fee income from these merchant. In collaboration with existing merchant, the company achieved the creation of a new solution within 60 days.

## MasterCard's Innovation Program Formulated in Collaboration with Clients



A vending machine dispenses a beverage, in response to an order received from a smartphone. A service also exists which communicates this order to a convenience store where a customer can receive a drink.



A coin-operated washer can be used without cash, and it is also possible to search for an available washer in advance or receive advice on detergent or fabric softener.



A stadium application enables spectators at sporting events, etc. to locate their seats at a stadium through the use of a QR code, and food and drinks may be ordered by smartphone and delivered to seats (jointly developed with Samsung).





# Initiative of DBS Bank (Singapore)



DBS Bank, the largest bank in Singapore, is pioneering in that it created an innovative corporate culture in an organized manner.

Mr. Neal Cross, Chief Innovation Officer, explains that there are three methods for innovation as follows: (i) **incorporate innovation into existing infrastructure (like casting pearls before swine)**; (ii) **purchase a product from outside and rebrand it**; and (iii) **reform corporate culture earnestly**. DBS Bank selected (iii) that would have the greatest final effects. In the meantime, the bank intended to improve swiftness in product development to a level equivalent to that of FinTech through shifting 50% of its IT assets onto public cloud services.

## Promotion of an In-house Innovation Project

The department in charge of innovation consisting of 20 staff members, with the cooperation of 50 ex-employees with an entrepreneurial spirit, developed a minimum viable product (MVP) in line with the ideas recognized through the following programs.

### 1. Digital Mindset Hackathon

A program in which the senior management (including branch managers) creates FinTech startups by themselves (52 different teams across four countries have been already set up); Ideas of these teams are presented in front of the CEO, CIO, HR executives, and venture capital firms, from which funds are provided. Eight new products are already under consideration.

### 2. Sparkies Program

Under this program, all employees including branch managers are committed to spending one day per month for activities for innovation.

- ☛ The DBS Academy was established for employee education and implementation of the program.

## Positive Adoption of Public Cloud Services

The screenshot shows a DBS Newsroom article. At the top is the DBS logo. Below it is the title 'DBS to leverage Amazon Web Services Cloud'. There are navigation links for 'Previous' and 'Next'. The article text states: 'Groundbreaking initiative will allow bank to deliver new technological applications rapidly in fast-changing world'. A sub-headline reads: 'Up to 50% of bank's compute workload may be shifted to cloud by 2018'. The main text, dated 27 July 2016, describes how DBS Bank is leveraging Amazon Web Services (AWS) to create a hybrid cloud environment. It mentions that the bank has signed an agreement with AWS and will create a hybrid cloud environment optimized for rapid changes of capacity and functionality. The article concludes by stating that DBS' early adoption of cloud among financial sector players comes amid a digital revolution that is redefining the banking industry. A quote from David Gledhill, DBS Head of Technology and Operations, is included at the bottom.

**DBS**

## Newsroom

[< Previous](#) [Next >](#)

### DBS to leverage Amazon Web Services Cloud

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*Groundbreaking initiative will allow bank to deliver new technological applications rapidly in fast-changing world*

*Up to 50% of bank's compute workload may be shifted to cloud by 2018*

SINGAPORE, 27 July 2016 - DBS Bank, which has been on the forefront of digital transformation, continues to lead the charge in re-architecting its technology so as to be more "fintech-like" and responsive to customer needs. The bank said today it has signed an agreement with leading infrastructure provider, Amazon Web Services (AWS), to leverage its cloud technology. With this, DBS will create a hybrid cloud environment optimised for rapid changes of capacity and functionality, which is complementary to the bank's traditional use of data centres.

DBS' early adoption of cloud among financial sector players comes amid a digital revolution that is redefining the banking industry. With the use of cloud, the bank is better able to experiment in a digital way as well as deliver new applications rapidly, while adhering to the highest standards of security.

Said DBS Head of Technology and Operations, David Gledhill: "In today's fast-changing world, companies

# Initiative of a US Local Bank

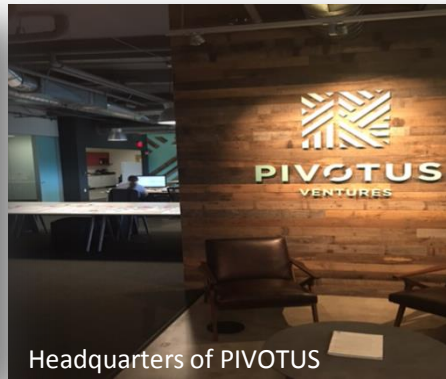


Umpqua Bank founded PIVOTUS Ventures jointly with an independent consulting company. PIVOTUS is a **hybrid-type financial venture where roles for achieving success are shared between both sides** (the bank provides funds, legal systems, clients and test environment, and the consulting company provides business concepts, while procuring development power from the market). The current unfavorable exit environment for financial ventures triggered the foundation of PIVOTUS. Such division of roles by **bringing out the strengths of each company is worth considering in Japan**, where the idea of coalition has taken root.

## A Venture Affiliated to a US Local Bank



San Francisco branch of Umpqua Bank



Headquarters of PIVOTUS

### Umpqua Bank

The largest local bank in the State of Oregon, listed on the Nasdaq; The headquarters is located in Portland.

The bank is locally famous as being pioneering, for its unique branch designs and direct phone calls from the president.

Total assets: 23,387 million dollars (approx. 2.7 trillion yen) in FY2015

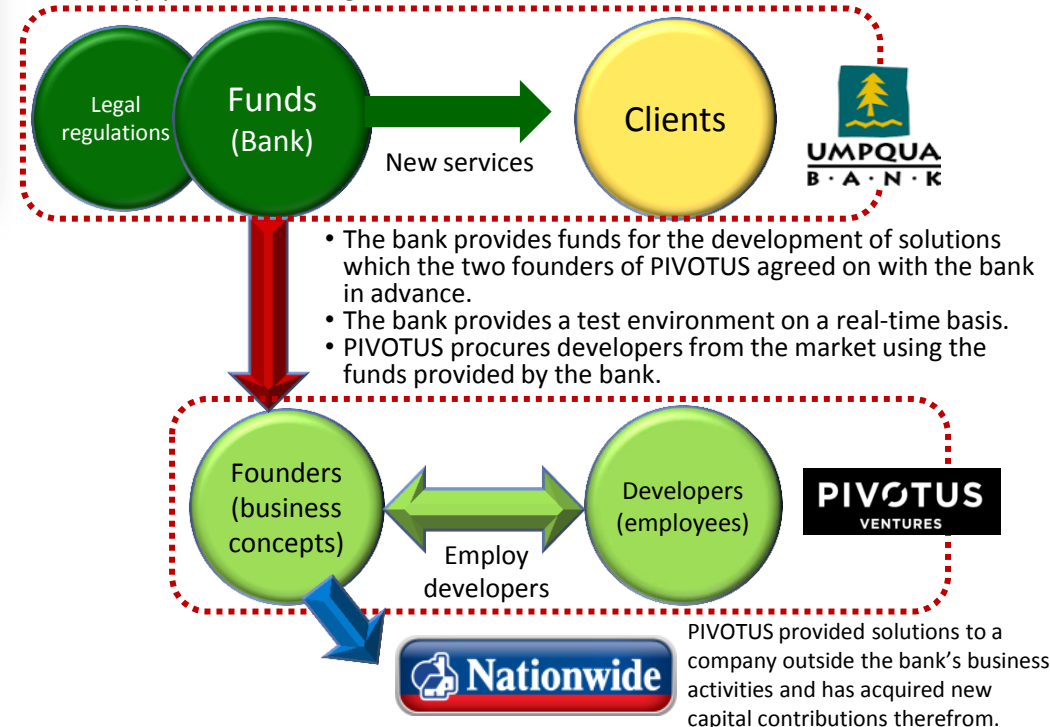
### PIVOTUS Ventures

A subsidiary of Umpqua Holdings; a digital innovation studio based in Silicon Valley

With funds and a real-time test environment provided by Umpqua Bank, PIVOTUS develops systems for enhancing data analysis and user experience (UX) mainly in the design field. Nationwide Building Society in the United Kingdom decided to invest in this company.

## Hybrid Innovation by a Bank and a Venture

PIVOTUS is a **hybrid model with limited risks for investors and entrepreneurs**, which receives the provision of funds, measures against regulations, and the development environment from the bank for overcoming management problems, while maintaining properties as a venture. Focusing on the improvement of customer satisfaction of Umpqua Bank, the company supports the bank's business model shift, replacing its existing lease and loan processes with online selection of lease equipment, ordering and assessment.





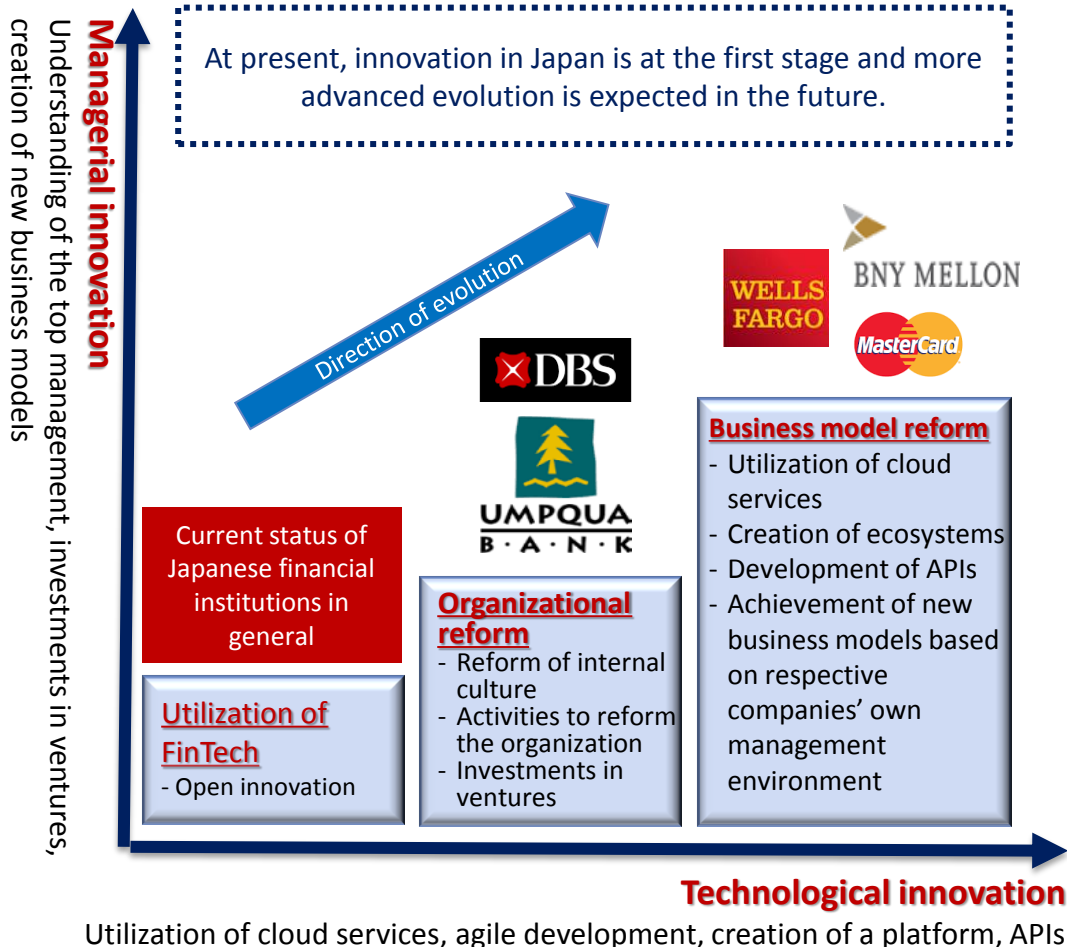


### 3. Summary and Consideration

# (1) Stages of Digital Innovation Development

Comparing stages of digital innovation development of foreign financial institutions and ordinary Japanese financial institutions, the latter is expected to promote initiatives for achieving **unique innovation in management and IT in consideration of social problems and characteristics unique to Japan**, while adopting past examples regarding universal matters.

## Stages of Digital Innovation Development



## For the Development of Digital Innovation

Innovation in Japan is expected to be developed through unique initiatives in consideration of social problems and characteristics unique to Japan, while incorporating common factors for facilitating innovation.

### Utilization of cloud services

- Utilization of cloud services will facilitate optimization of management resources, such as cost reduction, enhancement of flexibility at peak hours, and shortening of development time.

### Ecosystems and APIs

- Reform of the business will change the banking system and facilitate the creation of ecosystems involving clients and other types of businesses and the utilization of APIs for achieving the former.
- In collaboration with overseas authorities and with the FSA's research organization, efforts are to be made to expand innovation ecosystems.

### Unique innovation in Japan

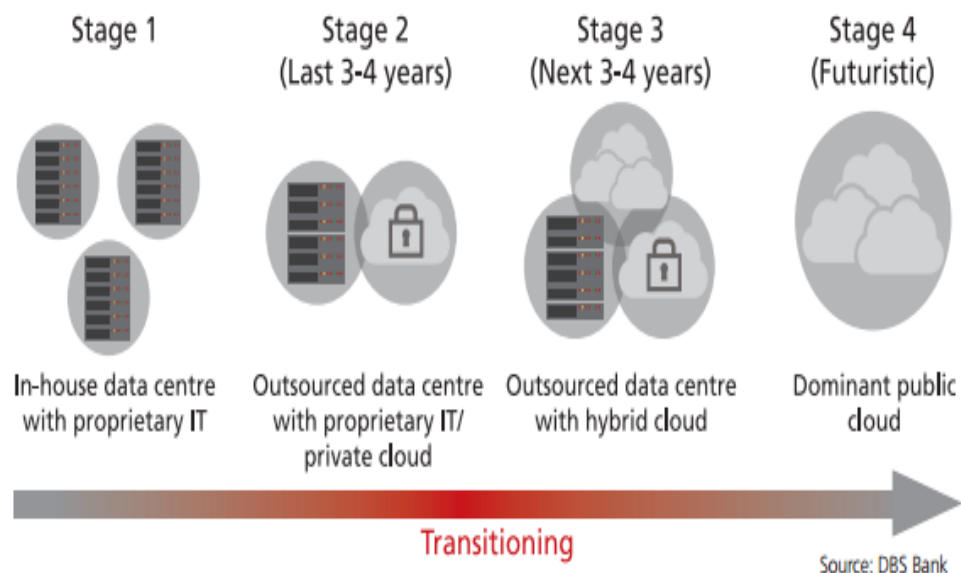
- Unique initiatives are expected in consideration of such trends as increasing investments in ventures, heightening dependence on external development resources, and preference for high quality, etc.

## (2) Utilization of Cloud Services

Since Capital One, one of the major US banks, announced in 2015 its intention to reduce data centers by utilizing AWS mainly for its mobile system, US banks of equivalent business sizes have shown moves to follow such trend of utilizing cloud services in their retail sectors. Such moves are also expected to prevail in Asia in the future. In the meantime, the UK regulatory authority publicized its position not to oppose the utilization of public cloud services as long as they satisfy the authority's requirements. Utilization of cloud services that support innovation is thus attracting people's attention.

### Stages of Cloud Services Utilization

**Evolution of Data Centres – US is at Stage 3; Asia is at Stage 2 transitioning to Stage 3**



### UK Regulatory Authority's Position Concerning Public Cloud Services

In 2014, the UK FCA launched Project Innovate to promote innovation.

Innovation can be a driver of effective competition, so we want to support innovation and ensure that regulation unlocks these benefits, rather than blocks them. (Section 1.2)

*1.6 So we are setting out in more detail our approach to regulating firms which outsource to the cloud and other third-party IT services.*

*We see no fundamental reason why cloud services (including public cloud services) cannot be implemented, with appropriate consideration, in a manner that complies with our rules.*

☛ Section 1.6 attracts attention in that it clearly shows the FCA's position concerning public cloud services.

\* [Source] "Guidance for firms outsourcing to the 'cloud' and other third party IT services" (FCA; July 2016)

\* FCA (Financial Conduct Authority): In 2013, the UK Financial Services Authority (FSA) was divided into the Prudential Regulation Authority (PRA) and FCA and a twin peak system was established.

Public cloud services first appeared in 2006 and SMEs started to utilize them for the purpose of reducing costs. In the United States, when the dissemination rate exceeded 15%, large companies started the introduction on the grounds of their superiority in cost, security and convenience. Asia is expected to face a turning point in this field in 2017. Oracle and Adobe are also shifting to cloud-native systems.

[Source] "Data Centres - What to Do in the Face of Public Cloud?" (DBS Asia Insight; April 2016)

# (3) Ecosystems and APIs

When banks transform themselves and create new business models utilizing digital technology, their business scope expands and **what people expect from the banking system also changes drastically**. On that occasion, **ecosystems**, which create markets through the expansion of contacts with clients in collaboration with other types of businesses, and **APIs**, which can easily connect systems of different banks and connect ecosystems with client systems, will play extremely significant roles.

## Reform of Banks' Business Models

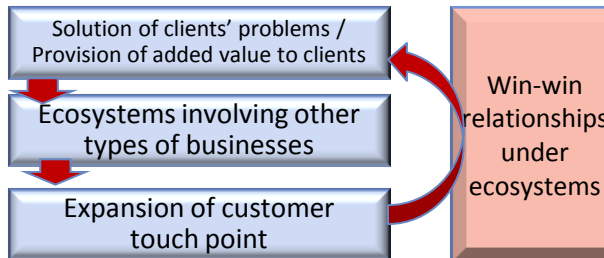
Against new entries of platform providers, banks **create new business models to change their competence into services through the use of digital technology**.

### Technology users

Transform themselves into service providers through the use of technology = Become software providers

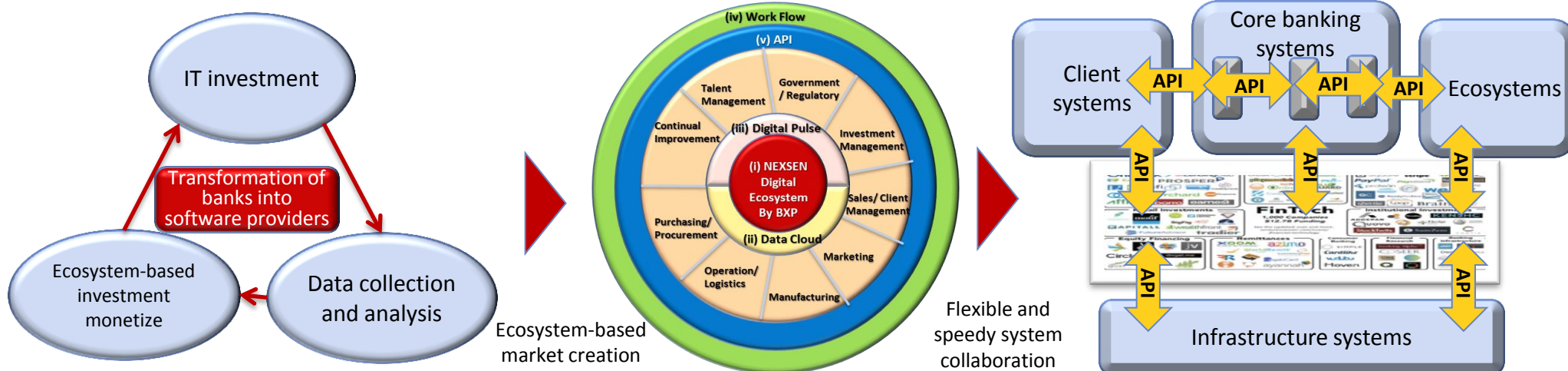
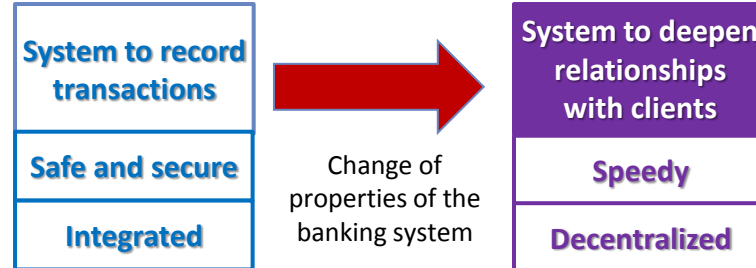
## Ecosystems

Banks entering a new market as software providers create new **mechanisms for the purpose of expanding customer touch point in collaboration with other types of businesses**, instead of conducting business independently.



## APIs

New business models **evolve the conventional banking system from mere transaction records to a system to deepen relationships with clients**. APIs will be indispensable as means to easily connect various systems and realize ecosystems.



## (4) Expansion of Ecosystems

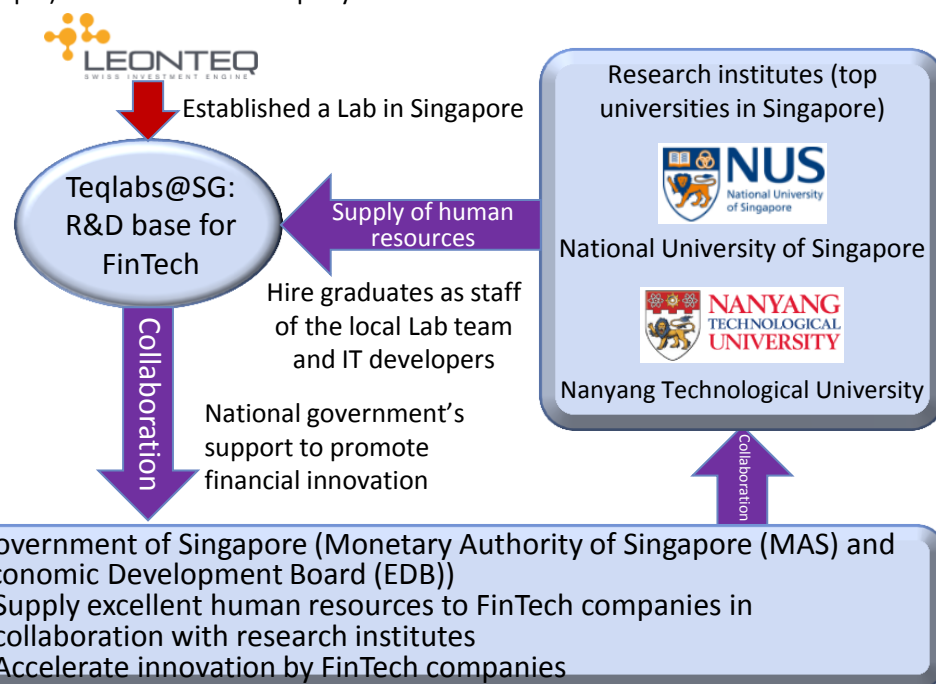
Innovation and regulations in financial business are like two sides of the same coin. In order to create an effective ecosystem for innovation, it is preferable to involve all parties and the regulatory authority in all stages of a series of growth, from a seed of an innovation idea to business startup, expansion of users and overseas business expansion, aiming to create an end-to-end ecosystem.

### Collaboration between the Authority and Research Institutes

The government of Singapore has promoted the FinTech University Ecosystem project through offering support to supply human resources to a FinTech company in collaboration with research institutes (universities).

#### “Singapore’s FinTech Univesity Ecosystem”

(Example) A Swiss FinTech company



### Cooperation between Authorities of Britain and Singapore: FinTech Bridge

**First ever FinTech Bridge established between Britain and Singapore**



HM Treasury



Monetary Authority of Singapore

*Jacqueline Loh, Deputy Managing Director of the MAS, said:*

*“The FinTech Bridge that is forged with the UK today is a significant step forward in our FinTech journey. It will support FinTech innovators who wish to use Singapore as a base for collaboration and as a gateway to other markets in Asia. Singapore’s vibrant FinTech ecosystem is well-positioned to serve the Asian market, the fastest growing region in the world. The Agreement between the MAS and FCA will also create opportunities for Singapore-based companies to grow and scale into the UK market.”*

[Source] MAS



## (5) Achieving Unique Innovation in Japan

Financial institutions overseas are striving to incorporate new ideas, **change their internal cultures** in addition to changing the services they provide, **and reform themselves**. They have reached the stage of accelerating their innovation initiatives. In sophisticating related initiatives, Japanese financial institutions should not only introduce overseas services as they are but should seek evolution through **unique innovation** in consideration of characteristics and social problems unique to Japan.

### Factors for Success in the United States / Difference from Japan in Characteristics

#### Affluent venture companies

- ☛ Encourage not only open innovation but also internal innovation
- ☛ Consider the creation of a hybrid-type mechanism to combine the strengths of each company

#### Internally developed financial institutions' IT

- ☛ It is important to innovate business models together with IT vendors.
- ☛ FinTech investment is now at a turning point to shift to internal development of IT (return to initial financial IT).

#### Relatively low expectations for the quality of IT

- ☛ Public expectations for IT are managed to prevent cost increases.
- The average monthly operation rate of US Mission Critical Systems is below the level in Japan.

#### Loosely coupled system

- ☛ Flexible approach like a second account system and cloud services are utilized.
- A tightly coupled system centered on real-time transactions will increase costs.

**If banks create new business models, diverse innovation will be facilitated in the long run. Such initiatives of banks are evaluated as being significant also from the perspective of fostering venture companies and developing the exit environment.**

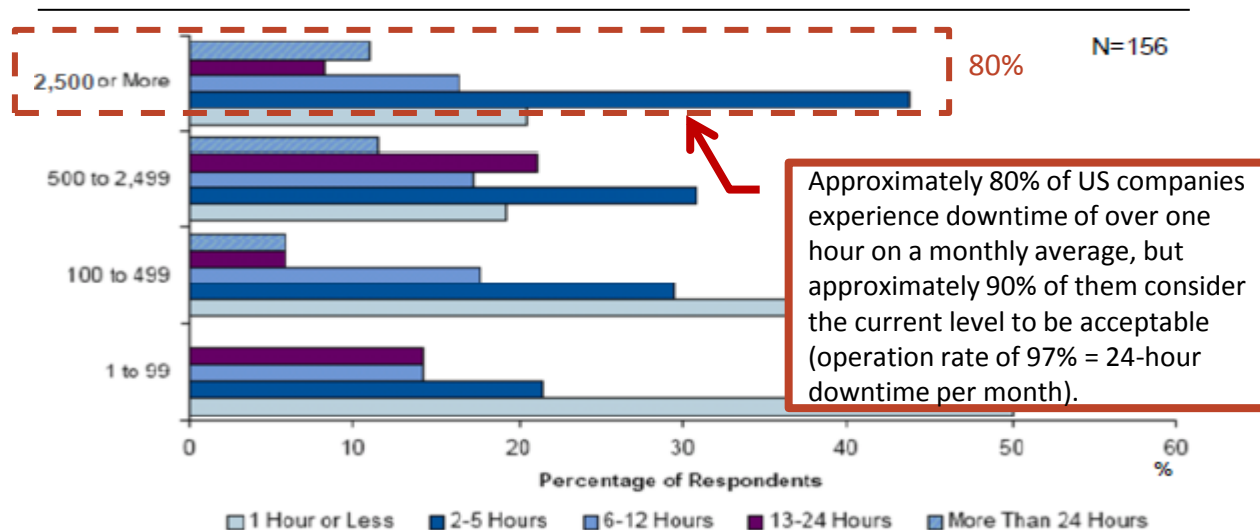




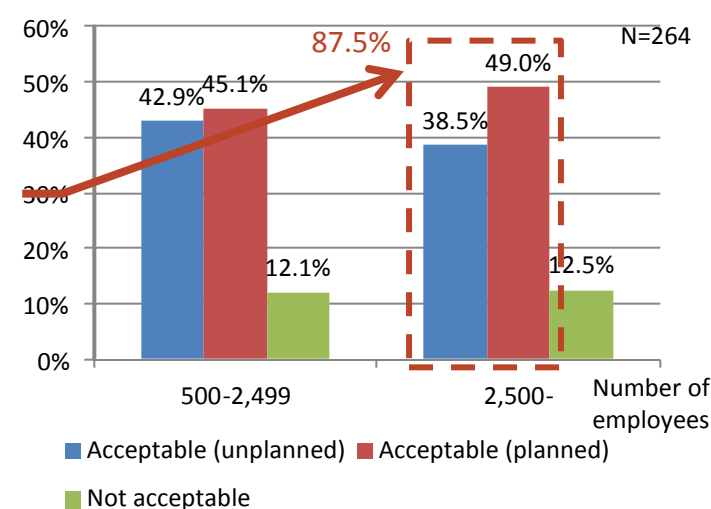
# (Reference) Differences in System Reliability Required in Japan and the United States

Differences in required system reliability are notable and the performance shows that Japanese systems are more reliable than those in the United States.

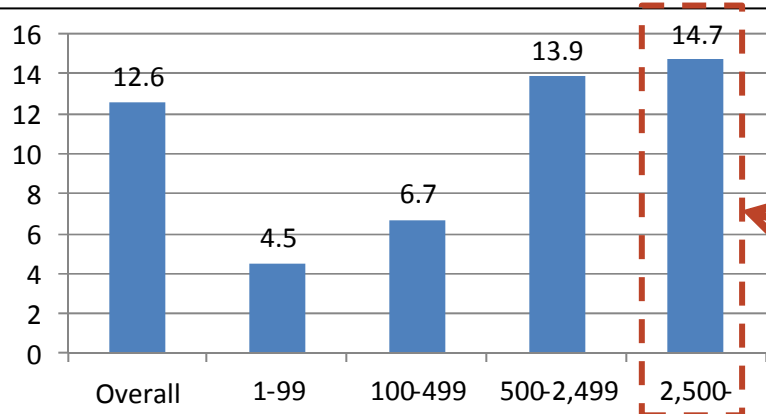
### Monthly Average Total Downtime of US Mission Critical Systems



### Whether the Current Level of Downtime is Acceptable (US)

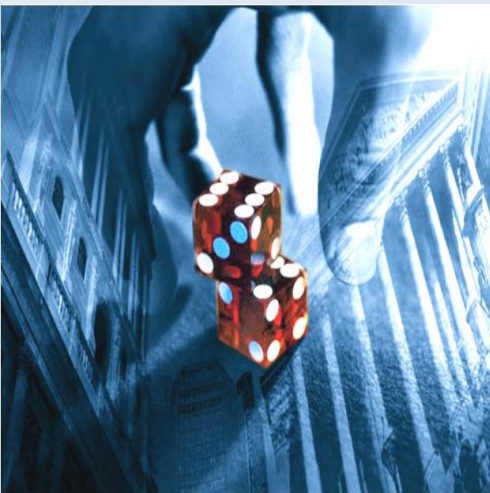


### Monthly Average Downtime of Application Services (US)



### Operation of Core Systems of Companies with 1,000 or More Employees (Japan)

Options (annual downtime)	Monthly downtime per case (h)	Number of replies	Total monthly downtime (h)
99.999% or over (5 minutes)	0.0072	64	0.461
99.99% or over (50 minutes)	0.0720	64	4.608
99.9% or over (8.6 hours)	0.7200	48	34.560
99% or over (86 hours)	7.2000	24	172.800
98% or over (175 hours)	14.400	4	57.600
Total	1.3200	204	270.029



**“Most companies ultimately fail because they do one thing very well but they don’t think of the next thing, they don’t broaden their mission, they don’t challenge themselves, they don’t continually build on that platform in one way or another”**

**Eric Schmidt former CEO Google**