

APEC FRTI Regional Seminar on Technology Operations and Risk Management

14–17 May 2019, ADB Headquarters, Manila, Philippines

Target Participants

The seminar on Technology Operations and Risk Management is designed for any bank supervisor seeking to better understand the IT risks present in today's financial institutions as well as discuss the related risk management programs and supervisory expectations.

Course Overview

The seminar aims to provide training in the IT supervision of financial institutions, introducing foundational concepts on IT risk, risk management, and integrated supervision. IT risk topics will include cloud computing, cybersecurity, mobile banking, FinTech, and payment systems and operations. Additionally, IT risk management expectations for information security, data governance, vendor management, business continuity, and IT audit will be discussed. Finally, the seminar is intended to give guidance on how links between IT and business risks can be made and incorporated into an integrated supervisory approach.

Course Objectives

Upon completion, the participant will:

- Recognize major IT risks and achieve a high level understanding of significant IT topics that impact the operating environment of financial institutions.
- Identify the connection points between IT and business risks and how they are incorporated into an integrated supervision approach.
- Recognize the supervisory expectations for appropriate IT governance at a financial institution, including organizational structure, strategic planning, and IT audit.
- Gain an understanding of how IT risk could impact the overall condition of a financial institution and how this impact can be addressed in recommendations to management.

What you will receive on completion of this course

Participants who attend all sessions will receive a Certificate of Attendance under the APEC Financial Regulators Training Initiative.

APEC Financial Regulators Training Initiative
Regional Seminar on Technology Operations and Risk Management
 14-17 May 2019, ADB Headquarters, Manila, Philippines
 Presented by US Federal Reserve System

Co-hosted by Asian Development Bank, Bangko Sentral ng Pilipinas and Philippine Deposit Insurance Corporation

Hour	Tuesday, May 14	Wednesday, May 15	Thursday, May 16	Friday, May 17
9:00	(8:30 – 9:00) Participants Registration (9:00 – 9:30) Welcome Remarks SATORU YAMADERA, Principal Financial Sector Specialist, ERCD, ADB Opening Remarks CHUCHI G. FONACIER, Deputy Governor, BSP Official Photo Participant Introductions APEC and Federal Reserve (9:30 – 10:15) IT Risk Supervision Overview Steve Galperin FRB-Chicago	(9:00 – 10:15) IT Risk Topics: Cybersecurity Steve Galperin FRB-Chicago	(9:00 – 10:15) IT Risk Management: Information Security Patrick Prickett FRB-San Francisco	(9:00 – 10:15) IT Risk Assessment & Audit Patrick Prickett FRB-San Francisco
To				
12:15	Break (10:15 – 10:30) (10:30 – 12:15) IT Risk Supervision Overview (cont.) Steve Galperin FRB-Chicago LUNCH (12:15 to 1:15)	Break (10:15 – 10:30) (10:30 – 12:15) IT Risk Topics: Mobile Banking Steve Galperin FRB-Chicago LUNCH (12:15 to 1:15)	Break (10:15 -10:30) (10:30 – 12:15) IT Risk Management: Data Governance Steve Galperin FRB-Chicago LUNCH (12:15 to 1:15)	Break (10:15 – 10:30) (10:30 – 12:15) IT Management Organization and Governance Patrick Prickett FRB-San Francisco LUNCH (12:15 to 1:15)
1:15	(1:15 – 2:45) IT Risk and Business Strategies Patrick Prickett FRB-San Francisco Break (2:45 – 3:00) (3:00 – 5:00) IT Risk Topics: Cloud Computing Steve Galperin FRB-Chicago	(1:15 – 2:45) IT Risk Topics: FinTech Patrick Prickett FRB-San Francisco Break (2:45 – 3:00) (3:00 – 5:00) IT Risk: Payment Systems & Blockchain Patrick Prickett FRB-San Francisco	(1:15 – 2:45) IT Risk Management: Vendor Management Patrick Prickett FRB-San Francisco Break (2:45 – 3:00) (3:00 – 5:00) IT Risk Management: Business Continuity and Disaster Recovery Steve Galperin FRB-Chicago	(1:15 – 2:45) Integrated Supervision Steve Galperin FRB-Chicago Break (2:45 – 3:00) (3:00 – 3:30) Examination Practices and Wrap Up Steve and Patrick (3:30 – 4:00) Closing Remarks ROBERTO B. TAN President and CEO, PDIC Certificate Presentation ADB, BSP, PDIC (6:00 – 10:00) Farewell Reception (Details to follow)
To				
5:00	(6:00 – 9:00) Welcome Dinner 42 nd Fl. Columbus Room, Discovery Suite			

Note: This seminar is financed by the People's Republic of China Poverty Reduction and Regional Cooperation Fund.

BIO OF PRESENTERS

Satoru Yamadera
Principal Financial Sector Specialist
Economic Research and Regional Cooperation Department
Asian Development Bank

Mr. Yamadera is Principal Financial Sector Specialist, Economic Research and Regional Cooperation Department, ADB, since October 2014. He is the Secretariat of the Asian Bond Markets Initiative and he leads the ASEAN+3 Bond Market Forum that fosters bond markets standardization and the Cross-border Settlement Infrastructure Forum that promotes efficiency and safety of cross-border transactions. He also manages the project to support ASEAN financial integration through capacity building of ASEAN central banks.

He has over 25 years of central banking experience and was Director of International Standardization Group, Bank of Japan. He has a BA in Law from Keio University; M. Sc in Public Administration and Public Policy from the London School of Economics and Political Science; and M. Sc in Systems Management from Tsukuba University.

CHUCHI G. FONACIER
Deputy Governor
Financial Supervision Sector
Bangko Sentral ng Pilipinas

Chuchi G. Fonacier is the Deputy Governor of the Financial Supervision Sector (FSS), which is mainly responsible for the regulation of banks and other BSP-Supervised Financial Institutions (BSFIs). Under her direct supervision are five subsectors which handle onsite examination and offsite surveillance (or integrated supervision) of BSFIs including specialized supervision of specific areas (i.e., anti-money laundering, trust, financial market operations and information technology), oversight of payment systems, policy studies/research, and supervisory data management.

Deputy Governor Fonacier joined the BSP in 1984 as a bank examiner and worked her way to become assistant governor in 2017. One of the highlights of her career as a central banker is her designation as the BSP's point person of two important legislative measures passed by Congress – the Securitization Act and the Special Purpose Vehicle Act. Both laws were instrumental in unloading banks' non-performing assets and improving their financial position. In 2008, she headed the BSP's primary supervisory unit that handles specially-challenged banks. Under her watch, a record number of banks were successfully resolved. Deputy Governor Fonacier also led the development of various programs, in coordination with the Philippine Deposit Insurance Corporation (PDIC), aimed at strengthening the thrift, rural, and cooperative banking sectors by encouraging mergers, consolidations, and acquisition involving weak banks.

Deputy Governor Fonacier is currently the Chair of the Executives' Meeting of East Asia Pacific Central Banks Working Group on Banking Supervision (EMEAP WGBS), composed of central bank and supervisory authorities from 11 countries in the East Asia and the Pacific which focuses on bank supervision matters that are relevant to EMEAP WGBS members.

As Deputy Governor, she is also a member and the BSP-designated representative in different interagency committees such as the Financial Sector Forum (FSF), Agricultural Credit Policy Council (ACPC) Governing Council and Credit Information Corporations Project, and the permanent

alternate of the BSP Governor in the Board of Directors of the Philippine Deposit Insurance Corporation (PDIC) and the National Development Corporation (NDC).

Deputy Governor Fonacier took up her Bachelor of Science in Commerce major in Accounting degree at University of St. La Salle - Bacolod. She is a Certified Public Accountant (CPA) and a holder of a Career Service Executive Eligibility (CSEE). She obtained her Master in Business Administration (MBA) at the Ateneo de Manila University.

She attended the Program on Rethinking Financial Inclusion: Smart Design for Policy and Practice organized by the Harvard Kennedy School, and various foreign trainings and seminars offered by the IMF/World Bank, International Association of Deposit Insurers (IADI), and other central banks and supervisory authorities such as the Federal Reserve System, Bank of England, Monetary Authority of Singapore (MAS), Bank Negara Malaysia (BNM) and South East Asian Central Banks (SEACEN).

She was also invited as panelist/resource person in various international conferences/fora on banking supervision, financial inclusion, shadow banking, microfinance, information technology, bank resolution and crisis management, financial stability, capacity building, etc. organized by international bodies such as the United Nations (UN), IMF/World Bank, Bank of International Settlements (BIS), Financial Stability Institute (FSI), Asia-Pacific Economic Cooperation (APEC), Asian Bankers Association (ABA) and central banks and monetary/supervisory authorities of various countries.

ROBERTO B. TAN
President and CEO
Philippine Deposit Insurance Corporation

Roberto B. Tan was appointed President and Chief Executive Officer of the Philippine Deposit Insurance Corporation (PDIC) on February 3, 2017.

Prior to PDIC, Mr. Tan headed the Philippines' Bureau of the Treasury from 2008 to 2012 and from 2015 to 2017. As National Treasurer of the Philippines, he was responsible for directing the formulation of policies on borrowing, investment and capital market development, and on operations guidelines for fiscal and financial policies. Concurrent to his position as National Treasurer, he was also Officer-in-Charge of the Department of Finance's International Finance Group from 2015 to 2016.

Mr. Tan's extensive experience in public finance comes from over 25 years with the Philippine Department of Finance. He joined the Department in 1991 as Director of the International Finance Group and rose to the rank of Undersecretary in 2005.

Mr. Tan has served as an Alternate Member of the Board of several government agencies including the Monetary Board of the Bangko Sentral ng Pilipinas.

He was also Executive Director of The World Bank Group and Affiliates in Washington, D.C. from 2012 to 2015, and Advisor to the Executive Director of the Asian Development Bank Board from 1995 to 1998.

Mr. Tan earned his doctorate and master's degrees in Economics from Fordham University, New York, USA. He also holds a master's degree in Business Administration from the Ateneo de Manila University where he likewise received his Bachelor's degree in Economics.

Patrick Prickett
Examining Manager
Financial Institution Supervision and Credit
Federal Reserve Bank of San Francisco

Mr. Patrick Prickett is an Examining Manager in the Division of financial Institution Supervision and Credit at the Federal Reserve Bank of San Francisco (FRBSF). Currently, Patrick supervises and serves as the central point of contact for a portfolio of over 30 foreign banking organizations. As such, he oversees safety and soundness examinations, and reviews and approves reports of examinations. Previously at the FRBSF, he has served as central point of contact for two regional banks, and as the information technology risk coordinator for two large, complex foreign banking organizations.

Patrick began his career with the Federal Reserve System in 1996, at the Federal Reserve Bank of New York. There he served in a variety of roles over his nearly 10 year career including working on the Basel II Capital accord, authoring white papers on Managing Outsourcing Risk and Y2K preparation, and developing examination procedures for examining banking organizations who are undergoing mergers and acquisitions. He also managed a team of financial analysts which was responsible for evaluating the financial condition of the largest domestic and foreign banks, and managed a portfolio of British banks. Patrick graduated from Rutgers University with degrees in political science, history and philosophy, and earned a master's degree in Public Policy from Duke University.

Steve Galperin
Lead Large Bank Examiner
Supervision and Regulation Division
Federal Reserve Bank of Chicago

Mr. Steve Galperin is a Lead Large Bank Examiner on the Discover Financial Services dedicated supervisory team. Steve's primary area of focus includes serving as the IT / Operational Risk specialist for Discover Financial Services. Prior to that Steve was responsible for serving as the IT Risk specialist for Northern Trust Corporation. Prior to joining the Federal Reserve in 2010, Steve worked as an Internal Audit associate at Omnium (now Northern Trust Hedge Fund Services) and a Senior Associate at PricewaterhouseCoopers. Steve earned a BS and MS in Accounting (specializing in information systems) from Michigan State University and is a Certified Public Accountant and Certified Information Systems Auditor.

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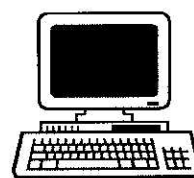
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IT Risk Supervision

Outline of the Discussion

- Define IT Risk
- Identify Scope of an IT Examination
- Describe a Bank's Operating Environment
- Identify Risks Considered in IT Supervision
- Describe the IT Ratings Framework



Unique Attributes

- What is IT Risk...
 - Expansive
 - Automation and technology advancements
 - Connection to business risks
 - Dynamic
 - New risks are introduced with innovation
 - IT Strategy
 - Challenging
 - Difficult to implement policy that stays current
 - Supervision must be flexible

IT Scope - Operations

- Risk Focused IT Examinations
 - Access and Identity Management
 - Internet and Mobile Banking
 - Branch and Remote Capture
 - Wire Transfers
 - ATM Processing
 - ACH Originations
 - Virtualization / Cloud
 - Models

IT Scope – Risk Management

- Risk Focused IT Examinations
 - Information Security
 - Cybersecurity
 - Vendor Risk Management
 - Business Continuity / Disaster Recovery
 - Application Access Controls
 - Change Management
 - Data Governance
 - IT Audit Coverage



IT Scope – Environment Changes

- Risk Focused IT Examinations
 - implementation of new systems
 - significant changes in operations including mergers or system conversions
 - new or modified outsourcing relationships for critical operations
 - significant industry trends/issues
 - business lines where internal controls or risk management are heavily dependent on information technology
 - follow-up on issues raised by internal audit or in the last report of examination
 - Issues related to the use of the internet and cyber security



IT Examination Process

1. Understand Operating Environment
2. Identify Technology and Business Risks
3. Develop Risk Assessment and Conclusions
4. Rate the Institution

Understanding the Operating Environment

Outsourced (Serviced)	In-House (Turnkey)	Combination (Blended)
Data processed at vendor location i.e. Fiserv processes items and posts transactions to the general ledger for a financial institution.	Data processed at bank with purchased hardware and software i.e. Financial institution purchases hardware and software which it uses to process items and post transactions to the general ledger.	Combination of in-house and outsourced data processing i.e. Item processing is performed internally by bank staff and the posting of transaction of the general ledger is performed by Fiserv.

Degree of Control



- Level of IT risks - depends on degree of control
- In-house operations - 100 percent
 - retains all responsibility authority and accountability
- Outsourced operations - 0 percent
 - delegates some authority to an outside party through a contract while retaining accountability
- Vendor - 0 percent
 - products developed without bank input; carefully evaluate the risks



Identify Technology and Business Risks

Management
Processes

Architecture

Integrity

Security

Availability



Management Processes

The potential that ineffective management processes result in information systems that are not adequately or appropriately aligned with the business processes and mission of the organization.

- Planning
- Investment
- Development
- Execution
- Staffing

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Management Process - Key Issues

- Competitive advantage
- Critical to global competition
- Critical to a merger - whose systems to use and how to integrate
- Linkage to strategic planning
- End-users - should understand the systems and be included in decision-making



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Management Process – Key Controls

Preventative:

- Strategic plan
- Succession planning
- Communications
- Staffing
- Policies/procedures
- Segregation of duties
- Cross training/job rotation
- Documentation

Detective:

- Managerial reports
- Financial reports
- Variance reports
- Employee appraisals
- Error statistics and logs
- Internal and external audit

Corrective:

- Education
- New plans or procedures
- Outsourcing
- Replacement of management



Architecture

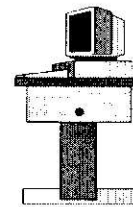
The risk that the underlying design and individual components of an automated information system will not meet current and long-term organizational objectives.

- Compatibility
- Capacity Management
- Alignment with Business Goals



Architecture – Key Issues

- Underlying design of the information technology system and its physical and logical components:
 - Network communications
 - Hardware
 - Software: operating systems, communications software, database management systems, programming languages and desktop software



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Architecture Risk - Key Controls

Preventative:

- Strategic and tactical plans
- Feasibility study
- Procurement policy
- System development methodology
- Capital plans and procedures
- Change control
- Acceptance testing

Detective:

- Inventory systems
- Self-assessment
- Internal and external audit

Corrective:

- Retrofit
- Re-engineer
- Translate/transform

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Integrity

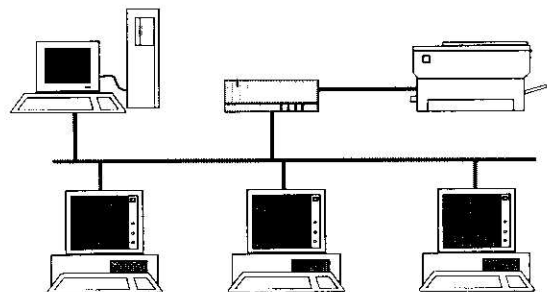
The risk that a system, application, or computer program, and the resulting information flows, will not satisfy end-user business requirements and expectations.

- Audit Coverage
- Policies, Procedures and Practice
- Reliability, Accuracy, and Completeness



Integrity – Key Risks

- Key part of this process - System Development Life Cycle - SDLC
 - **Initiation**
 - **Requirements**
 - **Design**
 - **Programming**
 - **Testing**
 - **Implementation**
 - **Evaluation**
 - **Maintenance**



Integrity Risk - Key Controls

Preventative:

- Adherence to SDLC
- Quality assurance program
- Change control
- Acceptance testing
- Capacity planning
- Resource scheduling

Detective:

- Self-assessment
- Internal and external audit
- Acceptance testing
- Performance monitoring
- Machine diagnostics/logs
- Error statistics

Corrective:

- Redesign of application
- File rotation and retention
- Recovery and restart
- Replacement
- Reschedule demand

Security

The potential that control breaches will result in unauthorized access, modification, destruction, or disclosure of information assets during their creation, transmission, processing, maintenance, or storage.

- Information Security Program
- Physical Security
- Logical Access Management

Security – Key Risks



- Utilize preventative and detecting controls - physical and logical
- Physical - isolate mainframes and servers
- Logical - restrict access to systems and changes to systems; create audit trails; periodically review access; encrypt critical information (particularly sensitive customer information)

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Security Risk - Key Controls

Preventative:

- Physical/logical access control
- Capacity modeling
- Proprietary networks
- Switchability routing
- Protocols
- Public networks
- Encryption/authentication
- Access code
- Firewalls
- Vulnerability/threat assessments

Detective:

- Violation reports
- Self-assessment
- Internal and external audit
- Inventory control
- Verification/configuration
- Call back
- Batch control
- Incident response team

Corrective:

- Disaster recovery plan
- Insurance
- Retransmission/rerouting

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Availability

The potential that an organization will not be able to consistently deliver information on a timely basis in support of business processes and decision making.

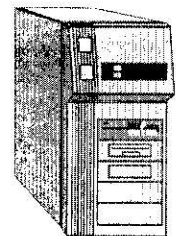
- Disaster Recovery Planning
- Business Continuity Procedures
- Data Backup/Recovery Process

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Availability – Key Risks

- Identification of critical systems
- Data back-up sites - “hot”, “warm” or “cold”
- Regular testing of the contingency plan
- Sufficient system capacity



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Availability - Key Controls

Preventative:

- Maintenance - hardware/software
- Redundancy
- Modeling
- Testing
- Diverse routing
- Physical security

Detective:

- Virus detection
- External sources
- Self-assessment
- Internal and external audit

Corrective:

- Disaster recovery plan
- Insurance
- Reciprocal agreement



Rate the Institution

- Uniform Rating System for Information Technology (URSIT)
- SR Letter 99-8
- 4 Components + Composite Rating
- Same Scale as CAMELS (1-5)



Uniform Rating System for IT

- URSIT Components
 - AUDIT
 - MANAGEMENT
 - DEVELOPMENT AND ACQUISITION
 - SUPPORT AND DELIVERY

- COMPOSITE (1-5)



Audit Rating

- Internal Audit review includes:
 - Overall effectiveness of the audit process
 - Audit independence
 - Adequacy of risk assessment methodology
 - Scope, frequency, accuracy and timeliness of internal and external audit reports
 - Extent of audit participation in application, development, acquisition and testing
 - IT audit staff and qualifications
 - Quality and effectiveness of internal and external audit as it relates to It controls
 - Overall adequacy of plan vs. IT risks



Management Rating

- Director oversight and support
 - Adequate strategic planning
 - Review/approval of policies, contingency plan
- Senior Management
 - IT plans, policies, procedures, and standards
 - Risk management/risk identification practices
 - Vendor Management Program
 - Responsiveness to audit issues/concerns and timely corrective action
- Line Management
 - Depth and succession
 - Qualifications



Management Rating

- Management review includes:
 - Level/quality of oversight and support of IT processes
 - Effectiveness of risk monitoring systems including identification, measurement, monitoring and controlling risks
 - Management planning - new activities - succession plan
 - Adequacy of MIS reports
 - Awareness of and compliance with laws and regulations
 - Management of contracts, outsourcing, and service delivery and monitoring of the arrangements



Development and Acquisition

- Identification and implementation of IT solutions
- Project management
- IT solutions align with user needs
- Change management
- Independent quality assurance
- Testing



Development and Acquisition

- Development and acquisition review includes:
 - Oversight and support of systems development and acquisition activities by senior management and Board
 - Accountability for systems development
 - Adequacy of SDLC and programming standards
 - Quality of project management programs, systems documentation and software releases
 - Independence of quality assurance function
 - Integrity and security of the network, system and application software
 - Involvement of clients in the acquisition process



Support and Delivery

- Security administration
 - Formal policy & awareness program
 - Logical & physical security closely monitored
- Continuity planning
 - Comprehensive BCP
 - Plans current and tested
 - Pre-defined recovery time frames
- IT Operations
 - Consistent performance
 - Reliable processes
 - Available processes
 - End user / Customer support



Support and Delivery

- Support and delivery review includes adequacy of:
 - Operating policies, procedures, and manuals
 - Physical and logical security including data privacy
 - Security policies, procedures, and practices in all units and at all levels of financial institution
 - Service levels that meet business requirements
 - Data controls over preparation, input, processing, and output
 - Corporate contingency planning and business resumption
 - Programs/processes monitoring capacity/performance
 - Quality of assistance provided to users
 - Controls over and monitoring of OSPs
 - Firewall architectures/security of public networks



IT Risk: FinTech

Agenda – Purpose of Presentation

- Define fintech
- Describe the importance of fintech to supervisory community
- Summarize Federal Reserve's and other U.S. regulators' response to fintech innovation and growth
- Describe various fintech segments
- Explain important developments and concepts in alternative lending

What Is Fintech?

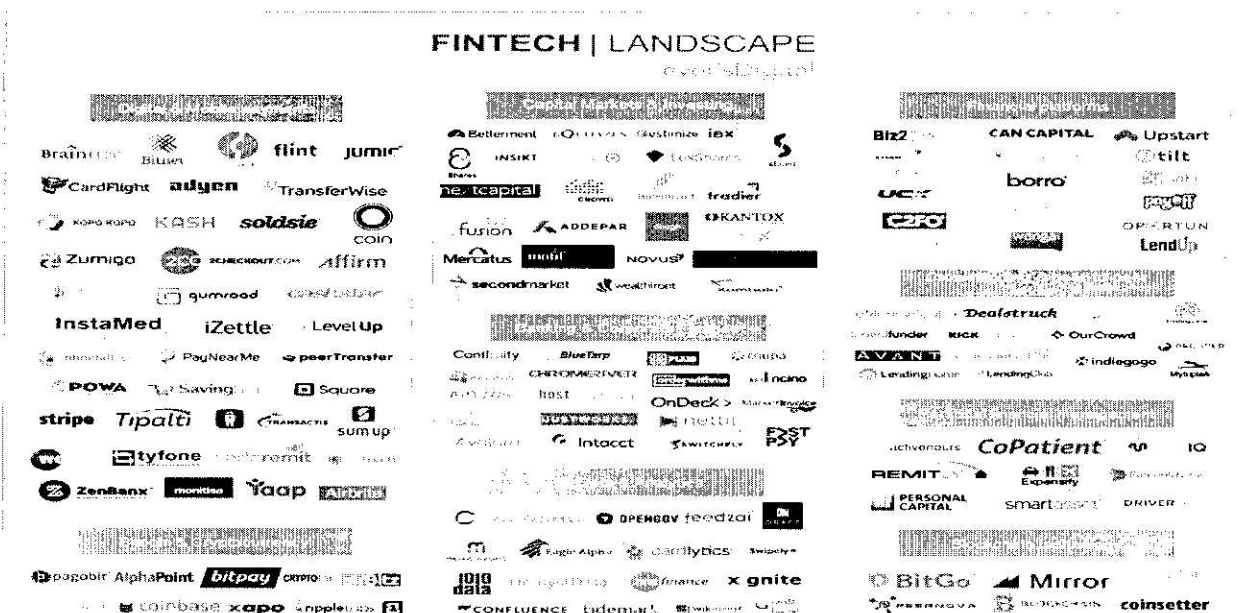
- Fintech is an industry composed of companies that use technology to make financial systems and the delivery of financial services more efficient

Unbundling of a Bank



Source: CBInsights; <https://www.cbinsights.com/blog/disrupting-banking-fintech-startups/>

Fintech Innovations are Transforming Financial Services for Consumers and Businesses



According to one report, global investment in fintech companies totaled \$19.1 billion in 2015 (\$13.8 billion in the United States).

One firm (Venture Scanner) is tracking 1,379 fintech companies.

Competition or Collaboration?

- Fintech initially seen as competition – more recently, collaboration has emerged
- Fintech advantages
 - New ideas, new technology
 - Agility/speed to market
 - Data expertise
- Traditional bank advantages
 - Customer trust/Inertia
 - Access to clearing/settling
 - Data expertise
 - Already regulated

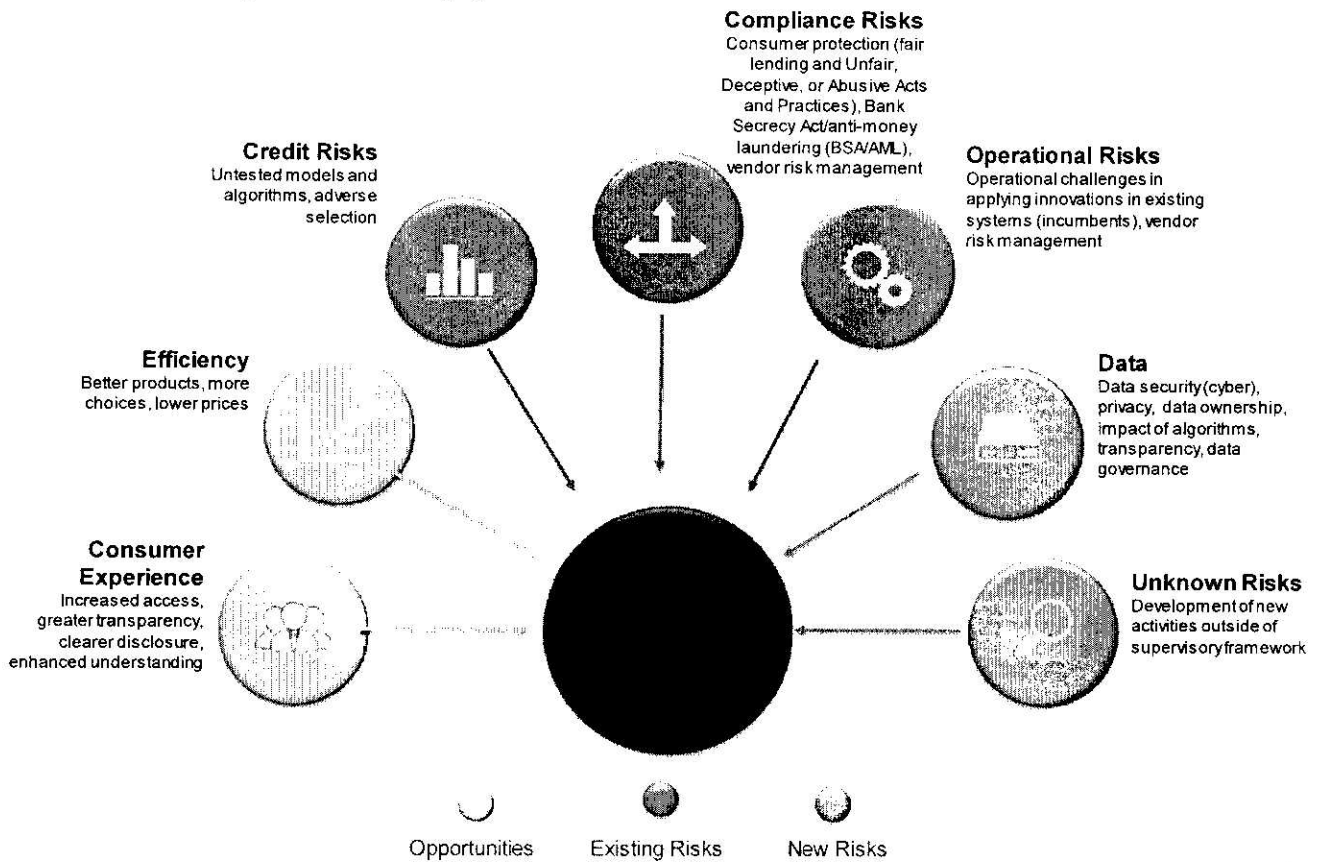


Why Do Regulators Care?

- Fintech and banks are connecting in multiple ways:
 - Banks invest in fintech companies
 - Banks establish start-up programs to incubate fintech companies
 - Banks partner with fintech companies:
 - Originate loans for fintech lenders
 - Retail business platform provider – cobranding arrangements
 - White label/private label arrangements
 - Referral arrangements for a fee
 - Banks acquire fintech companies
 - Banks launch own fintech solutions



Fintech Impacts: Opportunities & Risks



Source: This figure was inspired and derived from a similar figure in the report *Technological Innovation and the Dutch Financial Sector* published by De Nederlandsche Bank

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Initial Regulatory Response to Fintech Innovation

- **Federal Reserve System (FRS):**
 - Governor Lael Brainard Steering Committee – Overarching umbrella for all Federal Reserve System efforts
 - Fintech High-Priority Initiative – Multidisciplinary working group
 - Other efforts relating to payment systems and the Basel Committee
 - BSA/AML and distributed ledger workstreams
- **Office of the Comptroller of the Currency (OCC):**
 - *Responsible Innovation* whitepaper (March) and related public forum (June)
 - Considering limited-purpose fintech charter and regulatory sandbox
- **Federal Deposit Insurance Corporation (FDIC):**
 - *Supervisory Insights* article on marketplace lending
 - Limited examinations of fintech firms partnering with banks
 - Proposed new third-party lending guidance
- **U.S. Treasury:**
 - Completed request for information (RFI), *Public Input on Expanding Access to Credit through Online Marketplace Lending*, in 2015
 - Issued *Marketplace Lending* whitepaper (after RFI) in May 2016
- **Consumer Financial Protection Bureau (CFPB):**
 - Consumer bulletin on marketplace lenders in March 2016
 - Accepting consumer complaints against marketplace lenders
 - Project catalyst
- **Federal Trade Commission:**
 - Hosting a series of forums on marketplace lending beginning June 2016

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As policymakers, we want to **facilitate innovation** where it has the potential to yield **public benefit**, while ensuring that **risks are thoroughly understood and managed**.

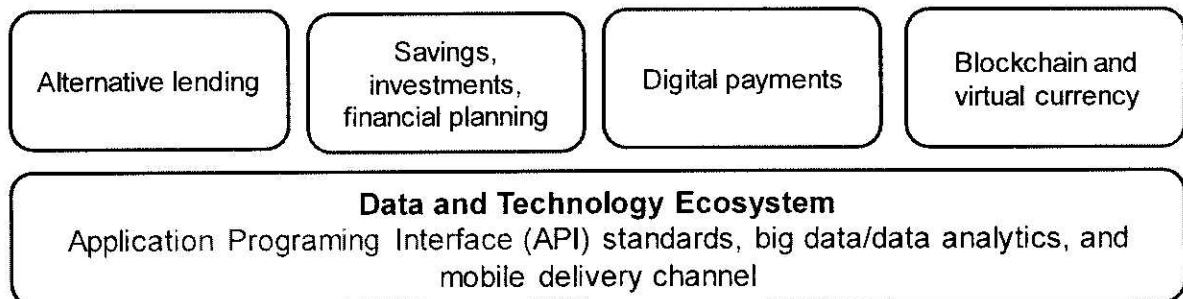
It is important to give **promising technologies** the serious consideration they merit, seek to **understand their opportunities and risks**, and actively engage in dialogue about their potential uses and evolution.

We should be **attentive to the potential benefits** of these new technologies and prepared to make the necessary **regulatory adjustments** if their **safety and integrity** is proven and their potential benefits found to be in the **public interest**.

Lael Brainard
Federal Reserve Governor
April 14, 2016

Federal Reserve's Primary Areas of Fintech Focus

- The Board of Governors of the Federal Reserve System established a multidisciplinary working group that is engaged in a 360-degree analysis of fintech innovation
- Focused on the following fintech segments:

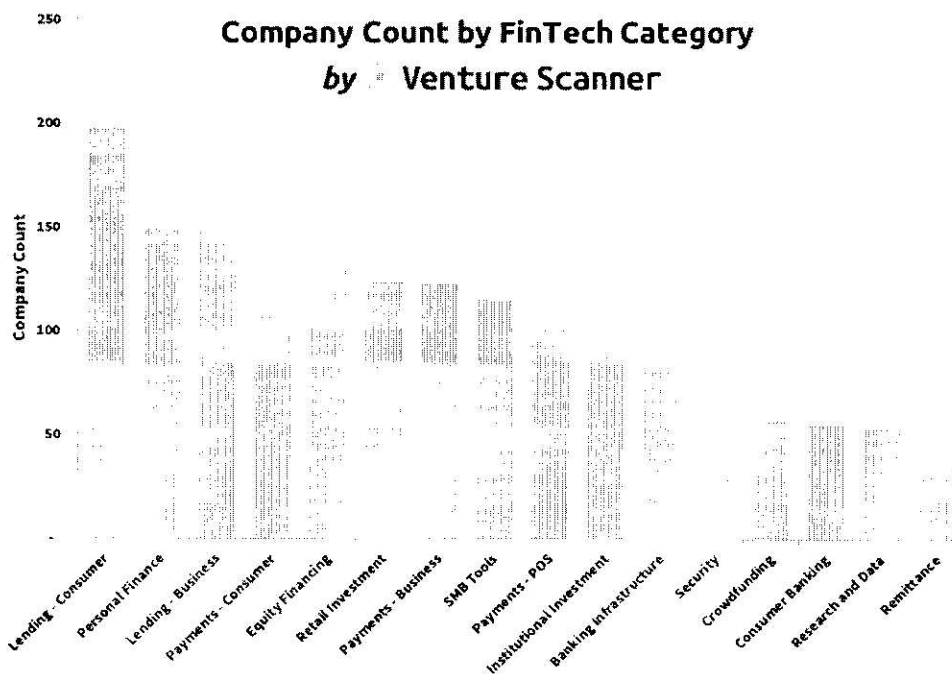


- Fintech creating **nontraditional platforms** for banking products and services
- Disruption most likely to impact **how financial services are delivered**
- Each fintech area developing at different pace; **not all will be equally disruptive**

Federal Reserve Fintech Initiative

RISKS AND OPPORTUNITIES ANALYSES – “WHY SHOULD WE CARE?”
Work Stream
Market Efficiency and Alternative Lending
Data Aggregation
Savings, Investment and Financial Planning
Payments / Digital Wallets
Blockchain
SMB Survey
LEVERS TO PULL IN RESPONSE – “HOW SHOULD WE RESPOND?”
Work Stream
Outreach / Public Statements
Convening Power
Bank Service Company Act Options
Chartering / Licensing Position
Innovation Hub / Sandbox Position
Vendor Risk Management Guidance and Supervisory Practices
Fair Lending / UDAP Guidance and Supervisory Practices
BSA / AML Guidance and Supervisory Practices

Range of Fintech Companies



Savings, Investments, and Financial Planning Segment



Robo-Advisors	wealthfront Betterment SIGFIG
Automated Savings Platforms	digit dlyme pay yourself SIMPLE
Financial Planning	piggy bank mint

Source: Federal Reserve System

Payments Segment

Digital wallets are the electronic devices that allow individuals to make e-commerce transactions.

Consumer to Consumer

These tools may allow individuals to complete financial transactions with one another

Xoom
A PayPal service

venmo
The easiest way to pay your friends

Introducing popmoney
The fast, easy & safe way to send money to friends and family

Payments between consumers

Consumer to Merchant

These mobile payment services allow all users to make payments via a mobile device

Apple Pay

SAMSUNG pay

pay

Consumers pay merchants with credit cards through mobile devices.

Business to Business

These companies provide real-time online payment processing. Their digital payment networks connect with financial institutions to facilitate bank transfers

DWOLLA

YAPSTONE

Making Automated Clearing House easier to use

Source: Federal Reserve System

Blockchain Segment

The entire Bitcoin network relies on a Blockchain network

Blockchain could be used to facilitate the exchange of financial assets with less middlemen.

Blockchain is the distributed ledger technology behind Bitcoin.

Several Blockchain companies are on the rise, e.g.,

- Chain
- Mirror
- Ripple

Bitcoin and Blockchain could have vast impacts on the fintech industry.

Source: Federal Reserve System

Data and Technology Ecosystem Segment

The Technology Behind Fintech

- | | |
|-----------------|---|
| Mobile | <ul style="list-style-type: none"> Apps, complete with modified user experiences, are being rolled out for consumers' on-the-go financial services needs. |
| Big Data | <ul style="list-style-type: none"> Vast amounts of consumer data How to interpret and use it |
| API | <ul style="list-style-type: none"> Programming code allows two software programs to communicate with each other Bank transactional data about consumers |



Source: Federal Reserve System

Alternative Online Lending Segment

- Alternative Lenders (ALs) are nonbank lenders that focus on the Internet and emerging data-analytic technologies.
 - Technology is used to improve customer experience, lending decisions, customer sourcing, and funding.
- ALs were originally viewed as a competitive threat to banks despite relying on them for loan origination.
- More recently, many banks have established a variety of business engagements with ALs.
 - The System is contacting state member banks to determine the types of ALs and fintech companies with which they are engaged.



AL Landscape

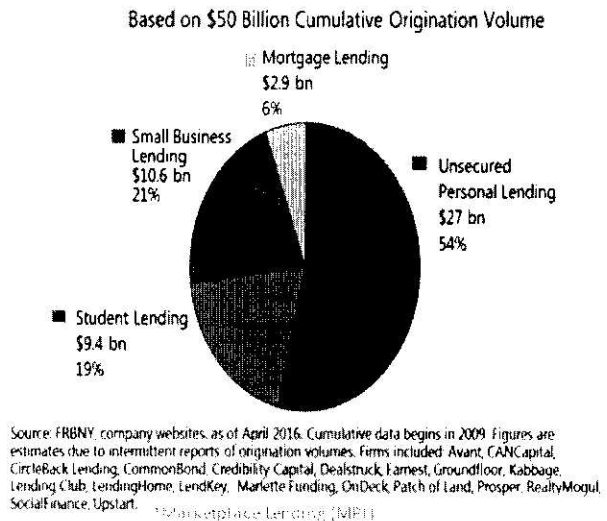
- Most loans are consumer or small business loans.
 - Consumer: Typically 3–5 years, <\$35,000, unsecured
 - Small business: Typically <\$500,000, <5 years, secured/unsecured
- Growth in loans has been rapid, from virtually nothing pre-crisis, but market shares are still very small.
 - Consumer loans are only about 3 percent of the U.S. market.



Alternative Lending Originations



Cumulative MPL* Origination Volume by Lending Segment



- Based on annualized 1Q16 originations, the top four alternative lenders are on pace to represent only about 3 percent of total consumer credit in United States.

- Personal loans are primarily used for debt consolidation, credit card repayment, and home improvement.
- The majority of consumer loans are made to prime or near-prime borrowers.

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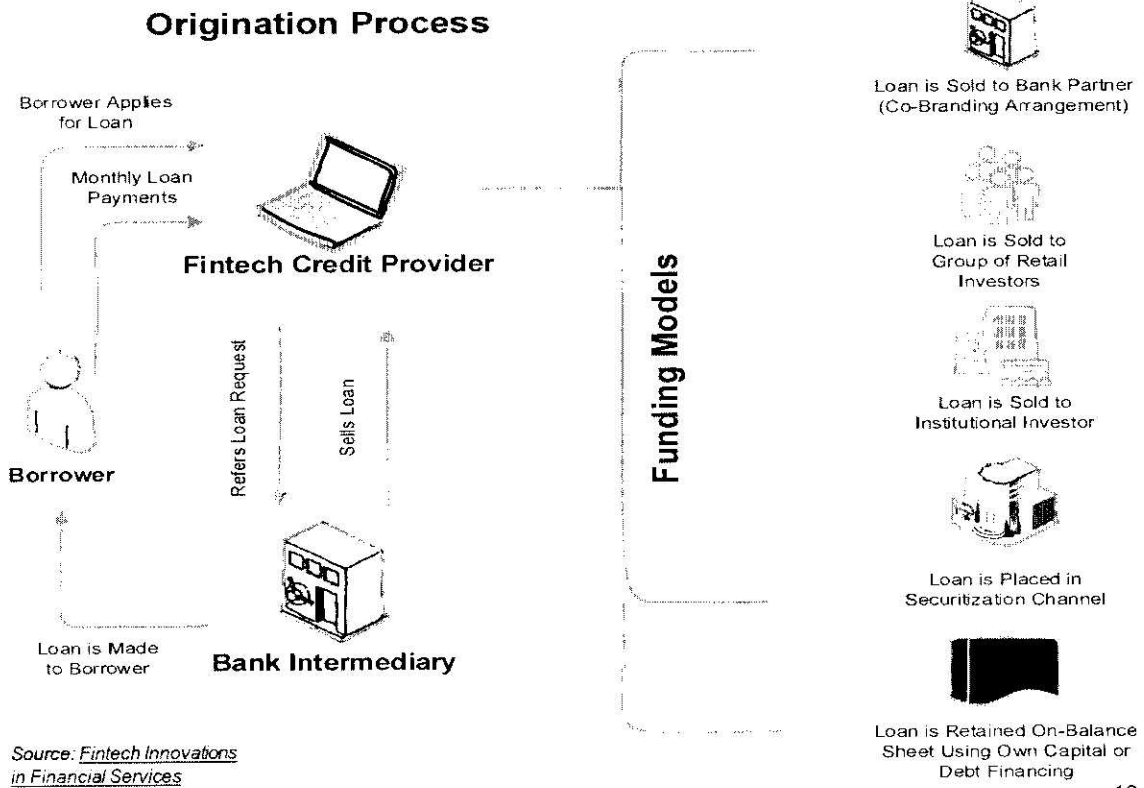
Bank Engagements with ALs

- Traditional AL business model** – Banks originate loans (funding from individuals/institutional investors).
- Partnerships** – Banks provide referrals, whole loan purchases, white labeling/cobranding of AL lending platform, and securitization services.
- Funding** – Banks fund ALs through credit extensions, whole loan purchases, and equity investments.
- Acquisitions** – Banks acquire an AL that becomes a primary business line unit, such as an online consumer lending unit.
- Incubators** – Banks provide workspace, seed funding, mentoring, training, and other related support for startup entrepreneurs.

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Business Model Example



Alternative Lenders Face Hurdles

- “Goldman, Jefferies Put LendingClub Deals on Hold”
Wall Street Journal, May 10, 2016
- “LendingClub CEO Fired Over Faulty Loans”
Wall Street Journal, May 9, 2016
- “Prosper Marketplace to Cut Jobs and Shuffle Executives”
Wall Street Journal, May 3, 2016
- “OnDeck Losses Grow as Lender Sells Fewer Loans”
Wall Street Journal, May 2, 2016
- “Fintech Lenders Dial Back Marketing in Response to Softer Investor Demand”
Wall Street Journal, April 10, 2016

Alternative Lending: New Risks and Challenges

- Data movement:
 - Data aggregators – Customer permissions, screen scraping, authentication methods, and use of APIs
 - Data ownership, security, and privacy
- Data usage:
 - Nontraditional data sources – What is used? How is it used? Is it accurate?
 - Impact of algorithms, machine learning, and artificial intelligence
- Market transparency:
 - Not all lenders are reporting to credit reporting agencies.
 - Transparency of algorithms/underwriting models:
 - Consumer ability to understand how their behaviors impact their creditworthiness
 - Inability for banks and investors to fully understand the impact of algorithms and models through the entire credit cycle
- New business models:
 - Chartering and oversight
 - Regulatory uncertainty
 - Regulatory innovation hub
 - Investor redlining

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Alternative Lending: Existing Risks and Challenges

- Credit and business model risks:
 - Customer sourcing and risk for adverse selection
 - Ability to maintain strong growth and associated pressures to do so
 - Loan performance and risk retention
 - Fintech funding challenges – Balance sheet and loans
 - Untested credit models and data algorithms
 - Opaque underwriting practices
- Compliance and operational risks:
 - Consumer protection – Fair lending, unfair and deceptive
 - Small business protection – Need for similar consumer protection safeguards?
 - BSA/AML, Know Your Customer, and fraud
 - Third-party risk management
 - New technologies and partnerships
 - Regulatory costs
- Reputation risk:
 - “WebBank: The Ugly Duckling Behind the San Bernardino Loan” – *Financial Times*, December 11, 2015
- Strategic risk:
 - What missteps might banks make as they adjust their strategic plans to deal with this competitive threat?

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ALs: Fair Lending – Potential Disparate Impact Practices

- Disparate impact – When a lender applies a racially or otherwise neutral policy or practice equally to all credit applicants, but the policy or practice disproportionately excludes or burdens certain persons on a prohibited basis, the policy or practice is described as having a “disparate impact.”
- Different loan terms – Applying via the fintech firm’s website vs. branch walk-in



Summary: Key Points of Consideration

- Fintech covers many types of financial products and services
 - Understand how financial institutions are already engaging or plan to engage in fintech activities
 - Think beyond innovation as being good or bad. Many products could be beneficial and addressing an unmet need.
 - Understand emerging views and public statements from various regulators
 - How do we address risks and concerns, while still allowing opportunities to foster?



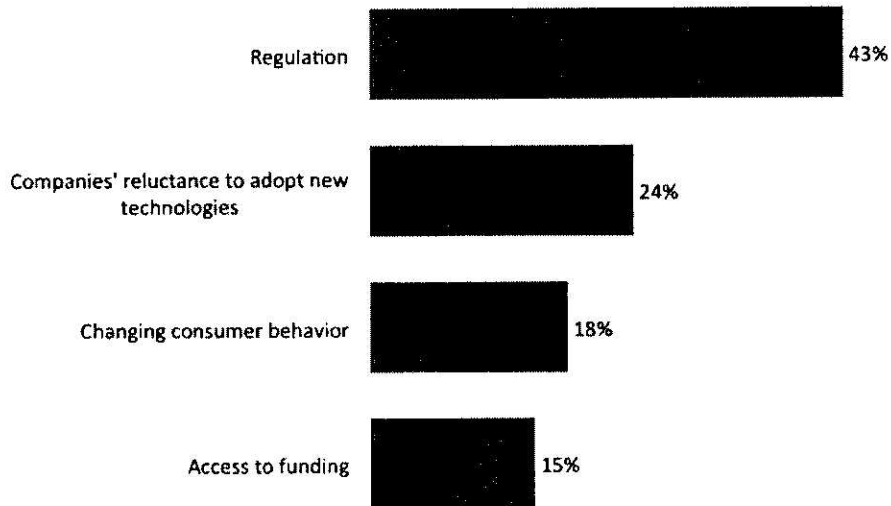
Appendix

List of Companies in Key Fintech Segment

Credit	Savings, Investments, Financial Planning	Digital Payments	Blockchain & Virtual Currency	Data and Technology Ecosystem
<ul style="list-style-type: none">• Lending Club• Prosper• SoFi• Kabbage• OnDeck• Affirm• Ascend• PayPal Working Capital• Square Capital	<ul style="list-style-type: none">• Betterment• Wealthfront• Future Advisor• Personal Capital• Digit• Acorns• Even	<ul style="list-style-type: none">• Paypal (Venmo, Xoom)• Google• Apple Pay• Seamless• Stripe• Square• MCX• Dwolla• Yapstone	<ul style="list-style-type: none">• The Linux Foundation• R3CEV• Digital Asset Holdings• Bitcoin• Coinbase• Ripple• Chain	<ul style="list-style-type: none">• Plaid• AlphaSense• Dataminr• BillGuard• Yodlee

Top Challenges For The Fintech Industry

101 fintech startups and investors



Source: Silicon Valley Bank, November 2015

BI INTELLIGENCE

Additional Resources

Federal Reserve

- FRB Governor Lael Brainard, April 2016 – [The Use of Distributed Ledger Technologies in Payment, Clearing, and Settlement](#)
- FRB Governor Lael Brainard, October 2015 – [Community Banks, Small Business Credit, and Online Lending](#)
- FRB San Francisco President John Williams, April 2016 – [Fintech: The Power of the Possible and Potential Pitfalls](#)
- FRB San Francisco Senior Vice President Teresa Curran, April 2016 – [Tailoring, Fintech, and Risk Culture: The Talk of the \(Community Banking\) Town](#)

Other U.S. Regulators

- CFPB – [Marketplace Lending Consumer Complaints](#)
- CFPB – [Understanding Online Marketplace Lending](#)
- FDIC – [Supervisory Insights Marketplace Lending Article](#)
- OCC – [Supporting Responsible Innovation in the Federal Banking System: An OCC Perspective](#)
- U.S. Treasury – [Opportunities and Challenges in Online Marketplace Lending](#)
- California Department of Business Oversight – [Survey of Online Consumer and Small Business Financing Companies](#)

Industry Self-Regulation

- [Small Business Borrowers' Bill of Rights](#)
- [Marketplace Lending Association](#) (newly formed trade association)
- [Innovative Lending Platform Association](#) (newly formed trade association)

IT Risk Management: Third Party Risk/Vendor Management

Agenda – Purpose of Presentation

- Define Third Party or Vendor Risk
- Identify Expectations for Third Party Risk Management Programs

What is Third Party Risk?

- The use of service providers to perform operational functions presents various risks to financial institutions.
- Some risks are inherent to the outsourced activity itself, whereas others are introduced with the involvement of a service provider.
- If not managed effectively, the use of service providers may expose financial institutions to risks that can result in regulatory action, financial loss, litigation, and loss of reputation.



What is Outsourcing from IT Standpoint?

- An institution contracts with an external party to provide different services which can include:
 - core processing
 - information and transaction processing and settlement activities supporting functions such as lending, deposit-taking, funds transfer, fiduciary or trading activities;
 - Internet related services;
 - security monitoring;
 - systems development and maintenance;
 - aggregation services;
 - digital certification services; and
 - call centers



Impact on Risk Profile

Does outsourcing increase, decrease, or leave unchanged the institutions IT risk profile?



Potential Benefits from Outsourcing

- Reduced costs
- Enhanced performance
- Access to better talent
- Access to advanced systems
- Obtain specialized expertise
- Accelerated delivery of services
- Allows bank to focus on core businesses

Potential Drawbacks to Outsourcing

- Involves binding (usually lengthy) contractual relationship
- Changes business practices and processes
- Offers access to confidential data
- Requires management of the service provider
- Introduces potential dependency on the service provider
- Creates reputation risk, especially if service provider interacts with customers
- Threatens employee relations



Types of Risk Exposure

- Compliance
- Concentration
- Reputational
- Country
- Operational
- Legal



Key Outsourcing Challenges

- Selecting a qualified vendor and structuring the outsourcing arrangement
- Managing and monitoring the outsourcing arrangement
- Ensuring effective controls and independent validation
- Ensuring viable contingency planning



Board and Senior Management Responsibilities

- Ensuring outsourced activities are conducted in a safe and sound manner and in compliance with appropriate laws and regulations
- Approving institution-wide vendor management policies that mitigate outsourcing risk
- Reporting to the board of directors on adherence to policies governing outsourcing arrangements



Service Provider Risk Management Program

- Program should be risk-focused and provide oversight and controls commensurate with the level of risk
- Program is highly dependent on criticality, complexity, and number of material business activities being outsourced



Elements of the Service Provider Risk Management Program

- Risk Assessment
- Due diligence for the selection of service providers
- Contract provisions and considerations
- Incentive compensation review
- Oversight and monitoring of service providers
- Business continuity and contingency plans



Risk Assessment

- Determine whether outsourcing the activity is consistent with the institution's strategic direction and overall business strategy
- Identify the associated risks, and conduct a cost-benefit analysis
- Determine the availability of qualified and experienced service providers to perform the service on an ongoing basis
- Conduct periodic updates of the risk assessment



Due Diligence and Selection of Service Provider

- Depends on the scope, complexity, and importance of the outsourced services
- Evaluate the service provider based on the following key due diligence components
 - Business background, reputation, and strategy
 - Financial performance and condition
 - Operations and internal controls



Contract Provisions and Considerations

- Provisions that should be included, but are not limited to, in a contract:
 - Scope of services
 - Cost and compensation
 - Right to audit
 - Confidentiality and security of information
 - Default and termination
 - Business resumption and contingency plans of the service provider
 - Subcontracting

Incentive Compensation Review

- Institutions should consider whether incentives might encourage the service provider to take imprudent risks
- Inappropriately structured incentives may result in reputational damage, increased litigation, or risk to the financial institution

Oversight and Monitoring of Service Providers

- Appropriate staff expertise
- Risk-based monitoring
- Financial condition
- Internal controls
- Escalation of oversight activities



Controls and Independent Validation

- Clearly define expected security controls
- Develop performance measurements to assess the effectiveness of controls
- Perform independent validation of the service provider's control environment, including:
 - Financial review
 - Internal controls
 - Network security
 - Electronic funds transfer
 - Disaster recovery



Business Continuity and Contingency Considerations

- A financial institution's disaster recovery and business continuity plan should include critical outsourced services
- Assess the effectiveness of the service provider's disaster recovery business continuity plan and its alignment to the financial institution's plan



Other Considerations

- Suspicious Activity Report (SAR) functions
 - Complexity of outsourcing SAR-related functions due to the confidentiality of suspicious activity reporting
- Foreign-based service providers
 - Need to be in compliance with applicable U.S. laws, regulations, and regulatory guidance
 - Need to be considered with regard to foreign-based laws and regulations concerning the financial institution's ability to audit the foreign-based service provider

Other Considerations

- Internal audit
- Sarbanes-Oxley Act of 2002
 - Prohibits a registered public accounting firm from performing internal audit services for a public company client for whom it performs financial statement audits
- Risk management activities
 - Appropriateness of service provider's model

Examination Practices

- Vendor management reviewed in routine full scope examinations
 - Target examinations if specific concerns
- Risk adjusted examination expectations
 - Expect enhanced risk management for institutions with greater risk
- Issues findings if controls not commensurate with expectations for in-house activity
- Vendor management incorporated into risk management rating
- Information Technology vendor management also included in URSIT rating

Examination objectives

- Evaluate the quantity of risk in outsourcing arrangements

- Evaluate the quality of risk management
 - Service Provider selection process
 - Contract
 - Monitoring practices
 - Policies and procedures
 - Board oversight



What is the Guidance

- Consists of SR 13-19/CA 13-21 letter (Guidance on Managing Outsourcing Risk) and an attached policy statement on managing outsourcing risk
- Supplements existing guidance for technology service providers
 - Refer to the FFIEC Outsourcing Technology Services Booklet (June 2004) at <http://ithandbook.ffiec.gov/it-booklets/outsourcing-technology-services.aspx>
- Applies to all financial institutions supervised by the Federal Reserve

