Unit 1

Introduction to Fintech

Department of Computer Engineering

BRACT'S, Vishwakarma Institute of Information Technology, Pune-48

(An Autonomous Institute affiliated to Savitribai Phule Pune University)
(NBA and NAAC accredited, ISO 9001:2015 certified)

Objective/s of this session

- To Introduce FinTech and it's sub sectors
- To Explain the classification of various models of FinTech
- To Describe the innovation in FinTech
- To Introduce an innovative Fin Tech strategy
- To Study the development of FinTech Application and about future trends in Fin Tech

Learning Outcome/Course Outcome

- After completion of the course, student will be able to
- 1. Understand what FinTech is and the sub sectors that comprise it.
- 2. Classify various models of the Fintech
- 3. Illustrate various innovations done using latest technology trends in FinTech.
- 4. State the Critical Success Factors in Fin Tech.
- 5. Be able to adopt an innovative Fin Tech strategy within their own organization to lead a digital transformation project.
- 6. Develop the application using the concepts of FinTech as a case study

Unit I: Introduction to Fintech

Introduction, Financial Services and Fintech: Introduction, Changing Environment, Customer Centricity, Digital Transformation, Definition of Fintech, History of Fintech, Fintech stages, An Overview of Fintech Initiatives Around the World, Ecosystems, Ranking National Ecosystems, Downsides of Disruptive Fintech Initiatives.

Unit II: Model and Classifications

Introduction, Classification, Five Ws and one H : 1. Why a fintech initiative was born? 2. For whom was it born? 3. Which are the services it aims to provide? 4. Where does it aim to perform its business? 5. When does it aim to operate, within the framework of the financial cycle? 6. How is fintech working? The organization and its elements, The V4 business model framework, A Business Model, A Business Model for Fintech, Revenue—Focus on Customer Lifetime Value, Components of an effective marketing plan.

Unit III: Fintech Innovation

Introduction, Innovation and Fintech, Digital Transformation and Fintech, A model for an integrated innovation strategy, Types of Innovation : Product (or services), Process, Organization, Business models, Examples of Innovation, Fintech business model canvas, Process Innovation : Big Data Analytics, Value Creation from Big Data Analytics, Kreditech's self-learning algorithm, Internet of Things, Blockchain Technology, Organizational Innovation: Social Networks, Business Model Innovation, Robots, The V4 business model framework for Kreditech, Virtual Currencies, Technology Acceptance Model.

Unit IV: Critical Success Factors
The Model, Low-Profit Margin, Agility, Scalability, Security Management, Innovation, Ease of Compliance, Metrics, Fintech and Financial Services, Structure of fintech initiatives, The Challenges, Aspects to Consider, A Cooperation Model, Open Innovation
Unit V: Regulations
The Role of the Regulators, Equal Treatment and Competition, The Risks to Consider, Regtech, A Business Model for Insurtech Initiatives, Drivers of Disruption, The Impact of Technology, Insurance and Technology: Insurtech, Application of the Model to the Insurance Industry, The Empowerment of Customers, Mobility in Support of Insurance Companies, Digital Wholesale Insurance,
Unit VI: A Case Study
Introduction, Robotica, Business Model Canvas, The Value Proposition, Customer Experience, Channels, Processes and Activities, Resources and Systems, Partnership and Collaborations, Revenues, Costs and Investments, The Future: Financial Services as Platforms

Unit 1 Contents

Part A :

- Introduction,
- Financial Services
- Fintech: Introduction,
- Changing Environment,
- Customer Centricity,

Part B

- Digital Transformation
- Definition of Fintech
- History of Fintech
- Fintech stages
- An Overview of Fintech Initiatives Around the World

Part C

- Ecosystems,
- Ranking National Ecosystems,
- Downsides of Disruptive Fintech Initiatives.

So What is Fintech

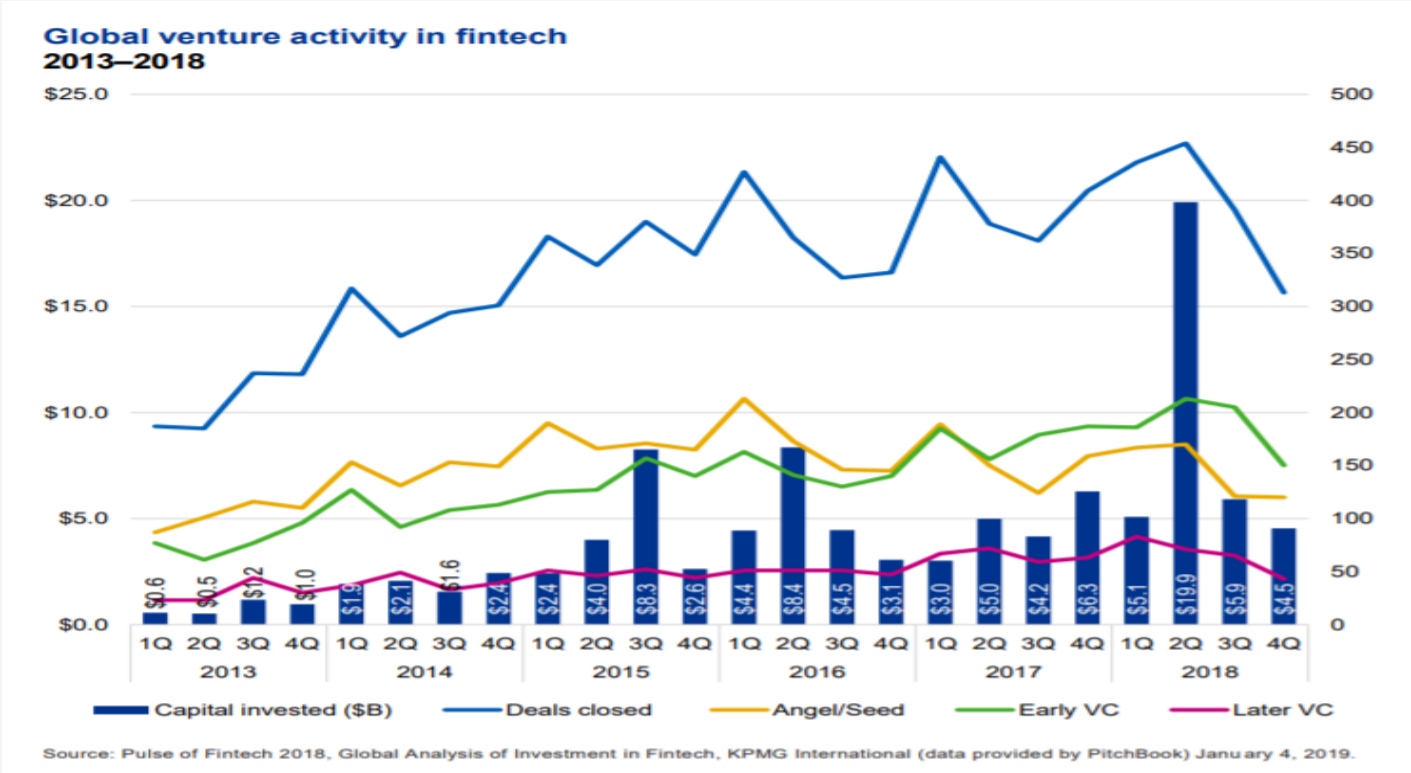
- Finance + Technology
- “New financial industry that applies technology to improve financial activities”
- Technologies, Methodologies, Companies, Business Models, New Services …

Definition

- Financial technology (abbreviated fintech or FinTech) is the technology and innovation that aims to compete with traditional financial methods in the delivery of financial services.
- It is an emerging industry that uses technology to improve activities in finance.
- The use of smartphones for mobile banking, investing, borrowing services, and cryptocurrency are examples of technologies aiming to make financial services more accessible to the general public. (https://empirica-software.com/fintech-companies-lending/)
- Financial technology companies consist of both startups and established financial institutions and technology companies trying to replace or enhance the usage of financial services provided by existing financial companies.

- **Here are the top fintech startups in the country:**
- Paytm.
- Paytm Money.
- PhonePe.
- MobiKwik.
- PayU.
- ETMoney.
- PolicyBazaar.
- LendingKart.
- MyWay
- Sharekhan

Number



Business Transactions Group (M&A(mergers & acquisitions)/PE(private equity)/VC(venture capital)

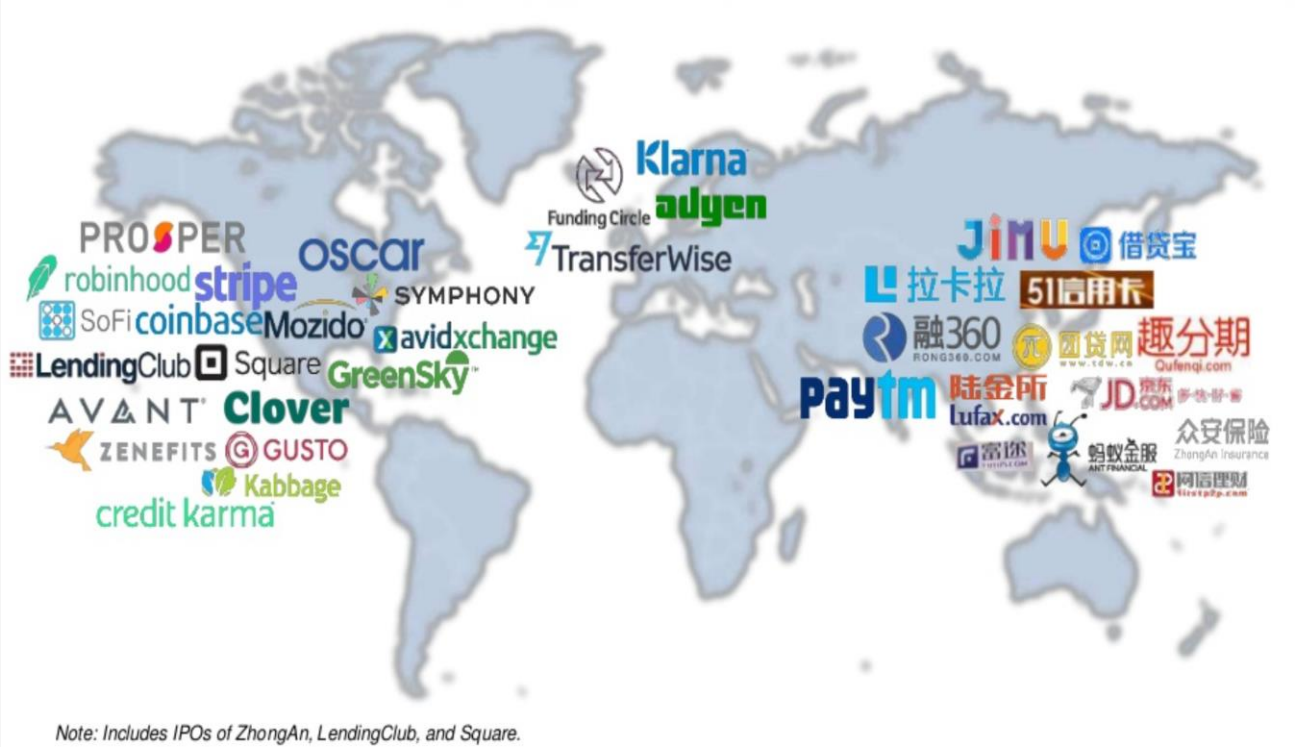
https://assets.kpmg/content/dam/kpmg/xx/pdf/2019/02/the-pulse-of-fintech-2018.pdf

- Global investment in financial technology increased.
- Then ascent financial technology industry in London has seen rapid growth over the last few years, according to the office of the Mayor of London.
- Forty percent of the City of London's workforce is employed in financial and technology services.

Numbers

- 26 Unicorns

Source: CBInsights



- Fintech technology has been used to automate Investment, Insurance, Banking Service and Risk Management
- The services may originate from various independent service providers including at least one licensed bank or insurer.
- In trading on capital markets, innovative electronic trading platforms facilitate trades online and in real time.
- Social trading networks allow investors to observe the trading behavior of their peers and expert traders and to follow their investment strategies on currency exchange and capital markets.
- The platforms require little or no knowledge about financial markets and have been described as disruptors which provide "a low-cost, sophisticated alternative to traditional wealth managers" by the World Economic Forum.

To be continued in next session

- Part A :
- Introduction,
- Financial Services
- Fintech: Introduction,
- Changing Environment,
- Customer Centricity,

Part B

- Digital Transformation
- Definition of Fintech
- History of Fintech
- Fintech stages
- An Overview of Fintech Initiatives Around the World

Part C

- Ecosystems,
- Ranking National Ecosystems,
- Downsides of Disruptive Fintech Initiatives.

Digital Transformation and Fintech

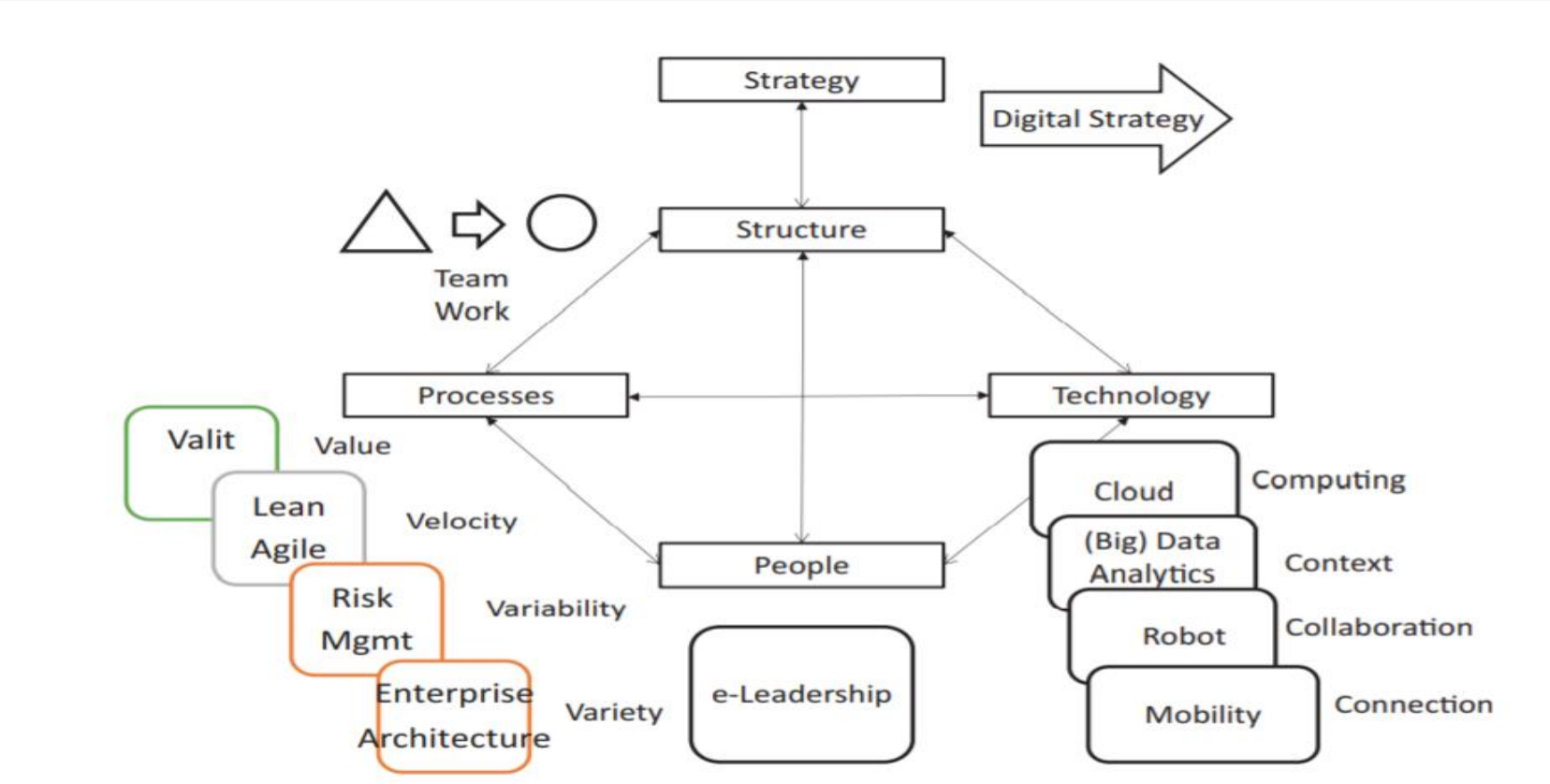
- A new application of digital initiatives, such as marketing
- A matter of using technology to drive business process innovation
- Nothing less than to be the Uber of taxi or the Airbnb of hoteling, and more

business' 4 Cs—context, customers, challenges and costs, and competitors—so that they can have a clear view of how digital transformation, technologies, and customer behavior can affect their organizations in the years to come

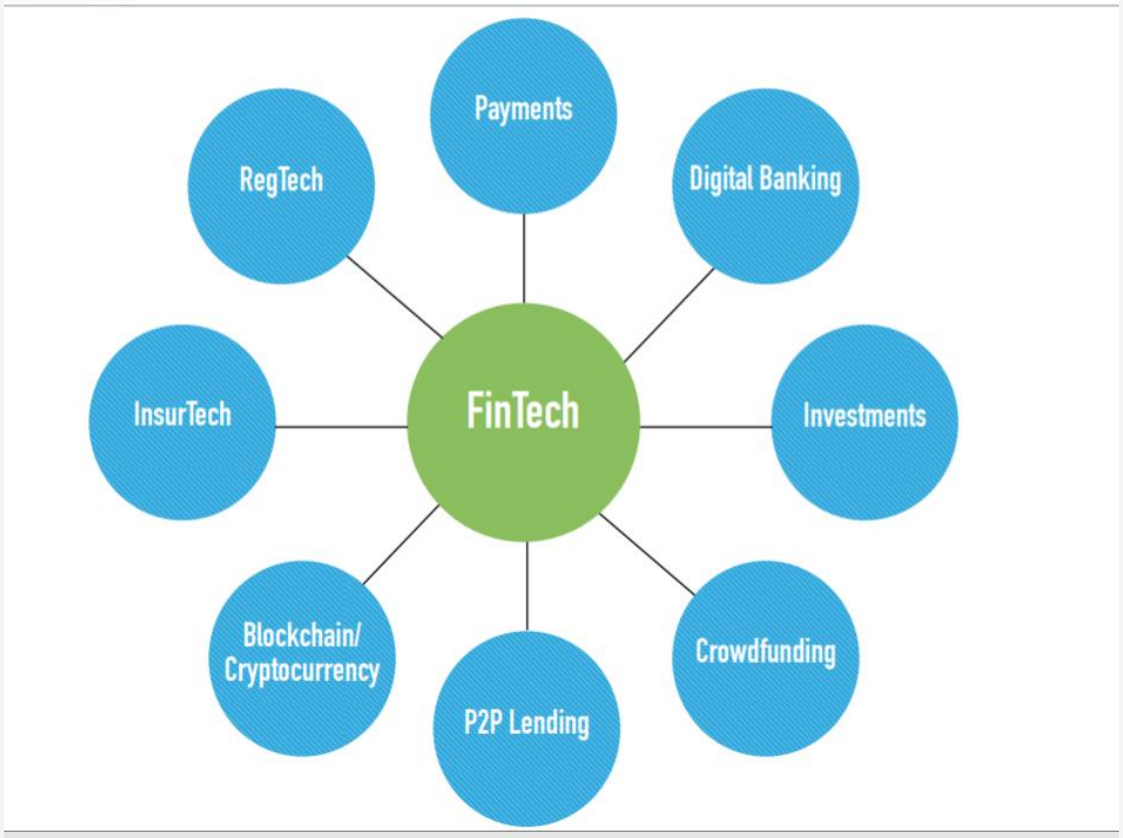
Digital Transformation and Fintech

- the digital transformation, it is important to look at the 3 Ps
- Products: The definition of services to be offered to the customers of the organization is really essentially.
- Processes: The introduction of new products needs to consider also the changes in the processes. The two goes together in an innovation.
- People: Finally yet importantly, people must deploy and deliver the innovation. Executives should devote to them a very strong consideration.

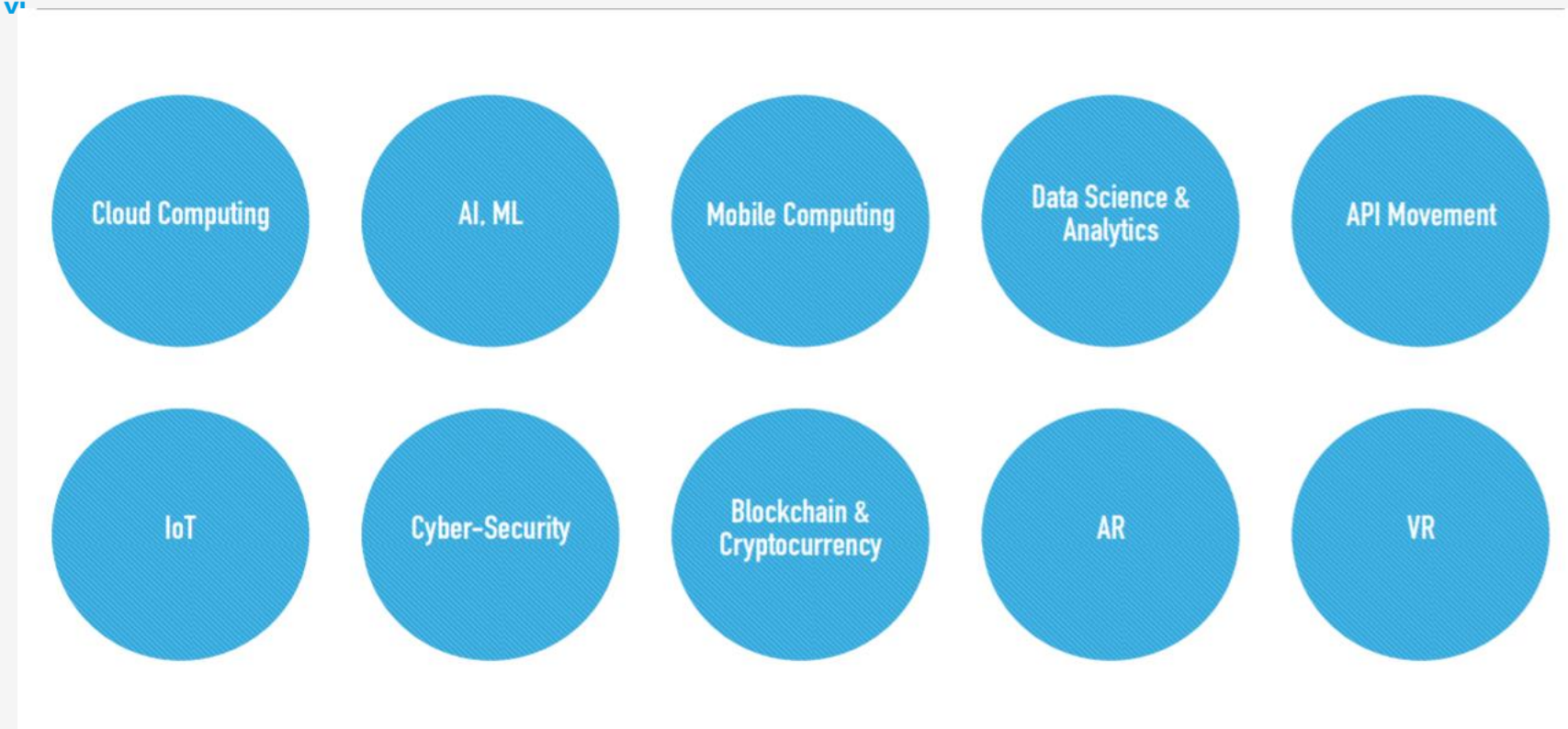
Digital Transformation and Fintech



Fintech Universe



Technologies



- The financial services industry, some of the used technologies include artificial intelligence (AI), big data, robotic process automation (RPA), and blockchain.
- Artificial Intelligence is a blanket term for many different technologies.
- In terms of the "fintech" industry, AI is used in various forms. AI algorithms can be used to predict changes in the stock market and give insight into the economy.
- AI is used to provide insight on customer spending habits and allows financial institutions to better understand their clients.
- Chatbots are another AI-driven tool that banks are starting to use to help with customer service.
- Big Data is another "fintech" technology that financial institutions utilize.
- In the finance sector, big data can be used to predict client investments and market changes and create new strategies and portfolios.
- Big Data can be used to analyze customer spending habits and therefore improve fraud detection.
- Big Data helps banks create segmented marketing strategies and can be used to optimize the operations of a company.

U.S Patents Related Fintech(2015)

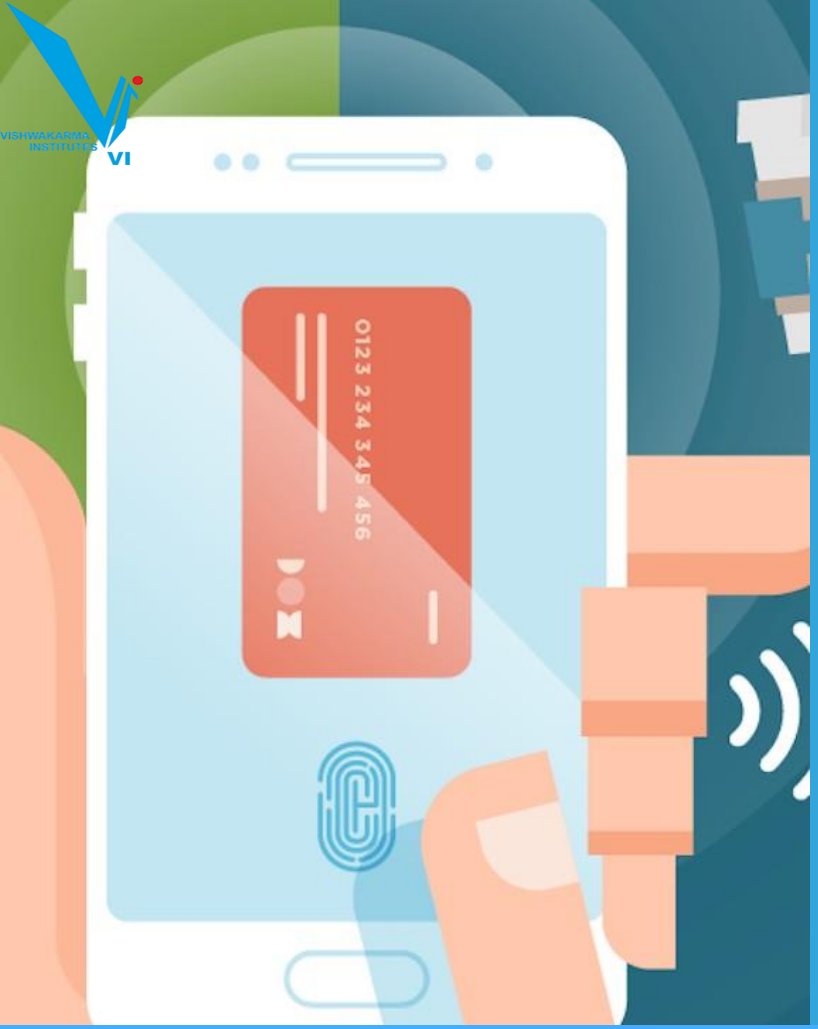
Financial Categories

Technology Categories	Payment	Banking	Wealth Management	Capital Market	Insurance	Lending
Data & Analytics	18,447 Hitachi (475) Sony (391)	8,736 Hitachi (360) Oki (353)	4,154 Shinhan Bank (85) Hitachi(68)	3,278 Daiwa Securities Group (91) MUFG (48)	2,679 The Hartford (163) Hitachi (46)	2,353 Shinhan Bank (91) Bizemodeline (77)
IOT	21,994 Hitachi (390) Visa (322)	6,738 Hitachi (200) Shinhan Bank (176)	2,708 Trading Tech Int Inc (43) JPMorgan Chase (40)	2,856 Hitachi (67) Trading Tech Int Inc (57)	1,443 The Hartford (37) Accenture (15)	1,957 Shinhan Bank (37) Bizemodeline (32)
Mobile Platform	16,426 Visa (654) MasterCard (257)	3,229 Visa (126) Shinhan Bank (93)	827 Bizmodeline (24) Woori Bank (20)	567 Mitake Co Ltd (19) Orbis Patents Lts (10)	609 The Hartford (32) State Farm (21)	763 Bizemodeline (30) Shinhan Bank (19)
Security	8,540 Visa (245) Hitachi (144)	2,602 Hitachi (111) Oki (82)	1,330 ITG Software (29) Goldman Sachs (28)	1,424 Hitachi (35) Goldman Sachs (33)	639 The Hartford (19) ITG Software (18)	790 Shinhan Bank (35) Freddie Mac (18)
Cloud Computing	4,585 Visa (107) Diebold (89)	1,365 American Express (44) Capital One (25)	984 GE (32) American Express (15)	612 Accenture (12) Blackbird Holdings (12)	556 The Hartford (39) State Farm (21)	516 American Express (23) Rawllin International (12)
Cryptocurrency	597 Bank of America (13) MasterCard (12)	113 PayPal (4) Sony (4)	57 American Express (4) Content Technologies (3)	28 Phone1 Inc (2)	15 Zynga Inc (4) Digonex Technologies (2)	58 IBM (3) Socolof Alex (3)

- According to Gomedici the US was the most active market for FinTech in 2015 – the most recent year for which information is available – with a total of 45,410 patents, followed by Japan with 16,978 and Korea with 9,902.
- In the same year, according to IAM Media, the top patent holders in FinTech were financial services organisations, such as VISA, at the top of the list with 1,342, followed by Bank of America, with 1,052 and Hitachi, with 1,048.
- 2018 IBM, is leading the way with 23,864 FinTech related patents.
- FinTech Fast Track Initiative was launched in Singapore early last year by the Intellectual Property Office of Singapore

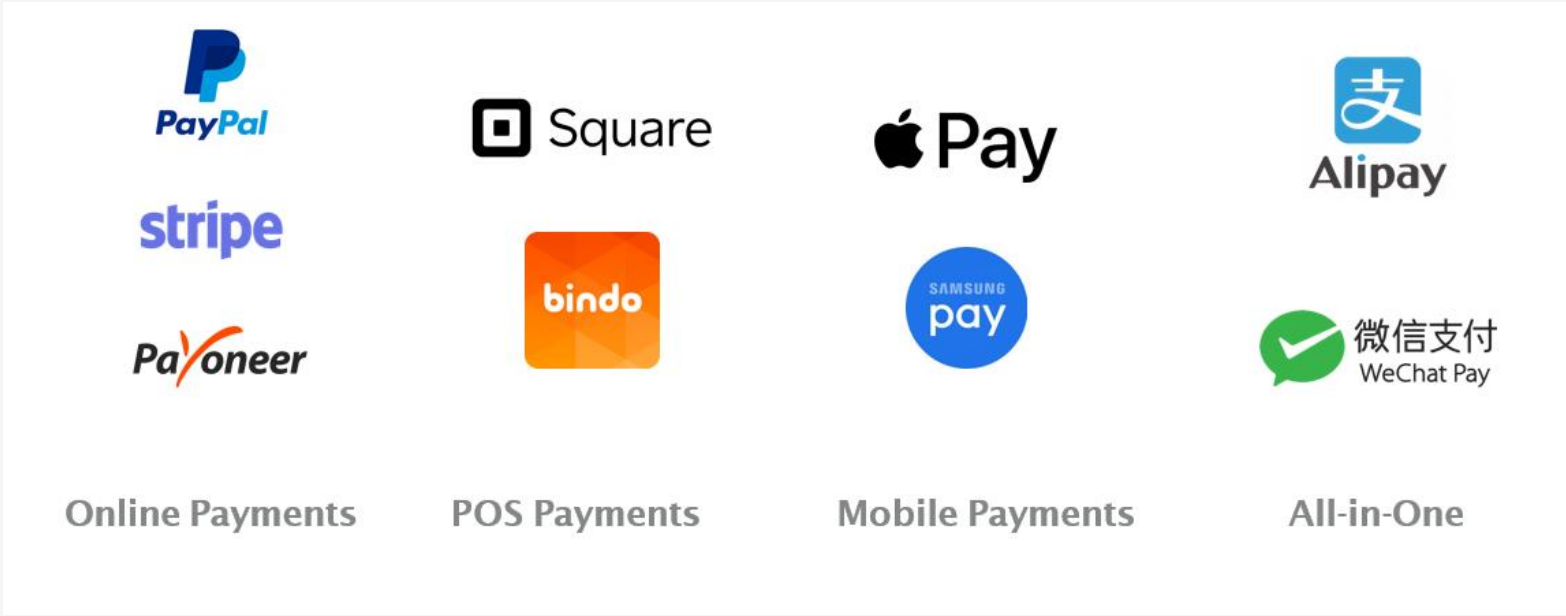
The top technology areas for granted patents in FinTech are:

- Finance
- Exchange, e.g. stocks, commodities, derivatives or currency exchange.
- Special adaptations for electronic funds transfer systems
- Banking, e.g. interest calculation, credit approval, mortgages etc.
- Investment, e.g. financial instruments or portfolio and fund management
- Insurance, e.g. risk analysis or pensions
- The FinTech landscape is continuing to grow and evolve



Payments

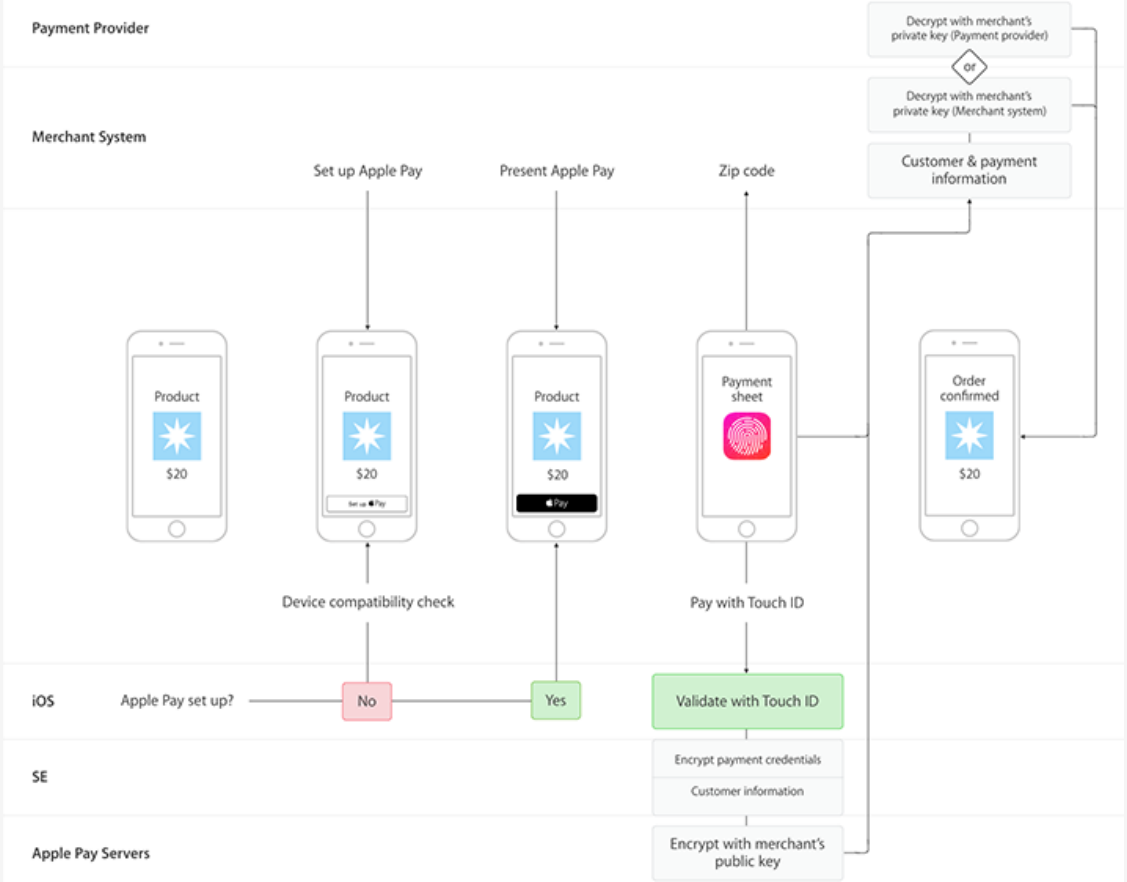
Payments


PayPal
Square
Pay
Alipay
stripe
bindo
SAMSUNG pay
Payoneer
微信支付
WeChat Pay
Online Payments
POS Payments
Mobile Payments
All-in-One

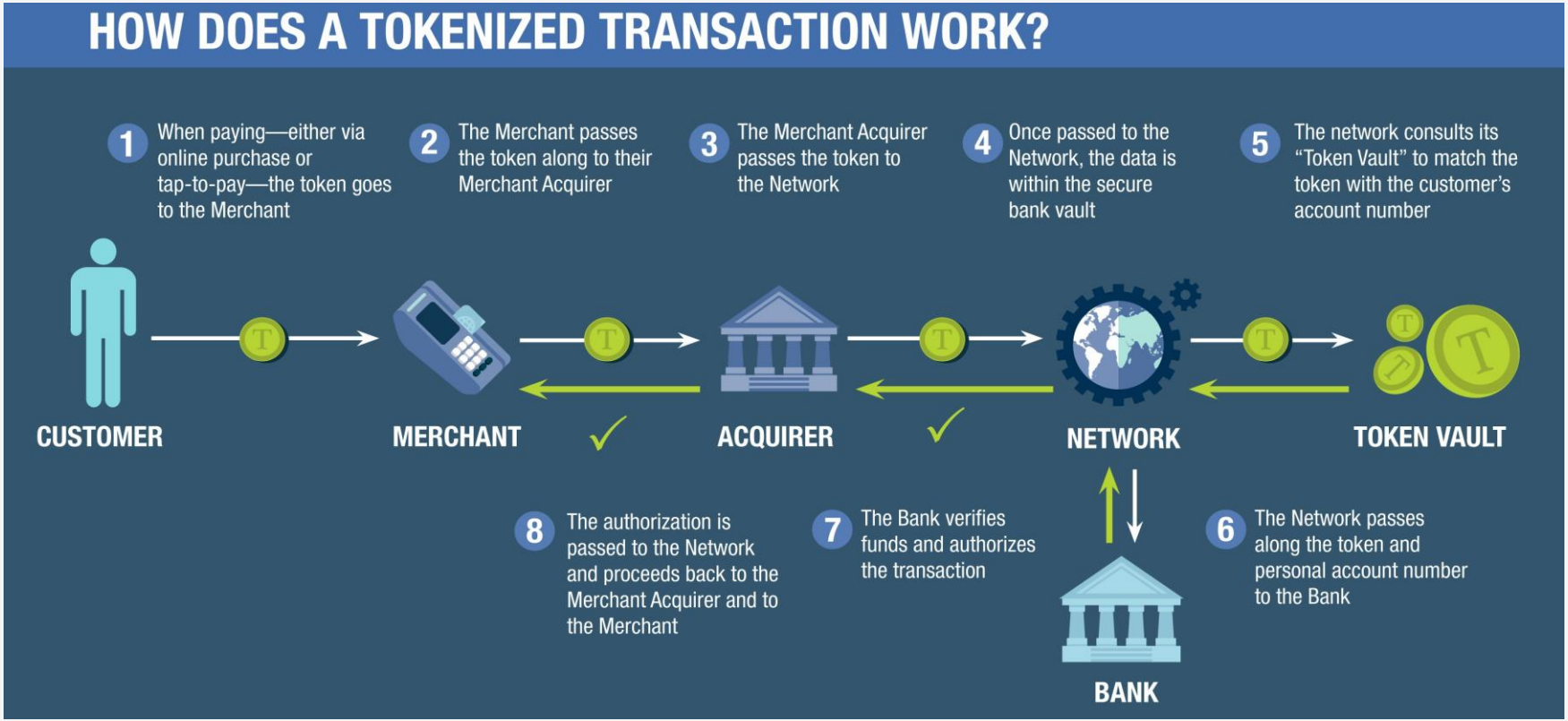
How does apple pay work

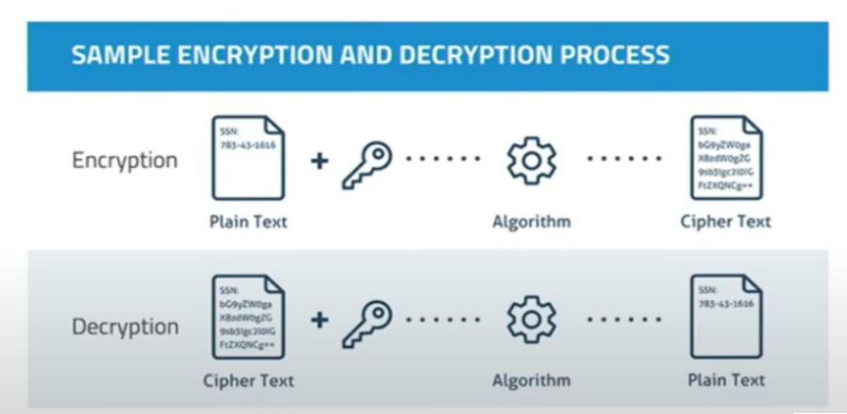
- No credit card information is ever stored on iPhone or Apple servers (even in encrypted form).
- EMV Payment Tokenization

https://www.tokenex.com/blog/emv-payment-tokenization

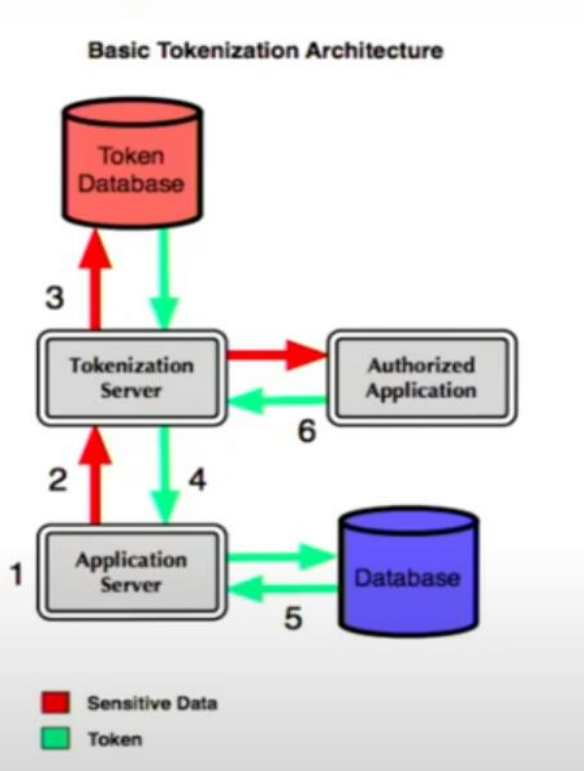


Tokenization




SAMPLE ENCRYPTION AND DECRYPTION PROCESS
Encryption
Plain Text
Algorithm
Cipher Text
Decryption
Cipher Text
Algorithm
Plain Text


End user
Arthur Watkins
SSN: 783-43-1616
Acct: 679364917
Data stored in cloud
Arthur Watkins
SSN: 866-99-9702
Acct: 509415876
Token vault
Plain text value
Token value
783-43-1616
866-99-9702
679364917
509415876

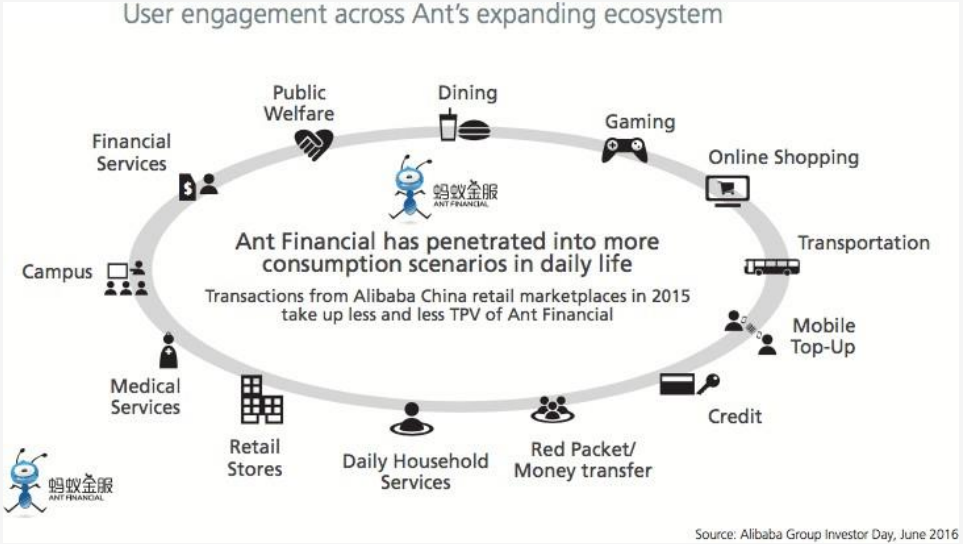


Several levels of authentication is required between the Authorize Applications and the Token Server:

- Bidirectional authentication using SSL/TLS handshakes to verify that the connection was established by a trusted party
- Validation of the user issuing the request

Data within the Token Vault is often encrypted

Cashless payment and beyond …



Digital Banking

Banking is necessary but banks are not

BillGates 1994

Still Banking ,But Better

- Money Deposits, Withdrawals, and Transfers
- Checking/Saving Account Management
- Applying for Financial Products
- Loan Management
- Bill Pay
- Account Services

Lending Players

citibank

FIRST INTERNET BANK

Capital For Bankers. By Bankers. Banking Solutions

招商銀行 CHINA MERCHANTS BANK

WeBank 微众银行

TEMENOS The Banking Software Company

Digital Banking

Virtual Banking

3-party Platforms/Vendors

Technology for Better Banking


Temenos
Get inspired by our clients
ABN·AMRO
UBS
CREDIT SUISSE
HSBC
cba
上海银行
Bank of Shanghai
Investec
Itaú
KBC
Openbank
Grupo Santander

Investment

Digital Wealth Management Evolution

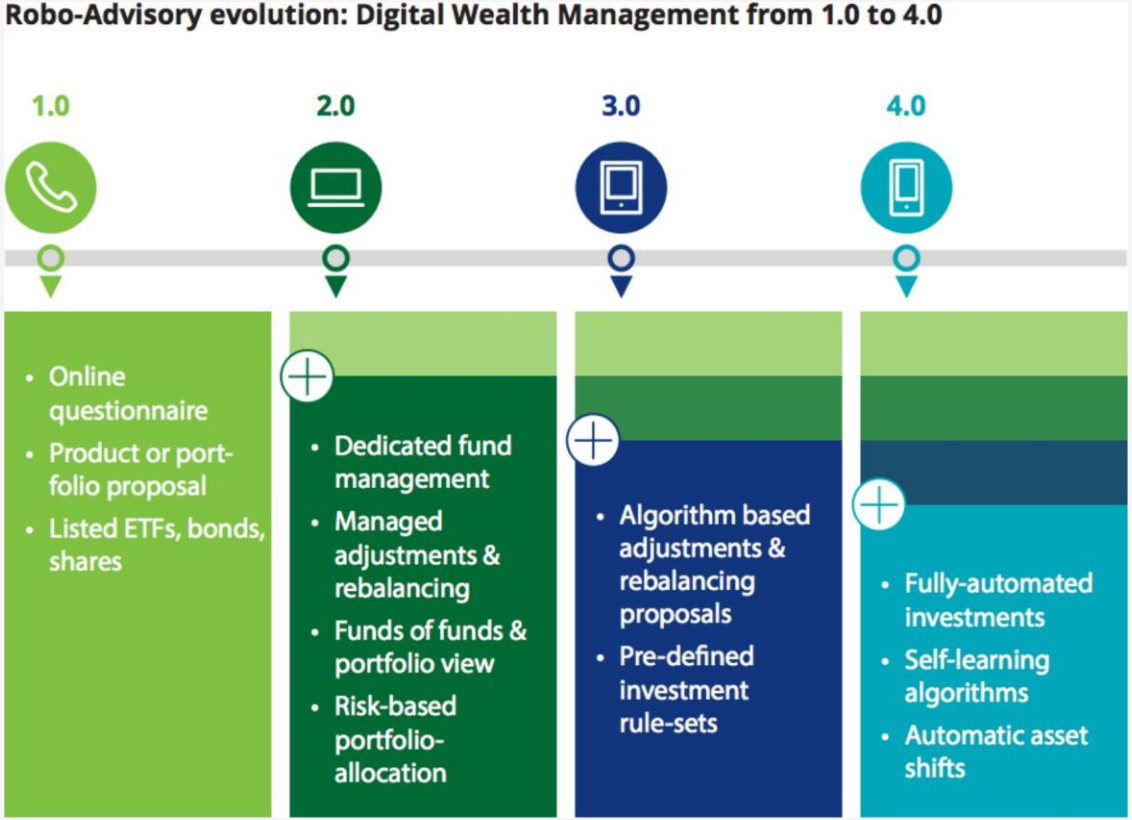
- Online portfolio management solution that aims to invest client assets by automating client advisory.

wealthfront

Betterment

intuit mint

robinhood



Robo Advisor Key Tech

Advise/Engagement

- Interactive UX
- Chatbot
- NPL
- Voice Recognition
- eKYC
- User Profiling
- eSignature/Contracts

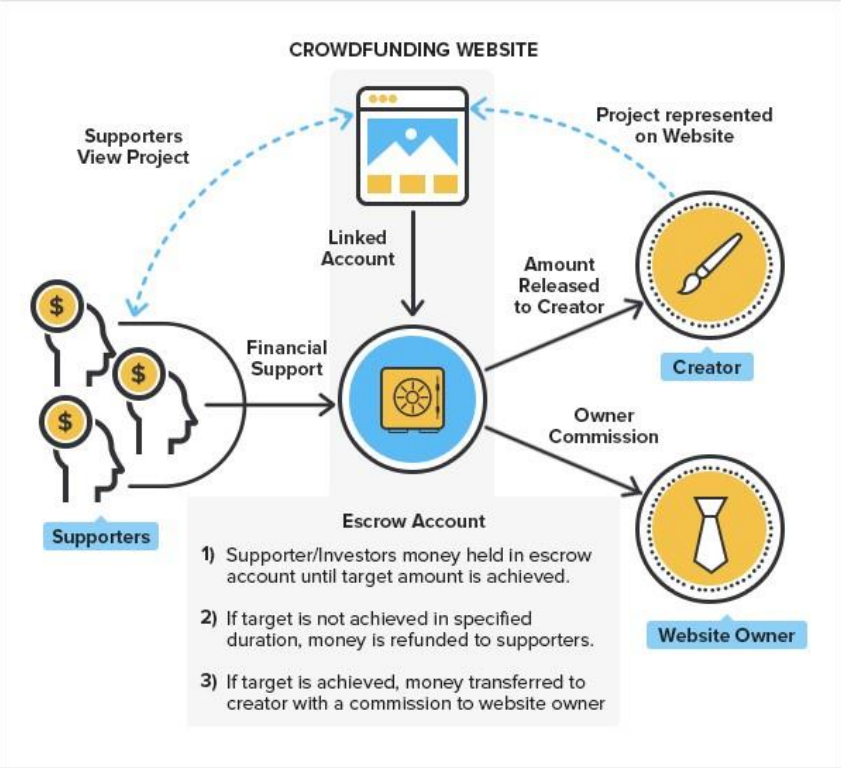
Asset Management

- Model Management
- Big Data
- Machine Learning
- Artificial Intelligence

Data Platform

Crowd Funding

Crowd Funding Model



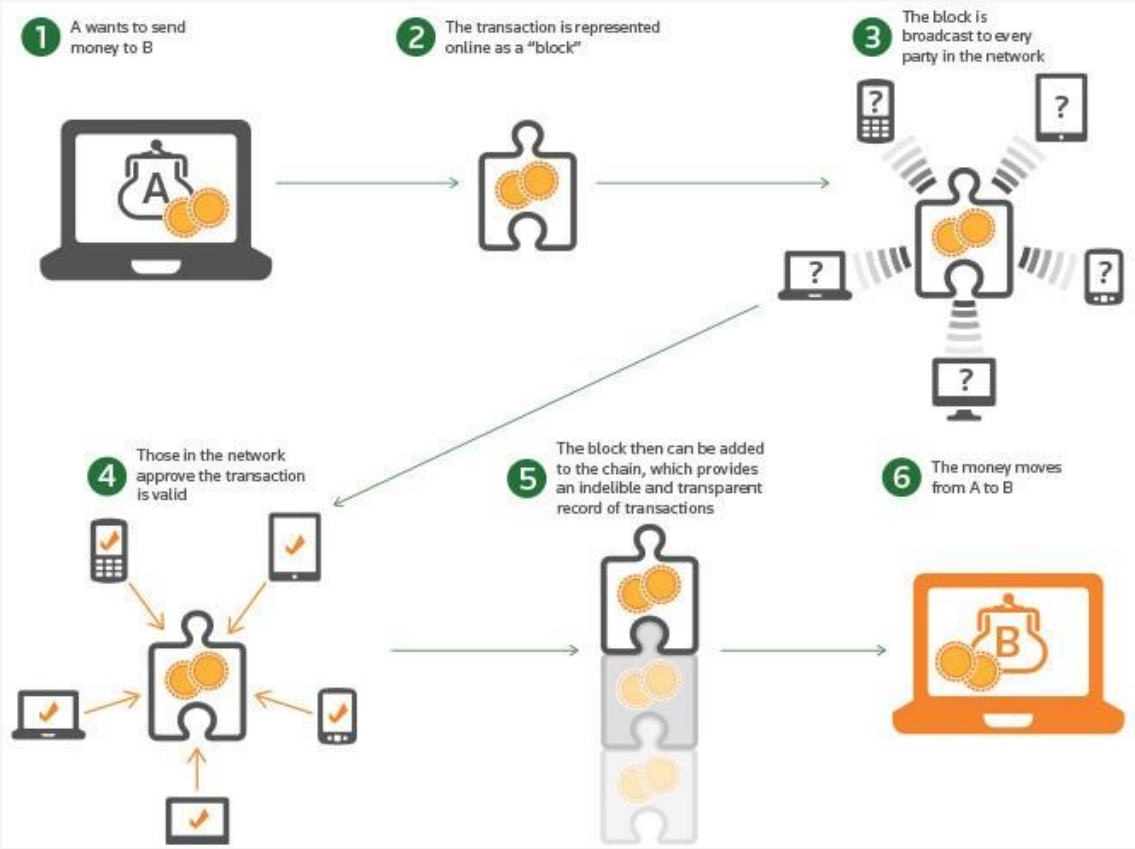
Source: FATBit

- Reward-based Model
- Donation-based Model
- Equity-based Model
- Lending-based Model

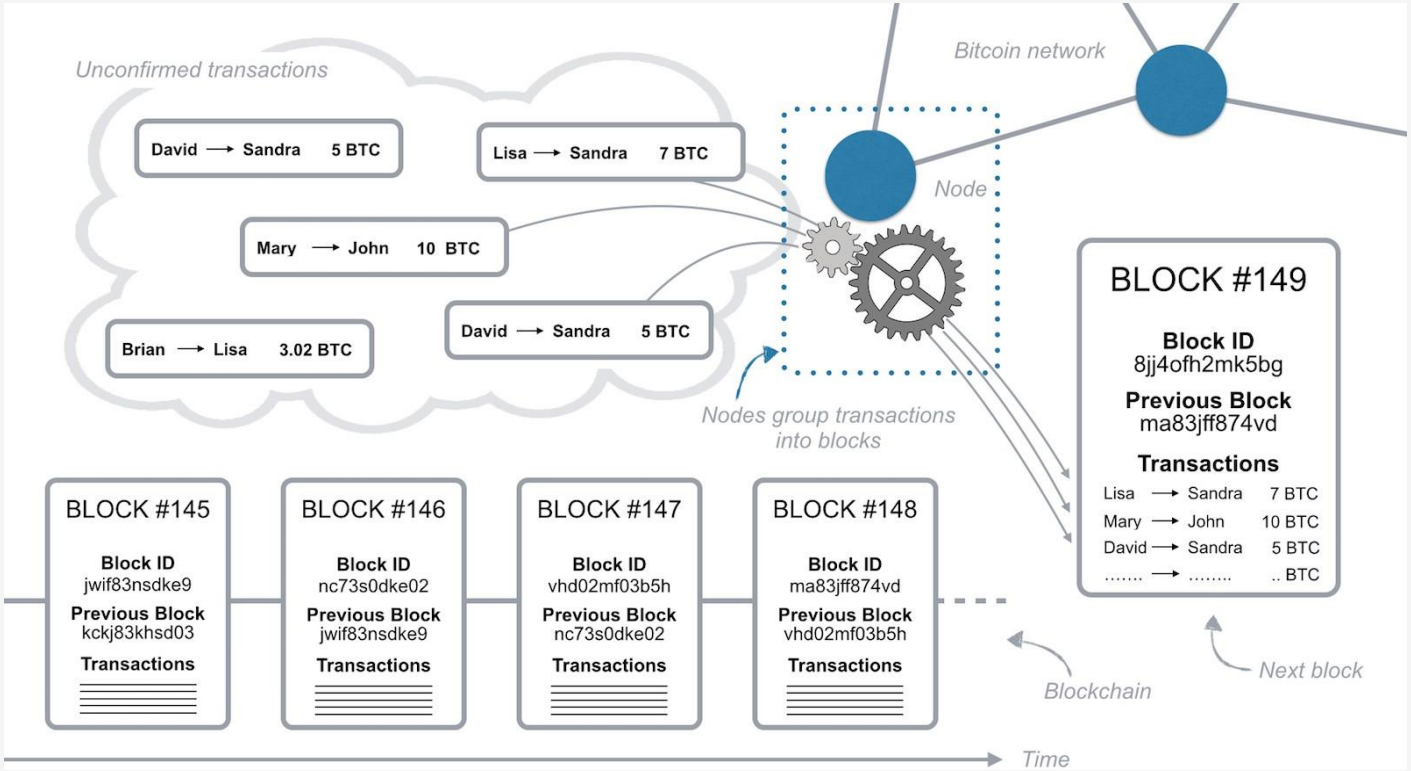
Blockchain/Cryptocurrency

Block chain Explained

- Decentralized
- Digitalized
- Cryptographically Sealed
- Consensus-based
- Chronological & Timestamped
- Distributed, public ledger



Block chain Structure



https://www.investopedia.com/terms/b/blockchain.asp

Broader Application

Insurance Tech

Insurtech Ecosystem

Regulation Tech

We the people want our money safer than our selfies

PayPal, 2014

Regulation Tech

Fintech stages

- The period of fintech 1.0.(around 1866 to 1967)
- 1967, the development of digital technology.
- 1987 at the latest, not only highly globalized, but also digitized. This period of fintech 2.0 continued until 2008.
- Since 2008, a new stage has started (fintech 3.0).
- Nowadays, industry 4.0 is a vision of an increased connection between physical and virtual industrial machines.

To be continued in next session

- Part A :
- Introduction,
- Financial Services
- Fintech: Introduction,
- Changing Environment,
- Customer Centricity,

Part B

- Digital Transformation
- Definition of Fintech
- History of Fintech
- Fintech stages
- An Overview of Fintech Initiatives Around the World

Part C

- Ecosystems,
- Ranking National Ecosystems,
- Downsides of Disruptive Fintech Initiatives.

FINTECH ECOSYSTEM

- The consultancy company Ernst & Young (EY) ranked the most relevant fintech ecosystems from a worldwide perspective. It identified four core ecosystem attributes, to which it is necessary to add “solutions” as the fifth one:
- (1) Demand (2) Talent (3) Capital (4) Policy (5) Solutions

(1) The **demand** attribute is the result of the synergies built between customers, financial institutions, corporates, and governments.

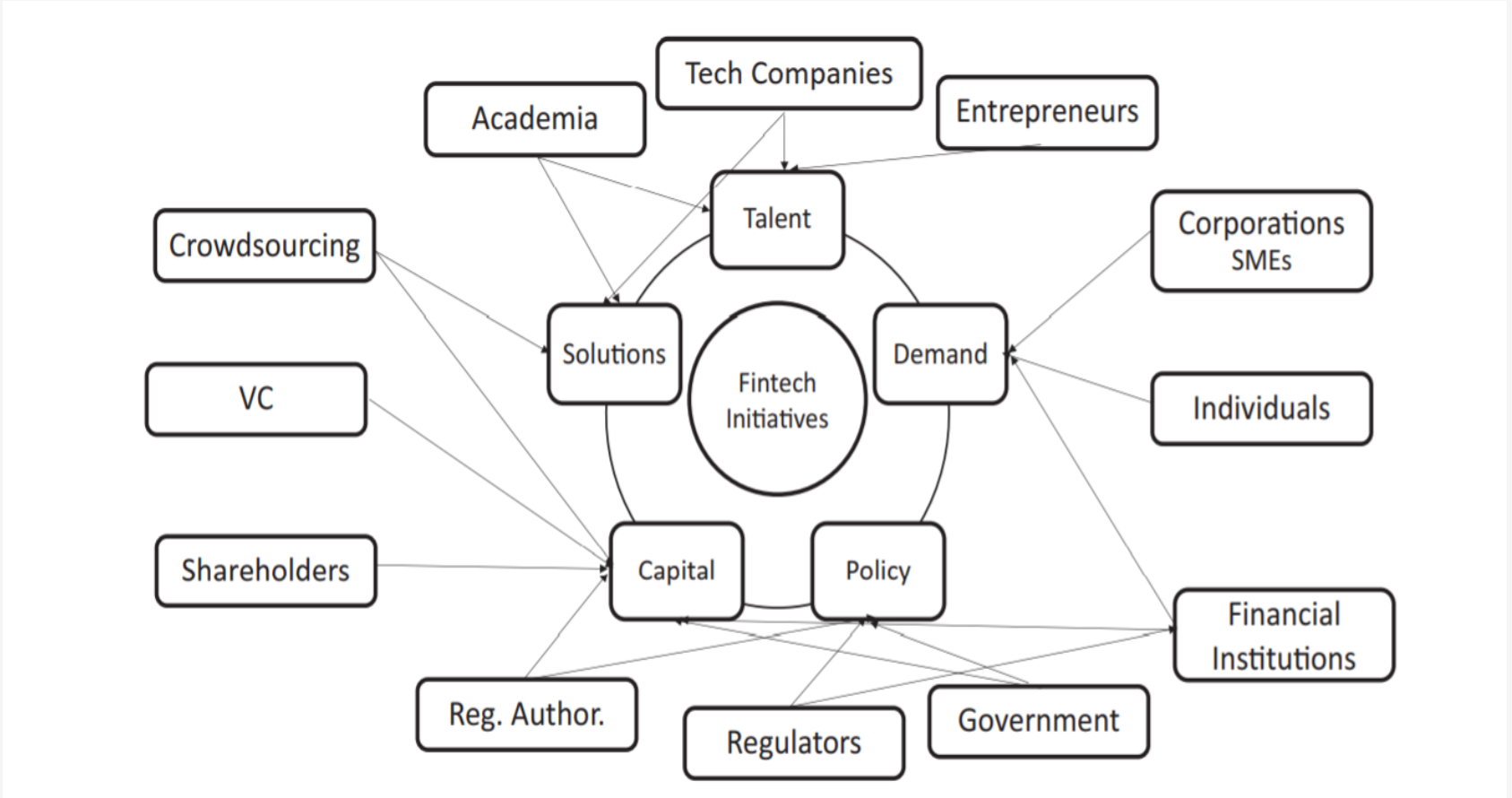
(2) The **talent** attribute depends on universities and other educational institutions, technology and financial institutions, and entrepreneurs operating their businesses in sectors with a high level of correlation with financial technology.

(3) The **solutions** attribute depends on the technological companies, the academia, and, potentially, on crowdsourcing.

(4) The **capital** attribute depends on three main categories of investors:

- angel investors, or business angels
- venture capital investors
- IPO (initial public offering) investors

- (5) The **policy** attribute refers not only to the specific policy environment but also to the effectiveness of the tax incentives and government programs: the ordinary stakeholders belonging to this area are regulators and governments.


Tech Companies
Academia
Entrepreneurs
Talent
Crowdsourcing
Corporations
SMEs
Solutions
Fintech
Initiatives
Demand
VC
Individuals
Shareholders
Capital
Policy
Financial
Institutions
Reg. Author.
Regulators
Government

Ranking National Ecosystems

- In Europe, $1.5 billion was invested in financial technology companies in 2014.
- Stockholm is the second highest funded city in Europe in the past 10 years.
- Europe's fintech deals reached a five-quarter high, rising from 37 in Q4 2015 to 47 in Q1 2016.
- Lithuania has issued 51 fintech licenses since 2016,
- Fintech companies in the United States raised $12.4 billion in 2018, a 43% increase over 2017
- In the Asia Pacific region, the growth will see a new financial technology hub to be opened in Sydney, in April 2015

- While Singapore has been one of the central Fintech hubs in Asia, start ups in the sector from Vietnam and Indonesia have been attracting more venture capital investments in recent years.
- Since 2014, Southeast Asian Fintech companies have increased VC funding from $35 million to $679 million in 2018 and $1.14 billion in 2019

Market Size

Table 2.1 Market size and investments of some regions

	Market size (Billions)	Investment (Billions)	Fintech staff
UK	$6.6	0.5	61,000
New York	$5.6	1.4	57,000
California	$4.7	3.6	74,000
Germany	$1.8	0.4	13,000
Australia	$0.7	0.2	10,000
Hong Kong	$0.6	0.05	8000
Singapore	$0.6	0.04	7000

Table 2.2 Fintech evaluation of some regions

	Talent	Solutions	Capital	Policy	Demand	Total
UK	4	3	3	4	4	18
California	4	4	4	2	3	17
New York	3	2	4	1	4	14
Singapore	2	1	1	4	2	10
Germany	2	3	3	2	2	12
Australia	2	2	2	3	1	10
Hong Kong	1	2	2	3	3	11

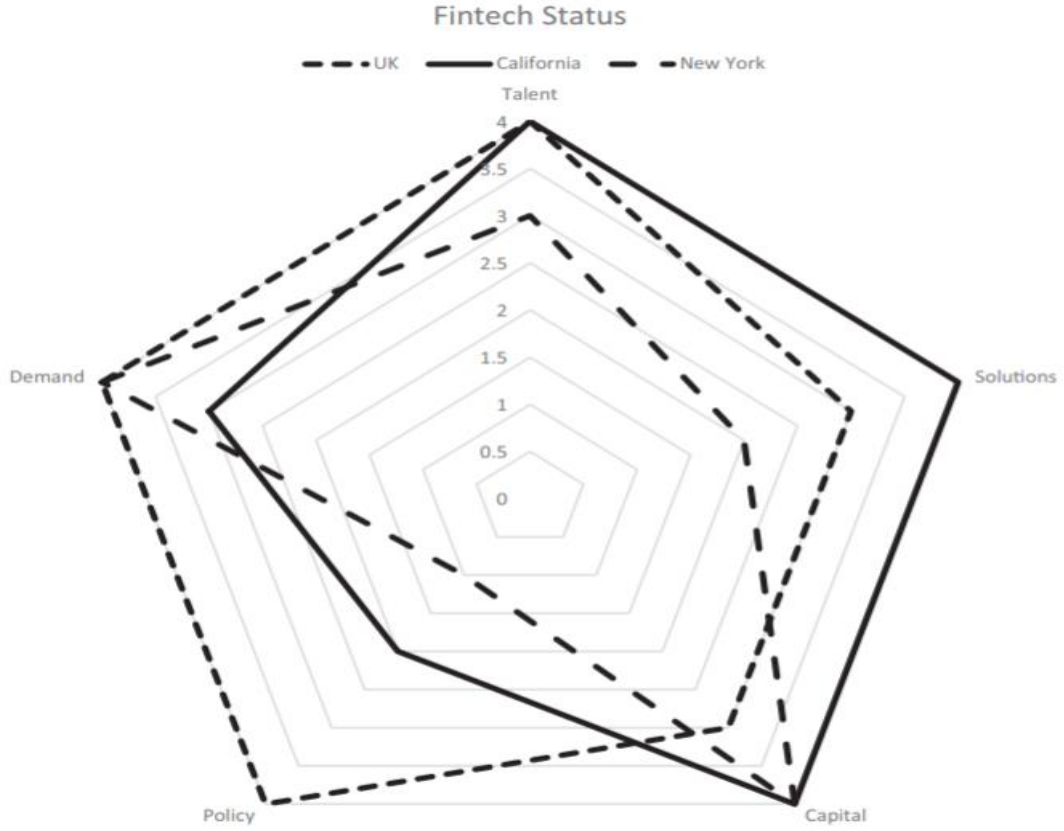


Fig. 2.2 Status of Fintech in different regions

Downsides of Disruptive Fintech Initiatives

- In the case of fintech initiatives:
- There are new risk exposures with fintech initiatives.
- Financial services and market providers generally consider themselves fortresses.
- Virtual door to similar activities.
- As the technologies advance, so too do hackers' abilities and resources.
- The nature of attackers has grown.

Downsides of Disruptive Fintech Initiatives

- Deep risks connected with regulations .
- Technology generally helps to go beyond traditional national borders.
- National borders are less relevant from a technology point of view, but regulatory agencies on all sides are keeping a close watch.
- International sovereignty aspects, legal jurisdiction, customer data protection, and taxation.
- Risk management on their agenda currently are a perceived barrier to fintech initiatives

Downsides of Disruptive Fintech Initiatives

- There is a cultural challenge on how traditional financial institutions accept technology Without fintech innovation.
- Rrisk losing competitive advantage by allowing their financial environment to become non-competitive in the global marketplace.
- For example, the South Korean government realizes that fintech initiatives are changing the nature of financial services.The industry there is highly regulated, and the government worries about the viability of its existing banking infrastructure going forward.

Reference

1. B. Nicoletti, The Future of FinTech, 1st ed. Palgrave Macmillan, 2017
2. Financial technology – Wikipedia
3. Albert Wang CTO, LionRock FinTech FINTECH: OVERVIEW