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# Banking and FinTech (Financial Technology) Embraced with IoT Device



G. Suseendran, E. Chandrasekaran, D. Akila and A. Sasi Kumar

**Abstract** In recent years the traditional financial industries have motivated for a new technology of financial technology (FinTech) which embraced with internet of things (IoT). The requirements of FinTech and IoT need to be integrated into new business environment. Several companies are affected because of the financial-level investments. So, there is a need to improve the next level of the business. FinTech can introduce a new service of tools and products for the emergent businesses through the internet of services which provide ideas linked in internet. Nowadays, increasing number of companies uses the IoT and creates new added values. The administrators of existing money-related organization in the direct society are dreadful by means of budgetary innovation. The social innovation is accomplished by new innovation. To make a powerful business plan and action, the FinTech and IoT are combined in order to create new innovative ideas based on the requirements.

**Keywords** FinTech · IoT · Innovation · Business model · Cyber security · Banking

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# 1 Introduction

The current generation is surrounded by smart phones, which connect devices working from home, public places and office, colleges, schools and everywhere. The consumers use this opportunity to work smarter with the help of internet of things (IoT). Banking, finance and insurance companies are easily embraced with IoT devices. The banking and financial sectors create a new way of collecting the valuable information about the customer through IoT sensor devices using smart phones. FinTech is similar to electric vehicle innovation which works with capital valuation, trading, investment and asset valuation, and provides new improving accounting systems when compared to existing financial technology. Financial engineers handle hundreds of millions of datasets. It is not easy for them to maintain all the data. So FinTech is adapting to a larger field of the IoT and will transform all the customer information to cloud using IoT devices. Most of the banking and financial sectors can rapidly improve in e-commerce by connecting cloud business through the profitable offerings of business tactics, where the cloud is stored with a lot of customers' data. In recent years, all the banks are communicating with the customer through smart phones, social networks and any new sensors, in financial technology to create some new industries [1].

## 1.1 *IoT-Aided Banking Services*

The internet of things is a big approach in financial services. The IoT connected to the concerned bank through the internet will send and receive data that are stored in cloud. Figure 1 explains the details of the customer, bank and IoT transactions [2].

Around the world, billions of devices are connected with each other. These devices share the information on the cloud with the permission of the bank and allow the entire customers to view the account details and provide access power while using smart devices. It is the easiest way of communicating with the customer and also conveying the personal information through messages and alerts awaiting works.

## 1.2 *Benefits of IoT in Banking Services*

The most important benefit of IoT in banking services is providing the credit and debit cards for easy access of the services of the banks. Also, the bank can analyze the usage of ATMs in the specific area to increase and decrease the installations of ATMs. While using IoT device, all the customer information are stored in the devices. So, the bank uses this opportunity to help in identifying the customer's business needs, like supplier, retailer and distributors [3]. Figure 2 shows the details of the bank providing valuable services to a customer.

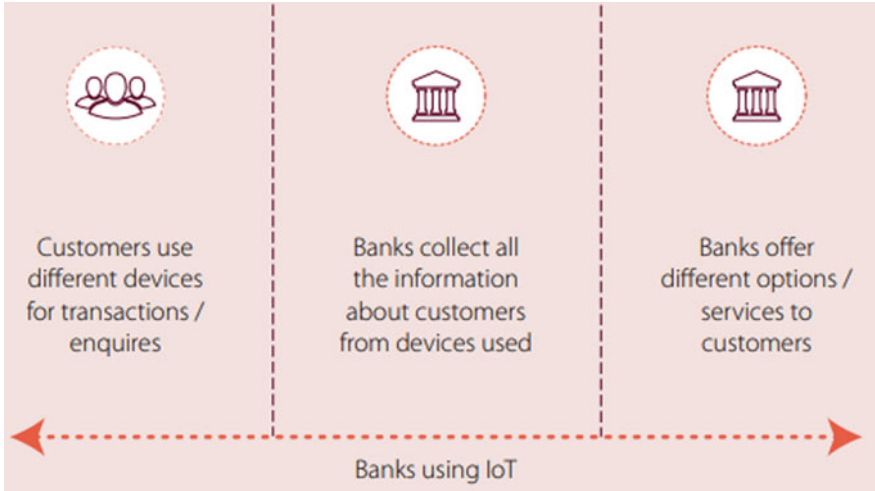
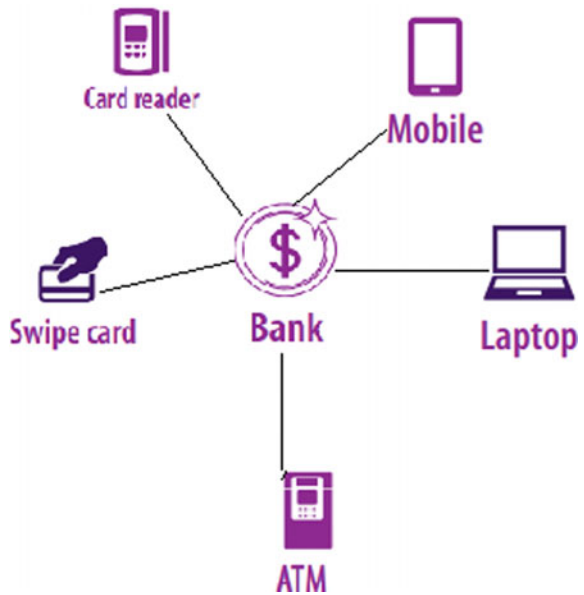


Fig. 1 How to connect customer, bank and IoT devices

Fig. 2 Bank providing valuable services



## 2 Cyber Security in the Banking and FinTech on IoT

The banking and financial industry is the main target of cyber attacks. In this network world, personal data are easily accessed by the attacker. So, cybercrime is feared all around the world today. We will protect the cyber security in the banking and FinTech services industries. In Fig 3 IoT connects device through the internet and then connects to the FinTech, cloud, machine learning and industrial productivity.

### Cyber Attack

Cyber attack is a careful mistreatment of a computer system, technology and networks. The hacker uses malicious code or software to alter the system and secrete code that can compromise the data to cybercrimes, such as health care documents, banking accounts details and hacking lock of the system.

As we are increasing the use of IoT connecting devices in the banking sector, the risk of cyber attacks also increases. The IoT connecting device communicates, analyzes and presents some new ways for technology. It is not only the data but other kinds of sensitive information are also shared through the IoT. Hence the risks are exponentially high [4].

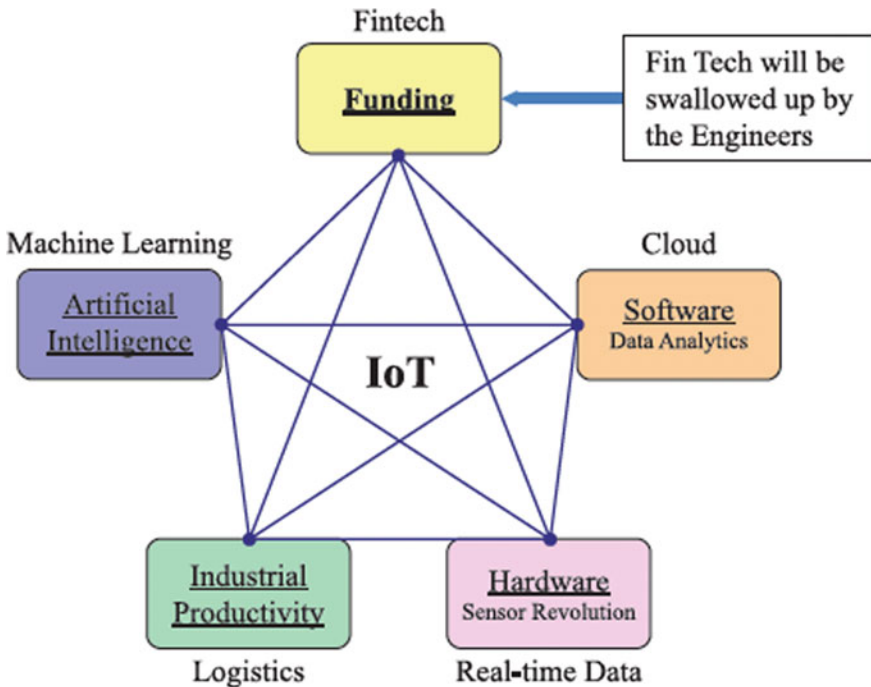


Fig. 3 Internet of things

**Unencrypted Data**

The data breach happens due to improper encryption, and the stolen data have immediate access.

**Unprotected Third-Party Services**

The internet services are an extremely worldwide connector; therefore, the cyber attacker can easily access the data of the targeted user, because third-party services are unprotected.

**Unsecured Mobile Banking**

In recent years, mobile banking users have increased. Using this opportunity, the mobile hacker accesses the data due to small computation time. For securing the data in mobile banking, a cryptography method of encryption and decryption is used.

**A Constantly Changing Treat Landscape**

In the past few years, cyber threat landscape has changed the financial services. Cybercriminals must change the low-value payment into high-value payment. So, a number of breaches affect the financial sector.

**False-Positives**

Anti-money laundering (AML) monitoring system is false-positive. The issue will point out the fake activity accessing time and calculated with the help of an analyst.

**The Big Breach**

The huge volume of financial data is increasing the risk on customers' security from hackers and cybercrime as it occurs at the night time. So beware of the breach in banking sectors.

These are major cyber security threats in banking and FinTech [5].

### 3 Challenges of Banking and Financial Institutions

Mainly four challenges are faced by banks and financial industries which respond consumer expectations, heavy competition on financial companies, regulatory pressure and not making enough money [6, 7].

i. **Not making enough money**

Many of the banks run on unprofitability because the financial industry is still not making enough return on investment.

ii. **Consumer expectation**

Many bank employees are feeling at most pressure because the expectations of the consumer are high. To maintain the standard they need to work hard which leads to the pressure.

iii. **Increased competition from financial technology companies**

FinTech companies is using the start up business to provide financial services to technologies. FinTech is a big challenge because of using a traditional banking system. They can change the modification and technical operation quickly, and another backup process is handled.

iv. **Regulatory pressure**

The bank requirements are continuously changing and because of that banks invest a lot of amount in some other business. So, the system processes to keep up with the higher goal requirements.

## 4 New Tools and Product for FinTech Sector

Traditional financial sectors are lacking because of some redundant files and were forced to move with the new tools and new products. With the advantages from new technologies, which are requirements, design and modeling, investments and delivery models are merged with IoT through the internet facilities. Table 1 lists out the new tools and products that are developed and developing in the financial sector. In 2018, 15 top Indian financial markets had radical transformation by technology and innovation in India. The FinTech sector in India with USD 1.2 billion in the year 2016 is expected to touch USD 2.4 billion in the year 2020. **MobiKwik**—Indian digital wallet company, **Capital Float**—digital financial company serving businesses, **Bank Bazaar**—online marketplace for bank loans, credit cards and insurance policies, **Incred**—web-based financial services, **PolicyBazaar**—online insurance aggregator, **Fino Payments Bank**—providing a

**Table 1** New tools and product of FinTech company [9]

S. No.	FinTech sector	New tool	New products
1	Banking	Improved loan risk Monitoring Emp Debt Profit Analysis of SMS lending Financing failing applications	Record keeping with sensors Factoring and leasing Trade finance and energy finance Security for accounts Goolglization of accounts
2	Wealth management	Real-time IoT data for stocks IoT as main source for ideas IoT replaces bond derivatives	Telematics as a metric for start ups Link health monitor to wealth management Data to profit customer
3	Insurance	Insuring in high-risk areas Sensors data for smart payload Unbiased vehicle data	Pricing assets in risk-prone areas Accurate pricing product liability Weather detection reduces claims
4	Capital market	Leveraging IoT for crowd investing Block chain IPOs	New commodity data streams New banks for public access to capital

technology solutions for institutions like banks, governments and insurance companies, **CCAvenue**—popular payment gateway, **Razorpay**—a product suite that manages the entire payments lifecycle for all business are the topmost FinTech companies in India [8].

## 5 Use Cases of IoT—Digital Future

In banking, IoT is interconnected with connecting devices; the system that provides services does machine-to-machine (M2M) communications and is connected to lot of protocols, domains and applications. The IoT has impacted the traditional financial process such as trade financial, payments, personal financial management (PFM) and insurance [10]. There are many use cases that can be implemented in banking in the period ranging from small to long term (Fig. 4).

### 5.1 Account Management on Things

Biometrics (voice/touch) can make the accounts’ access anywhere simpler through the digital channel. Using the new technology called Wet Ink, the customer can sign in remotely through any touch screen gadget and can be marked promptly onto physical paper with Wet Ink.

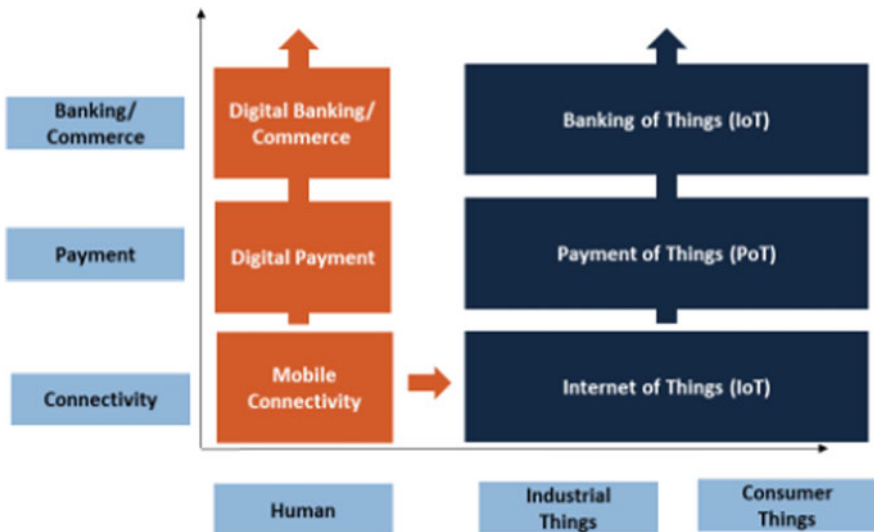


Fig. 4 IoT enabling banking of things in digital future



## ***5.2 Leasing Finance Automation***

New daily leasing models have enabled the digital assets worldwide and are effectively turning the traditional products and its services. For delineations, the rented resources could be bolted or debilitated remotely by the bank.

## ***5.3 Smart Collaterals***

An IoT device can empower the money-related banks to all the more likely command over client hypothecated resources, for example, observing their wellbeing, autos and home. Financial offerings such as manufacturing machinery, cars, building home loans as collaterals are provided in short term and can be done in a digital way automatically. For representations, in the event of EMIs are not paid, the motor can be impaired and the nature of security can be observed continuously.

## ***5.4 Automated Payment Through Internet of Things***

The traditional banking of payment transaction is automated and integrated of services. IoT can raise some conditions on security concerns and digital security in payments. So, the customer can do the payment transaction automatically like one bank to other bank or one bank to other companies.

## ***5.5 Risk Mitigation in Trade Finance***

High estimation of products are utilize the RFID monetary space. With the help of IoT the shipments including the delicate merchandise are monitored for example, restorative atoms. These executions of the hazard are relief and more educated choices at banks for including exchange back.

## ***5.6 Wallet of Things***

Wallet is associated with each device, where more devices have become digital and smart and that all banks have automated payments through IoT. For example, upkeep administrations utilizing wallet automatically can be stopping the payment transactions.

## 6 International Global Fintech Benchmark Report 2017

An international global FinTech benchmark report led an online review on FinTech chiefs from monetary establishments around the globe. An in-depth interview was conducted among senior executives from leading FinTech companies (Fig. 5).

FinTech technologies will come to emerging with Amazon, Google and business-based platforms by the next three years. From overview reacting investigation and huge information be arranged anticipated that would a large portion of consideration. 76% of back up plans, 65% of banks and 58% of advantage administration organizations are positioned the information examination as one of the best most FinTech advancements. Moreover, application programming interface advancements and mechanical autonomy and robo-guides are positioned in the high range of the world wide. Figure 6 shows the rising of FinTech with more enthusiasm in the upcoming next three years [7].

Insurance companies are more intent towards IoT because all valuable information and pricing are provided to the customer. The IoT connecting with the insurer person and his information from risk partners. On the off chance that any

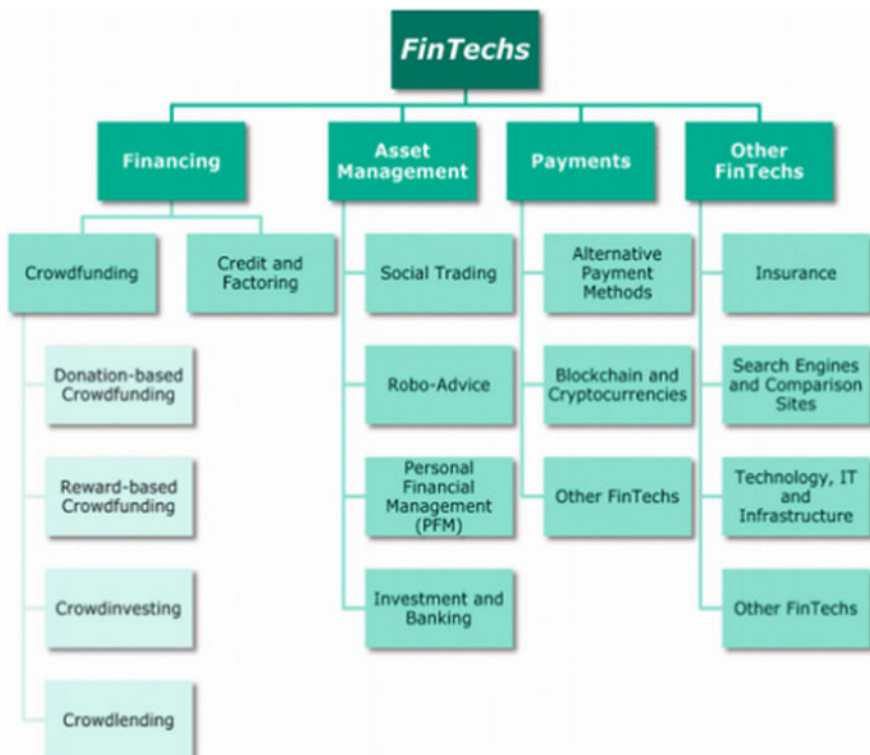


Fig. 5 Segments and elements of FinTech

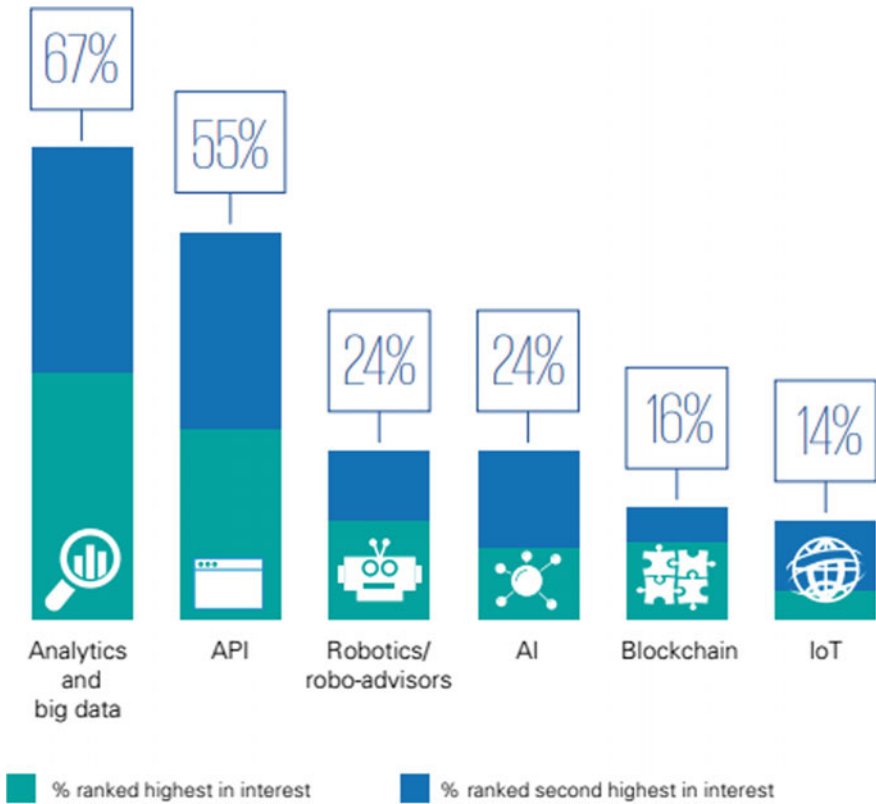


Fig. 6 Emerging FinTech in next three years in the field

mishaps to giving security after the occasion as a case. 36% resource administration organizations additionally positioned man-made consciousness as a best of advancements of intrigue. Safety net providers have more grounded enthusiasm for advances identified with IoT at that point banks or resource administration organizations.

In the course of recent months, the square chain has essential measurement of consideration. It was anticipating the high positioned organizations in the benefit administration. But, it was just 35% positioned zone intrigue.

## 7 Analysis and Discussion

For this part of work all information and data are collected from various research articles and magazines, and these data were discussed and investigated in this section. We divided the analyses into two categories: the first part is the status of

FinTech block chain and crypto currencies. EU, USA and India have how alternative payment methods and investment are to be demonstrated. Banking is providing positive characteristic as well as negative characteristic using FinTech global financial service sector elements [11].

### ***7.1 FinTech Current Status and Positive Characteristics***

FinTech is an imperative piece of open monetary administration segment. It gives information on monetary and keeping money of conventional individuals. The prospect getting diverse sorts of money related administrations. The fiasco and the wretchedness in all the three locales, for instance, the EU, USA and India, did negative effects and impacts on the advancement and interruption in the monetary administration sector [12].

The new FinTech companies are using block chain innovation that has given the opportunity and benefits for more money transaction related administrations. The term digital revolution was reported by Accenture in 2015.

According to Table 2, the Luxembourg is in the top position in digitalization index of 1.00 and USA has 0.92 in digitalization index, which means this is closing to reach the full potential value, and EU also has the average range digitalization value of 0.62, which means the EU member countries are positioned with different values. But India is lagging in digitalization world as it has the value 0.29 and positioned 83rd in the digitalization index.

The FinTech companies bid these services at a lower level price compared to traditional financial service sectors because fully automated technology accessing the operation and process work completely or partially. The motivation or main concept of FinTech service is to reduce the human errors and increase banking business transaction and accessing. In this system automatically applicable by India. India will reached the highest digitalization index ranking position when compared to EU and USA ranking level.

### ***7.2 Fintech Current Status and Negative Characteristics***

They are many positive characteristics identified by the people, which are block chain and crypto currencies, an alternative payment system and FinTech technology and banking solutions. Nevertheless, the treats related to the FinTech essentials are really negative effects in the FinTech financial service sectors. The negative elements are due to affecting the FinTech operations and that related process failed incompletely. That's why India is not able to develop it, while the EU and USA quickly increased the work regularly.

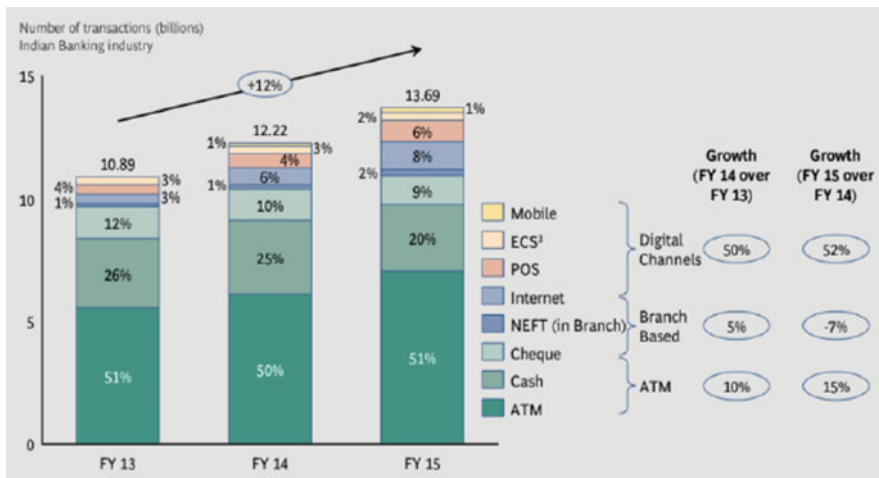
**Table 2** BBVA digitalization index 2015 [13]

S. No.	Country	Index	S. No.	Country	Index
1	Luxembourg	1.00	44	Kazakhstan	0.47
2	United Kingdom	0.97	45	South Africa	0.47
3	Hong Kong SAR	0.95	46	Slovakia	0.46
4	United States	0.92	47	Mauritius	0.46
5	Netherlands	0.90	48	Colombia	0.45
6	Japan	0.88	49	Russian Federation	0.45
7	Singapore	0.87	50	Italy	0.44
8	Norway	0.86	51	Azerbaijan	0.44
9	Finland	0.85	52	Poland	0.43
10	Sweden	0.84	53	Romania	0.43
11	Switzerland	0.82	54	Croatia	0.43
12	Iceland	0.82	55	Montenegro	0.42
13	Canada	0.81	56	Kuwait	0.41
14	New Zealand	0.80	57	Mexico	0.41
15	Australia	0.79	58	Greece	0.40
16	Germany	0.78	59	Armenia	0.40
17	Denmark	0.77	60	Georgia	0.40
18	Korea, Rep.	0.76	61	Panama	0.40
19	Estonia	0.76	62	Macedonia FYR	0.39
20	France	0.76	63	China	0.38
21	Austria	0.73	64	Thailand	0.38
22	United Arab Emirates	0.71	65	Morocco	0.37
23	Belgium	0.69	66	Philippines	0.35
24	Ireland	0.68	67	Sri Lanka	0.34
25	Island	0.68	68	Egypt	0.33
26	Bahrain	0.65	69	Indonesia	0.33
27	Lithuania	0.65	70	Bulgaria	0.33
28	Maita	0.64	71	Moldova	0.33
29	Malaysia	0.63	72	Tunisia	0.33
30	Spain	0.62	73	Argentina	0.32
31	Qatar	0.61	74	Kenya	0.32
32	Saudi Arabia	0.59	75	Peru	0.32
33	Portugal	0.59	76	El Salvador	0.31
34	Chile	0.58	77	Serbia	0.31
35	Latvia	0.55	78	Dominican Rep	0.31
36	Czech Republic	0.52	79	Vietnam	0.31
37	Oman	0.51	80	Honduras	0.30
38	Turkey	0.50	81	India	0.29
39	Costa Rica	0.49	82	Albania	0.28
40	Jordan	0.48	83	Albania	0.24

(continued)

**Table 2** (continued)

S. No.	Country	Index	S. No.	Country	Index
41	Cyprus	0.48	84	Senegal	0.24
42	Hungary	0.48	85	Guatemala	0.22
43	Uruguay	0.47	86	Ukraine	0.21



**Fig. 7** Digitalization transaction of India in 2013–2015

According to the data, Fig. 7 displays the digitalization transaction in India’s growth; however, the Billion Eco System (BCG) research in India that surveyed the ATM mobile transaction and withdrawal transaction at ATM, NEFT-based transaction in mobile, mobile internet and traditional transaction of cash and cheque and all our day-to-day our life usage showed 12% increase in the year 2013–2014 and also in 2014–2015; so, year by year as we increase FinTech operations, banking financial services also increased [14].

This is very a good example of block chain and crypto currencies method. The customer will need to safety for payment transaction because the hackers follow to your regular work. This cyber security and data privacy also comes from the USA and EU. The regularly EU, USA and India using the FinTech methods and block chain Methods for money transaction [15].

## 8 Conclusions

In this study the overall functions of financial advanced technologies, challenges of banking and financial industries, cyber security of banking while connecting IoT through the internet to store the all information's on cloud and benefits of the FinTech while connecting IoT device have been described. In addition, the use cases of FinTech on IoT in digital society in futures are mentioned in detailed. All banks, financial industry, insurance companies are moved to automated technology that reduces the workloads and easy to mingle the customer activities. From authors' point of view, the FinTech embraced with IoT in future will boom the society into the next generation.

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