



Internet of Things (IoT) – Underpinning the Banking

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Abstract: With many already claiming that we are entering the second major digital revolution, The Internet of Things (IoT) is one of the biggest technological transformation in recent times. Forecasts says that, there will be 25 billion smartphones, wearables, Smartwatches connected cars and other devices by 2020.

With the mass adoption of online banking, mobile banking apps and, most recently, contactless payment technologies, consumers are demanding on convenience and a personalized service. Additionally, they are also expecting the highest levels of digital security from their banks, where data breach and security threat is the most prevailing problems in IoT era.

Machine to Machine connectivity is helping the organizations to collect mass data and enabling exchange of data through use of sensors, opening numerous opportunities to banking sector. Through IoT, banks will be able to track and analyse consumer behaviour and will be able to deliver personalized experience to their customers with targeted advice. With the help of IoT banks can attain a new level of customer intimacy and it helps in understanding of the needs of both consumer and business clients.

Our paper aims at Understanding IOT and how Internet of Things is going to benefit individuals and financial institutions.

Keywords: Internet of Things, digital security, Machine to Machine connectivity, technological transformation.

I. INTRODUCTION

The Internet of Things (abbreviated as 'IoT') is defined as a way for devices which can communicate and exchange information by connecting to internet. With emergence of Wi-Fi (faster speeds of internet) at lower costs, IoT has emerged as a method to exchange information rapidly by connecting various electronic devices across different locations. This is also called 'Inter-Networking' as it is absolutely based on the internet.

II. OBJECTIVES OF THE STUDY

- To understand the concept and dynamics of the IoT.
- To understand how IoT helps Financial service Industry.
- To focus on the risk associated with IoT

III. METHODOLOGY

This paper is purely based on Secondary data and descriptive in nature. For the purpose of data collection, we have referred to various Journals, Magazines and authenticated reports of various International companies like PWC, Deloitte and M.C. Kinsey.

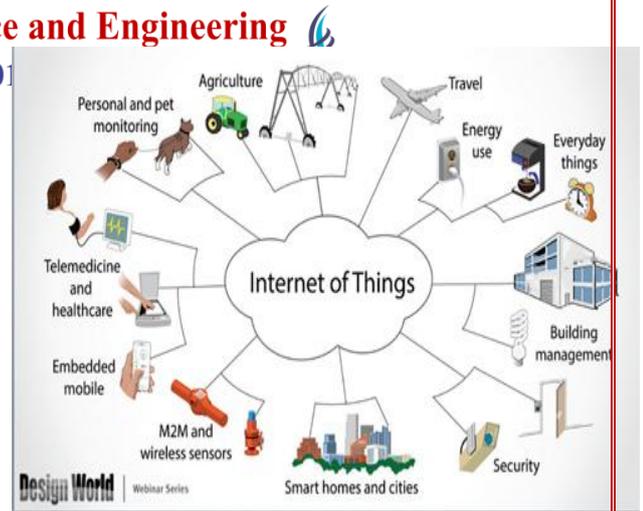
IV. EVOLUTION OF IOT

The concept of 'IoT' (Wasn't referred to as IoT then) emerged in early 1980s when technology started to influence business processes. One of earliest examples of an Internet of things was a Coca Cola machine, located at the Carnegie Melon University. Local programmers connected the refrigerated appliance by

the internet, to check and see if there was a drink available, and if it was cold, before making the trip. The word IoT was not officially used until 1999.

IoT (Internet of Things), what we call it today, evolved into a compact concept in 2013 with the growth in the usage of multiple system technologies, from micro-electro mechanical systems (MEMS) to embedded systems, Internet connection to wireless communication and so on. The traditional fields such as wireless systems, sensors, GPS and others provide support architecture for IoT.

During the initial stages of Technological advancement, Internet was heavily used for exchange of information through documents. Later, application in Commerce had taken place. Business houses started to heavily rely on Internet and conduct their businesses. It saved a lot of time and cost. This innovation took the world by storm as most of the transactions that had been done physically were replaced by virtual realm. Innovation was the key in telecommunications industry and that continuously generated numerous applications with which Internet can be connected to different machines and devices and used to store, retrieve and exchange data that is crucial for making timely decisions. No sooner, advent of social networking technologies erupted series of new innovations and Internet became the order of the day. People from across the globe are connected virtually. Today, internet is everywhere with everyone. It became cheaper and dependable to all. Everyone and everything (here Electronic Device) is connected to internet – what we term it as 'Internet of Things' or 'IoT'.



- In some form There are currently more than 400 companies providing IoT related services

VI. APPLICATIONS OF IOT

There are quite a lot of applications of IoT. The following diagram explains few important applications of IoT.

Source : <http://www.designworldonline.com/tips-on-designing-for-the-internet-of-things/>

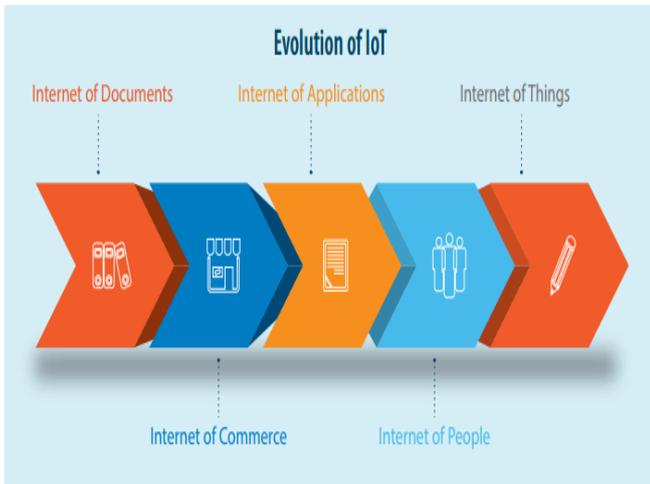
VII. IOT IN BANKING INDUSTRY

During the last few decades technology has changed medium in which we communicate. Wi-Fi and sensors have transformed the way we interact with the world around us. Internet of Things is bringing a new era of connectivity. The word Internet of things is not new. Even though its exact origin is not known it is probably coined in the late 1900s to imply the connectivity of devices and machine to machine communication. This enhanced connectivity gives us the opportunity to tap into the data collected, opening up enormous opportunities for businesses and many personal benefits. Central for facilitating most of that potential will be banks.

Our relationship with the banks and the way they operate will be transformed. Branches will no longer be required as face to face services will disappear. Cars, Homes and offices will initiate transactions directly with banks in real time. Banks role as custodians of our money will be enhanced to management services helping their customers with budgeting, portfolio management and even health.

More data collected through IoT can also help the bank make better risk management decisions. In addition to tapping into social media, spending, and other credit behaviour data, biometrics should also assist in the authentication process in all digital banking transactions with secure access.

The extent of change is limited only by our imagination. Already there are game-changing applications and services being trailed and implemented. It is time for financial services to be provided by the "Internet of Things". A day may come

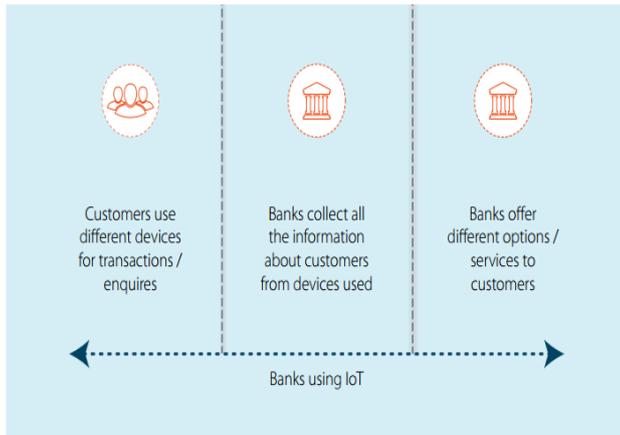


V. IoT & INDIA

- IoT market of Indian economy seems to grow to \$ 15 billion with 2.7 billion units by 2020 from current \$ 5.6 billion and 200 million connected units.
- IoT market in India is projected to grow at a CAGR of more than 28% during 2015 – 2020.
- The government of India is taking initiative in framing and draft policy to fulfill the vision of developing a connected, secure and a smart system based on our country's needs. Its main objective is to create an IoT industry in India of \$ 15 billion by 2020.
- The industrial applications of IoT, primarily in logistics, automotive manufacturing, and transportation are the main drivers to generate the IoT revenue by 2020.
- We can expect the global IoT business to likely touch \$300 billion by 2020, As India is aiming to capture 20 per cent market share in another five years.
- In India IOT market currently stands at \$130 million annually in revenues.
- Growing adoption of Cloud computing in IoT services and shifting focus over Industrial IoT (IIoT), rising market of M2M communication and increasing trend of wearable technology applications are among the major factors driving IoT market in India.
- In sector type of IoT, Telecom is the largest sector being served in India. In India the total revenue earned by IoT industry is 36% or \$47, million comes from telecom.
- Electronics stands second at 29%, followed by Oil & utilities sector at 23% of IoT revenues in India.
- Finance (Banking), healthcare & retail the 3 big sectors in terms of size, they are late adopters of IoT, providing single digit millions in revenue in IoT sector.

where we may experience the so called Banking of Things (BoT)!!

VIII. GENERAL FRAMEWORK OF IOT IN BANKING

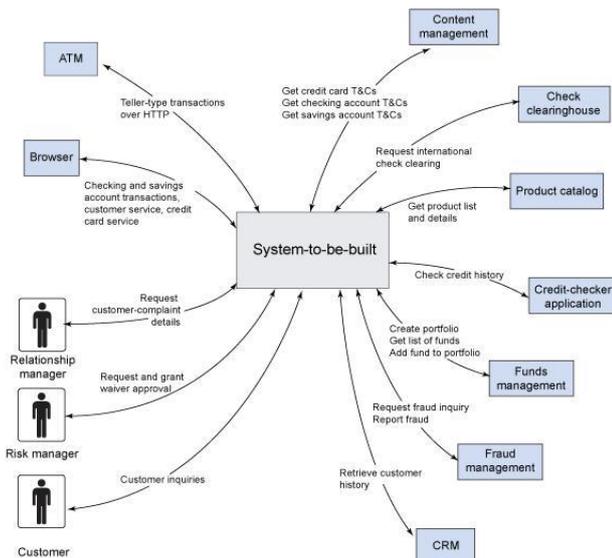


Source : IoT Enabled Banking Services White Paper from Infosys

Usage of IoT in Banks starts with Customers opting different devices for transactions or enquiry. Then the banks collect all the information about the customers from various devices used. Based on the data collected banks offer different options or services to customers.

IX. SPECIALIZED IOT FRAMEWORK NEEDED FOR BANKING INDUSTRY

Besides generalized framework of IoT for banking, we also need customised (Specialized) framework for operational effectiveness. This can be seen below.



Source: <https://www.linkedin.com/pulse/future-banking-iot-driving-change-david-john>

X. HOW DOES THE FLOW OF IOT-GENERATED INFORMATION CREATE VALUE FOR THE BANKS AND THEIR CUSTOMERS?

Through IoT numbers of digital devices that are communicating with each other are increasing. These devices not only communicate with each other but also communicate with external entities thus, providing an unpredictable amount of data and customer insights. With the use of this data, IoT allows correlation of information obtained and acts on it. IoT can bring new opportunities and benefits to institutions and consumers in the area of personal banking, Industrial Banking etc.

With the use of IoT banks may achieve improved customer experience, generate new markets and cross sell opportunities but banks has to develop new ways for cost reduction, risk management and improved operational efficiency. Real time data may pose risk to banks when providing financial services. The ability to manage risk in addition to collecting data from media and other credit behaviour data, allow banks in making better financial and commercial decisions.

XI. FUTURE OF IOT ENABLED BANKING

According to TCS survey on IOT in banking industry, financial institutions have reported an average IoT budget of \$117.4 million which is 0.4% of the revenue. It says that they are planning to spend \$153.5 million by 2018. A huge amount of their IoT budget will account for monitoring financial products and services that is 32% in 2015 and 29% by 2020.

According to TCS survey, it has been reported that the average projected budget for IoT initiatives is expected to be \$153.5 million US Dollars by 2018.

XII. WHAT ARE THEY USING IOT IN BANKING FOR?

It was observed that for banks, IoT technologies are most popularly used to monitor customers. It is observed that 65% of the banking respondents use mobile apps and 16% track wearable. It was observed that 38% of the respondents use these IoT apps to keep tabs on a complex web comprising branches, ATMs, partners and so on.

XIII. IOT CASES IN BANKING

The banking industry has begun to find ways to leverage IoT capabilities. From a survey it was found that 64.5% of global banking executives monitoring their customers through mobile apps on Smartphone, tablets and other digital devices etc. In addition, 31.6% of banking organizations used the IoT (Internet of Things) to monitor retail locations (e.g., bank branches), 21.1% used digital sensors to gather product performance of data and 15.8% used IoT(internet of things) sensors in wearable's to track customer product usage.

Banks started using the IoT (Internet of Things) to monitor and to collect data about their customers to



know about financial transactions, while lenders are finding ways to finance and track the assets and their value collateral based on sensor data. Financial executives are expecting consumers to start using connected devices for payments in the near term. Many financial executives believe that consumers will commonly make transactions using appliances or smart phones controllers in the coming years. There are few other things that are already taking the banking industry by storm with the help of IoT. Few of them are as follows:

A. **Banking on the cloud first strategy**

Big Data, Block chains, Artificial Intelligence are some of the technologies that are changing the face of business. These will be leveraged using cloud computing. Indian banks are in the idea that the business ability to provide cloud computing overshadows the concerns. Business models for emerging banks and financial techs will also be largely driven by the cloud-first strategy.

In 2017, you could expect Siri to help you transfer funds and open a new fixed deposit account with your bank.

B. **Intelligence—from sci-fi to reality**

Artificial intelligence (AI) has the potential to transform both front office and back office operation. For example, at ICICI Bank, software robots have been positioned in over 200 business process functions, reducing the response time to customers by up to 60%. As 2017 progresses, banks will look to explore more opportunities through AI and integrate its conventional interface to Machine to Machine Interface

C. **Open banking is the new normal**

Open banking is an ecosystem which connects multiple service providers for financial and non-financial services.

The launch of UPI Unified Payments Interface by the National Payments Corporation of India (NPCI) has opened enormous opportunities in open banking sector. Customers will be given the desired flexibility and a unified interoperable interface will allow all service providers to innovate for better customer experiences.

In a nutshell IoT is a blessing in disguise for us. Though it is a means to our ends, we need to use it appropriately to derive maximum benefit. Let us look at various advantages and risks associated with IoT that impact banking industry.

XIV. ADVANTANGES OF IOT TO BANKING INDUSTRY

- Virtual banking: Convenience for customers.
- Better understanding of customers and clients using large pools of data. Data analytics plays a crucial role here in understanding and using voluminous amount of data.

- Banks can use IoT to gather the required data to improve efficiency, decrease expense and improve risk management
- Data which is gathered from these implementations will help banks to develop a new processes and make decisions for further improvement
- IoT allows for increased security through encryption and authentication that only allows access to authorized individuals, including recognized customers and employees.
- It is saviour of time as customer can complete the task sitting at one place.

XV. RISK OF IOT TO BANKING INDUSTRY

- There is possibility of hackers breaking into system and stealing the data of the customers.
- Too much dependant on technology is not recommended as technology breach is very costly.
- Jobs get lost as they are automated machines to perform task.
- IoT is a diverse and complex network. Any failure or bugs in the software or hardware will have serious consequences as there may be loss of the most important data.

XVI. CONCLUSIONS

The end users will be able to do nearly everything at their ease, from anywhere and anytime through the internet. It offers new opportunities to solve problems, add value to financial services and to its customers – there is no area in life that would remain untouched. IoT is changing the face of finance and banking. The concept of Internet of Things is limited only to our imagination. An enormous amount of innovation is already been brought to the market. But, one thing we need to remember is the IoT is not an end in itself; it is a means to end. So, we have to carefully leverage it in order to achieve best possible results.

XVII. SCOPE FOR FURTHER RESEARCH

IoT has exerted its influence on almost all the industries across countries. There is no industry that is unaffected by IoT. In this scenario it is much needed to have a clear picture of what IoT actually does in the future. Various governments have already started researching on IoT. Many projects have been funded and many for a (Forum(s)) for discussions have been conducted in order to understand IoT in a better way. At this point, research on IoT derives much attention and appreciation. There is a lot of scope and availability of data for quality research on IoT. Few areas that derive high attention would be IoT in Banking & Finance, Manufacturing, Smart cities & Villages etc., the scope of research here is very high.

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