

MASSIVE GROWTH OF BANKING TECHNOLOGY WITH THE AID OF 5G TECHNOLOGIES

K. Krishna Prasad *.

P.S. Aithal**.

*Srinivas Institute of Management Studies, Pandeshwar, Mangalore - 575 001, INDIA, E-mail: karanikrishna@gmail.com

**Srinivas Institute of Management Studies, Pandeshwar, Mangalore - 575 001, INDIA, E-mail: psaithal@gmail.com

ABSTRACT

The advancement in information technology has resulted explosive growth in banking technology like ATMs, internet banking and mobile banking. Banks which emphasis more on existing customer satisfaction and in attracting new customer have implemented online banking and mobile technology to make banking more convenient, attractive and simple. Computerization, wireless network, ATMS, internet banking and mobile banking can connect any customer of any bank in any branch with a customer in any other bank regardless of time, location or physical boundaries. With the widespread of banking technology, public users or customers could create an account from their smart phone without actually visiting to the branch. GoBank is an emerging and new concept of banking without any physical branch, offers mobile bank accounts, especially for smart phone users. 5G (Fifth generation wireless systems) is emerging mobile telecommunication standard beyond 4G in terms of speed, bandwidth, data transfer rate and signaling efficiency. Next Generation Mobile Network Alliance (NGMN) defines 5G with some requirements, which includes data transfer rate more than 1 Gbit/s and should support tens of thousands of users, up to several lacks of connection simultaneously and spectral and signaling efficiency should be more than 4G.

Research and analysis of the new technology helps in popularity of the technology among public users. In this paper we discuss and analyze new banking technology, which includes Digital Deposit Apps, Photo Bill Payment Apps, Smartphone Credit Card Scanners, Electronic Meeting and Mobile Payment Apps. The new technologies are analyzed through a table which includes its advantages, benefits, constraints and disadvantages. Wish this paper could play an active role in actual research of mobile banking technology.

Keywords: Digital Deposit Apps, Photo Bill Payment Apps, Mobile Payment Apps, Electronic Meeting, Smartphone Credit Card Scanners, GoBank.

1. Introduction

The convergence of wireless technologies and the internet is creating a new channel to banking business which inspires the development of value added banking services, the use of smart phones as an access device of banking system functionalities/transactions. With the explosive recent advances in banking technology, customers no longer have to visit a bank branch during normal transactions hours in order to deposit cash, cheque and bill payment or for any other transactions. In 2014 Walmart introduced GoBank for public users or customers to create an account from their smart phone without actually visiting to the branch [1]. Users from home can deposit a cheque and cash can be credited to their account with the help of wireless electronic check deposit scanning and cashing machine [2].

The International Mobile Telecommunications Advanced (IMT-Advanced) specifies any conditions or requirements for 4G, which includes speed of 100 Mbit/s or more while travelling and 1 Gbit/s while stationary, channel bandwidths of 5-20MHz or sometimes even up to 40MHz, all-IP based packet switching network and able to switch over multiple heterogeneous networks simultaneously. 5G (Fifth generation wireless systems) is emerging mobile telecommunication standard beyond 4G in terms of speed, bandwidth, data transfer rate and signaling efficiency. Next Generation Mobile Network Alliance (NGMN) defines 5G with some requirements, which includes data transfer rate more than 1 Gbit/s and should support tens of thousands of users, up to several lacks of connection simultaneously and spectral and signaling efficiency should be more than 4G [3-4].

In this paper, we discuss and analyze new banking technology, which includes Digital Deposit Apps, Photo Bill Payment Apps, Smartphone Credit Card Scanners, Electronic Meeting, Advanced ATM Apps and Mobile Payment Apps. From Digital Deposit Apps using smart mobile phones the cheque is scanned or digital image of the two sides of cheque have taken and sent to the bank for processing it. Photo Bill Payment Apps works by transmitting digital images of a bill to user's account. The Credit Card Scanners will be attached to smart phones will scan and send the digital information for processing. Loan officer or any other officers of the bank can do direct teleconferencing with a user using an electronic meeting with prior request from the user. The Advanced ATM Apps works on the principle of facial biometric recognition. Mobile Payment

Apps helps to make payment for any goods or services. The new technologies are analyzed with its advantages, benefits, constraints and disadvantages.

2. Growth of Mobile Communication network from 1st to 5th Generation

Though Internet access is available in most major cities and many rural areas, the Internet connections for many businesses, homes, and schools use relatively slow modem connections through Internet Service Providers (ISPs). Making high-speed (broadband) connections directly available to all locations is the key to realize the true benefits of mobile business applications. A number of existing or future technologies that enable connections between mobile devices and other information appliances and between mobile devices and the Internet are discussed with the help of 1st to 5th generation networks.

A. First-generation (1G) networks: Less often, used than the following terms, 1G denotes the very first generation of common mobile communication networks connectable to the Public Switched Telephone Network (PSTN). These were analog cellular systems such as Advanced Mobile Phone System (AMPS) in the USA, Nordisk Mobiltelefon (NMT) in Scandinavia, or C-Netz in Germany. 1G technology embodied the first realization of cellular concepts, including frequency reuse and handoffs. 1G technology was developed in the year between 1970-1980, which uses analog system and have a speed of about 14.4 kbps by utilizing technologies AMPS, NMT and used for only voice purposes through the phone.

B. Second-generation (2G) networks: GSM (Global System for Mobile Communication) is considered the second-generation (2G) digital network. When data communications are desired, the user must dial-in to maintain a connection. It operates in the 900 MHz and 1,800 MHz frequency bands. Major functional enhancements of 2G technologies are voice coding, digital modulation, and forward error correction. Additional services like fax, data, messaging, and roaming between networks was provided. Especially in the GSM case, the successful Short-Message Systems (SMS) service has shown that voice traffic is not the only service users want. The standardization of the Wireless Application Protocol (WAP) brings the first phones with an integrated browser into the market. These 2nd generation systems had such a wide impact due to the rapid reduction in costs and the perceived quality. In the year between 1990-2000, 2G technology become popular, and have a speed of 9.6-14.4 kbps by utilizing technologies TDMA and CDMA and used by multiple users on a single channel via multiplexing.

C. 2.5G networks: GPRS (General Packet Radio Service) is 2.5G technologies. It is a continuous packet data service, uses the existing network infrastructure, but is being marketed as delivering ISDN-type speeds. Rather than sending a continuous stream of data over a permanent connection, GPRS's packet switching system only uses the network when there is data to be sent.

In between 2001-2004, 2.5 is defined based on Packet data technology with a speed between 20-40 kbps and utilized GPRS technology and through this internet has become popular and data became more popular. By this time phones started supporting web browsing with limited capacity.

D. 2.75G networks: Whereas 2.5G technologies introduce a set of packet-switched functionalities and minor changes of transmission speed only, 2.75G denotes 2.5G technologies with major improvements in transmission speed. EDGE (Enhanced Data GSM Environment), a faster version of GSM, is designed to enable the delivery of multimedia and other broadband applications.

E. Third-generation (3G) networks: UMTS (Universal Mobile Telecommunications System) are the so-called "third-generation (3G)" technology. 3G technology offers different services to customers like high bandwidth, packet-based transmission of text, voice, video, audio and multimedia needed support. The 3G network integrates functions of different range of equipments. There are two major competing schemes for UMTS. Wideband-CDMA (W-CDMA), which is supported by Nokia and Ericsson among others, and time division-code division multiple access (TD-CDMA). W-CDMA is similar to standard CDMA except that it uses higher bandwidth on the transmission channel. 3G technology became popular in between 2004-2005 and which is defined based on digital broadband packet data with a speed of 3.1 Mbps, considered to be the peak, by utilizing technologies like CDMA and UMTS. In 3G technology, multimedia services with streaming became more popular.

F. 3.5 G networks: 3.5 networks developed in between the year 2006-2010, are defined on packet data and have a maximum speed of 14.4 Mbps by utilizing HSPA technology. 3.5G serves the consumer with higher throughput and speed compare to 3G technology.

G. Fourth Generation (4G) networks: Mobile services, applications, and even core network are evolving at high speeds, and distinguishing different generations is not really possible anymore. The evolution and sometime revolution, is a very significant trend and 4G is such a revolution of air interface rather than a new phase of evolution. 4G technology is characterized by advanced personalization, Industry specific e-process models, Optimized CRM, and Niche customization.

E-marketplace is an evolving example of a parallel to a true 4G enterprise business environment. 4G technology provides Web transformation through external automation. The various external automation technologies may involve High optimization, Niche customization, Transparent processes, Self-service, Any –to-any multi-channel integration, Advanced personalization, Voice customer service, E-process driven technology, and Architectural interoperability. 4G networks are introduced with the main intention of customization of a flexible and ubiquitous service provision in the middle of 2012 based on digital broadband packet and all IP very high throughput speed of 100-300 Mbps in peak. Speeds of 4G network are further increased based on data access demand used by various services. Putting the user in the center of the development aims to guarantee a long-lasting, sound and profitable future for 4G.

H. Fifth Generation (5G) networks: Fifth Generation wireless mobile communication can be defined as “a wireless mobile communication technology without any restriction or limitation in terms of bandwidth, speed, access and zone issues. 5G is based on 4G with extended capacity. The 5th generation technology is real wireless communication technology which uses different technologies like LAS-CDMA, OFDM, MC-CDMA, UWB, Network-LMDS and IPv6. When 5G technology is implemented in full-fledged it will change the world of World Wide Web (WWW) and cell phone with unified global standard, high bandwidth and all time connectivity. 5G technology includes all types of advanced features which make it huge, powerful in the near futures. The 5G network is not yet implemented in full swing all over the world. Its throughput speed is expected in the range of gigabytes and going to become popular by the year 2018-2020. It will be going to use available bandwidth efficiently, when it is implemented. Due to the widespread of ubiquitous internet and smart phone services, 5G technology is going to provide tough competition in the marketplace demand or value of normal computers and laptops.

3. Smart Phone Banking and Communication Technologies

The influences of wireless telecommunication technologies and the internet have made a drastic revolution in banking transactions and services. Smart phone banking is different from ordinary mobile banking because of some unique, special and innovative features of smart phones [5]. With the rising complexity in the e-commerce transactions all over the world, different types of electronic payment appeared in the last few years, out of that few payment methods or techniques are in practice or implemented [6]. As younger consumers are more attracted by smart phone, there

is more probability to use mobile banking services like fund transfer, balance enquiry, cheque deposit and bill payments due to its convenience and ubiquitous services [7]. Customers can access their bank accounts with the help of fingerprint reader attached to smart mobile phones.

Cellular communications has brought unparalleled, non-comparable rapid changes over the fast few years. By using wireless technologies like WAP smart phone devices can be transformed to sophisticated payment devices that can process both micro and macro payments [8]. 5G technology is going to become a new revolution in mobile wireless communications. Through super core architecture 5G will offer very fast mobile commerce or internet or any other services, with unique standard where all network operators will be connected to one single core, even though they differ in their access technologies [9-11]. 5G is a real wireless world with no more limitations in access technology, connectivity, bandwidth or speed and zone issues [12].

This paper focuses on smart phone banking which involves some advanced features that makes banking transactions anywhere, anytime or ubiquitous. It mainly focuses on six services, which are Digital Deposit Apps, Photo Bill Payment Apps, Smartphone Credit Card Scanners, Electronic Meeting, Advanced ATM Apps and Mobile Payment Apps [1].

4. 5G Enabled Smart Phone Banking

Fifth Generation (5G) Technology not yet been deployed. 5G is a mobile telecommunication standard beyond 4G in terms of speed, bandwidth, data transfer rate and signaling efficiency. The different components of 5G enabled Smart Phone Banking are Digital Deposit Apps, Photo Bill Payment Apps, Smartphone Credit Card Scanners, Electronic Meeting, Advanced ATM Apps and Mobile Payment Apps as shown in figure 1.

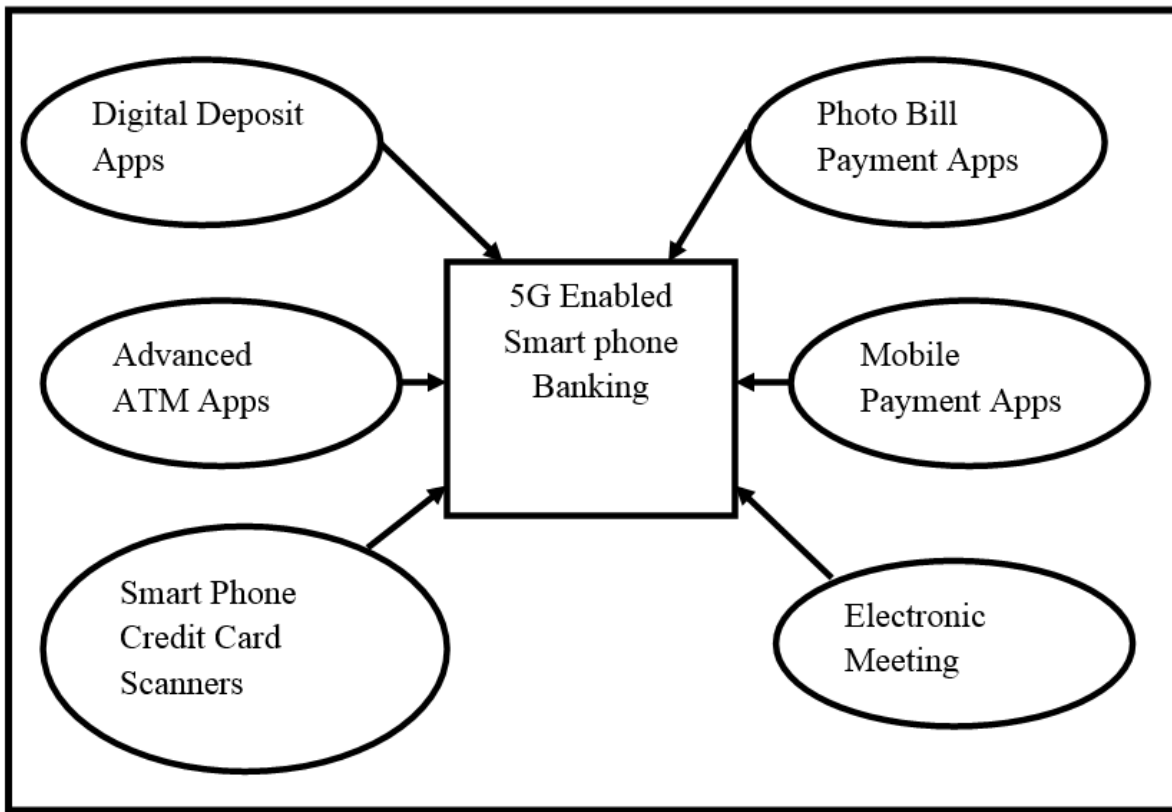


Figure 1: 5G Enabled Smart Phone Banking

4. 1. Digital Deposit Apps

Internet technology, wireless mobile communication standards and mobiles Apps made depositing a cheque very simple compared to old fashion paper cheque. In Digital Deposit Apps using Smart Phone users can deposit a cheque and sends two sides of the cheque image or digital scanned image to the bank for processing. In bank cheque will processed as a deposit made by the bank.

4. 2. Photo Bill Payment Apps

In Photo Bill Payment Apps, information's of the bill are transmitted to the respective customer account after taking a digital photograph of the bill. The details of the bill like payment amount, due date and company issuing the bill are collected from the user and bill amount is paid electronically. By setting a proper due date regular bill payment is scheduled using this apps.

4. 3. Smart Phone Credit Card Scanners

Usually credit card is scanned by the scanner or reader owned by the seller. The chances of hacking the password are more in this case. In Smart Phone Credit Card Scanner customer's credit card is scanned by the reader attached to smart phone. The scanner reads the card and specified amount of money is transferred from user's account to payee's account, so that the chance of hacking the password is reduced to an extent.

4.4 Electronic Meeting

In Electronic Meeting teleconferencing with bank teller or loan officer is a new concept going to be introduced in near future. The customer or user has to take prior permission in order to get an appointment with a bank teller or loan officer. Through this service user can open a new account or can apply for a loan or mortgage.

4.5 Advanced ATM Apps

In order to retain the existing customer trust and faith and acquire new customers in ATM transactions, banking institutions should incorporate a stronger security mechanism and thereby overcome from fraudulent transactions or users. In this advanced ATM App as soon as the user stands in front of ATM counter, user facial recognition is captured through facial recognition scanning/identification system attached to ATM machines. Facial recognition are sent to bank server and matched against stored facial recognition. If it matches, then an OTP is sent to user's Smart Phone. When users enter OTP in users Apps through wireless communication, OTP is sent to a bank, again matched with already generated OTP, if matches then ATM machine is opened for the user's transaction.

4.6 Mobile Payment Apps

In Mobile Payment Apps, initially user's credit or debit card information's are loaded into mobile apps. Users might have multiple cards of different banks, all the card information is loaded into mobile apps. Out of multiple choices of card's customer selects any one card from the menu on their Smart Phone and then touches phone to an in-store reader. After this process, payment is processed as like regular credit or debit card transactions.

5. Analysis of 5G Enabled Smart Phone Banking

5G Enabled Smart Phone Banking is analyzed using its advantages, benefits, constraints and disadvantages. Digital Deposit Apps, Photo Bill Payment Apps, Smartphone Credit Card Scanners, Electronic Meeting, Advanced ATM Apps and Mobile Payment Apps six new Smart Phone based banking technologies are studied and analyzed.

Advantages

- Paper less Banking.
- Ubiquitous Transaction facility
- E-slip of the deposited cheque
- Improved Speed, Bandwidth, due to 5G technology
- Automatic bill payment
- Bill payment generates incremental fee revenue
- Smart Phone Credit Card Scanning improves security of customer PIN
- Electronic meeting saves customer time
- In advanced ATMs, difficult to hack/crack the system security
- Improves User Trust over ATM machines
- All bills can be paid without visiting to respective offices
- Easy to use the system, if users are expert in usage of Smart Phone
- 5G Technology makes services more attractive and effective
- Unified standard for wireless communication due to 5G Technology

Benefits

- Global expansion of Smart Phone banking services.
- The ability to obtain a larger customer base due to ubiquitous services.
- The ability to take advantage of the growing popularity of Smart Phone banking through Digital Deposit Apps
- Enhances reputation of the bank by providing fast and secured services to its customer

- Expansion of Smart Phone users
- Banks can able to attract Business people, Software engineers or other tight scheduled customer pool due to their nature of professions.
- Improves consumer reputation of the technology
- High Quality of services are provided due to 5G Technology

Constraints

- Lack of newer technology support
- Possible failure of products due to non-acceptance of customer
- General competitiveness of the banking industry

Disadvantages

- Requirement of high memory and processors at Bank's servers
- Transaction duration time increases.
- Lack of technology support
- Initial investment in technology will be expensive
- Lack of trained staff
- Possibility of misuse of services, especially in electronic meeting
- 5G Technology become more expensive during its initial implementation

6. Conclusion

The advanced wireless communication technologies like 5G will offer a variety of services like mobile internet, mobile commerce and bill payment services with ever pleasant, highly sophisticated and super fast nature. The proposed 5G enabled smart phone banking can offer six services- Digital Deposit Apps, Photo Bill Payment Apps, Smartphone Credit Card Scanners, Electronic Meeting, Advanced ATM Apps and Mobile Payment Apps.

In Digital Deposit Apps the cheque is scanned or digital image of the two sides of the cheque has taken and sent to the bank for processing it. In Photo Bill Payment Apps digital images of a bill are transmitted to user's account. The Credit Card Scanners will be attached to smart phones will

scan and send the digital information for processing. Loan officers can do direct teleconferencing with a user using an electronic meeting with prior request from the user. The Advanced ATM Apps works on the principle of facial biometric recognition. Mobile Payment Apps helps to make payment for any goods or services. The proposed 5G enabled smart phone banking having some characteristics like improved speed, bandwidth, improves the security of customer PIN, saves customer time and improves user trust over ATM machines. Wish this paper could play an active role in actual research of mobile banking technology.

References

1. Barth, J. R., & Sau, M. (2014). Walmart: The New'Go-To'Bank?. Available at SSRN 2530010. Accessed 15 June 2014
2. Singfield, J. (2004). U.S. Patent Application 10/918,898.
3. Woerner, B.(2001). Research Directions for Fourth Generation Wireless. Proceedings of the 10th International Workshops on Enabling Technologies: Infrastructure for Collaborative Enterprises (WET ICE). Massachusetts Institute of Technology, Cambridge, MA, USA. June 2001.
4. K. Krishna Prasad & Aithal P.S., An advanced Service Provision Model using 4g Technologies, Proceedings of National conference “Changing trends in Management, IT, and Social sciences”, Manegma, 2014, Mangalore, 09/04/2014, ISBN No. 978-81-929306-0-2.
5. Kim, J. B., & Kang, S. (2012). A study on the factors affecting the intention to use smartphone banking: The differences between the transactions of account check and account transfer. International Journal of Multimedia and Ubiquitous Engineering, 7(3), pp. 87-96.
6. Murthy, C.S.V. (2002), E-Commerce: Concepts, Models and Strategies, New Delhi: Himalaya Publishing House, p. 626.
7. Koenig-Lewis, N., Palmer, A., & Moll, A. (2010). Predicting young consumers' take up of mobile banking services. International Journal of Bank Marketing,28(5), pp.410-432.
8. Mobile Payments: Preparing for the mCommerce Revolution’: White Paper, Trintech, March 2002
9. Debnath, A., & Abhinandan (2013). Review on NEXT Generation Technologies of Wireless Communication. International Journal on Recent and Innovation Trends in Computing and Communication, 1(4), pp.346-350.
10. Pachauri, A. K., & Singh, O. (2012). 5G Technology–Redefining wireless Communication in upcoming years. International Journal of Computer Science and Management Research, 1(1), pp.12-19.

11. "5G Wireless Architecture-2010" By Vadan Mehta.
12. <http://123seminaronly.com/Seminar-Reports/012/63854282-5G.pdf>. Accessed 10 March 2015.

