

## Mobile Technology Innovation

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**[Abstract]** Technological innovation continues to permeate and shape the environment we live in. Each decade sees our society become more integrated with new technologies to make our lives easier. One key area where technological innovation can be seen is mobile technology. The increased use of mobile technology and AI has allowed for the advent of mobile banking, bringing banking and financial services to the palm of your hand.

**[Keywords]** mobile technology, innovation, AI, technology industry, radical innovation, incremental innovation, disruptive innovation, mobile banking

### Technological Innovation Defined

Innovation is about a new idea, process, or method (Innovation, 2015). Technological innovation is the development of new processes or products within the technology industry. This innovation includes every step from the idea to the distribution of new products or the use of new processes. There are three types of technological innovation: radical innovation, incremental innovation, and disruptive innovation (Flynn, 2015).

### Types and Phases of Technological Innovation

In *Impact of Technological Innovation on Growth Trajectory of Enterprise's Technological Capability: A Theoretical Analysis*, radical technological innovation is defined as the first adoption of new technologies and their first introduction to the market (Zhou, Zhang, and Liu, 2005, p. 88). Zhou also discusses incremental technological innovation in the same journal. Incremental innovation usually follows radical innovation. It introduces minor changes to a product by exploiting the potential of the design (Zhou, 2005, p. 91). Finally, disruptive technological innovation is a product or service that makes use of new technologies (Zhou, 2005, p. 91).

The technological innovation process consists of three stages: the conception and evaluation of an idea, approval and adoption of an idea, and the implementation phase (Flynn, 2015). Any corporation that creates a new product or process should complete each of these stages. However, organizational barriers are common when dealing with technological innovation. Some of these barriers include use of financial techniques, dependence on market research, and the tendency to focus on what worked for the company in

the past (Flynn, 2015). “Two-thirds of executives identified innovation as one of the five most critical factors required for companies to succeed and sustain a competitive advantage,” (Wong, Peko, and Piramuthu, 2016, p.336).

### Mobile Technology

We live in a very technological world. Multimedia is present in all parts of our lives. In the past, cell phones were used in case of emergencies, but we cannot live without them today. Mobile technological innovation is constantly expanding. Mobile devices are much more than cell phones. Tablets have become extremely popular and have become more popular than desktop computers. “Mobile technologies are defined as devices that include mobile phones, laptop computers, or PDAs and have wireless connectivity and some collaboration-enabling software application” according to Wong, Peko, and Piramuthu (p. 339).

### Evolution of Mobile Telephony

The discussion of mobile technology would not be complete without discussing the evolution of mobile technology. Innovation in mobile technology can be viewed as a series of S-curves. Figure 1 (Wonglimpiyarat, 2014) reflects the S-curves of mobile telephony and its rapid evolution. According to Wonglimpiyarat’s design, the rapid evolution of mobile technology in the 1980’s expanded the capabilities of mobile devices. The evolution of mobile telephony from analog cellular phones to wireless communications networks comes with a significant increase in capabilities.

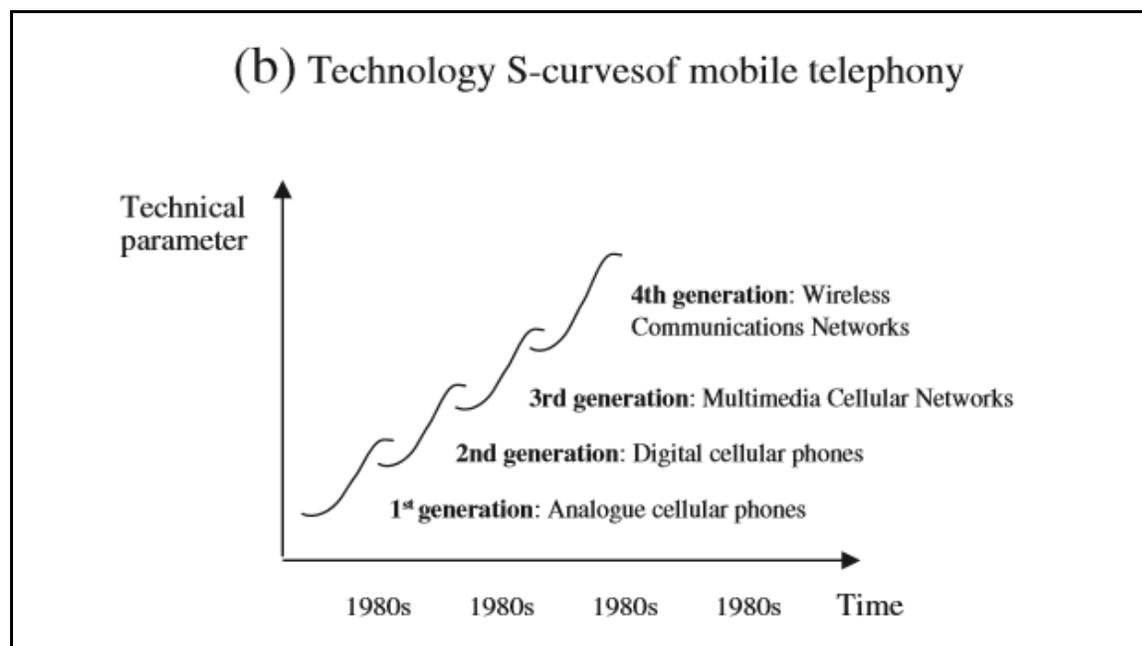


Figure 1. S-Curves of Mobile Telephony Evolution

Source: Wonglimpiyarat (2014)

The depicted fourth generation of mobile telephony in Figure 1 is inclusive of mobile technology that can handle information in digital form over wireless networks. Having this construct in place has positioned mobile technology for rapid expansion in terms of the types of information processed and handled by mobile devices and the associated networks. The increased capability of mobile telephony is evident in the prominence of mobile devices throughout today's society.

Phones have come a long way from corded home phones to cordless phones. Today, we have smart phones and tablets with wireless internet. Many tablets are even available with an internet connection when wireless internet is not available, often referred to as 3G or 4G, for an extra fee each month. Teenagers have constant access to the internet. With mobile devices, they can read books, play games, listen to music, use social networks, or browse the internet at any time.

Mobile technology continues to spread and have substantial effects on the way companies do business with each other and with their clients (Wong, 2016, p. 339). One of the biggest developments in mobile technology is the change of information systems. These have to be modified to allow mobile technologies to adapt to mobile businesses. Mobile applications allow for data to be shared securely between sources. For example, a banking application will allow customers to store their account information safely while paying bills or transferring money on a mobile device.

### **Mobile Banking**

The biggest mobile technology innovation is related to banking. Most banks today have applications that are available on phones and tablets. This has become very convenient for customers. Mobile banking apps allow customers to complete non-financial and financial transactions (Dash, Bhusan, & Samal, 2014). Non-financial transactions refer to viewing statements and balance inquiries. Financial transactions are transfers between accounts and bill payments. Banks continue to have traditional brick and mortar locations with drive-up windows, tellers, and other staff members to assist customers.

Mobile banking is a part of mobile commerce. Mobile commerce is the process of an electronic transfer of information on a wireless network by a mobile device, which actual or prepaid money is exchanged for goods, services, or information (Lotfizadeh, Ghorbani, 2015). Mobile banking has made many advancements, and a huge expansion of this modern approach of banking is expected in the future (Lotfizadeh, 2015). Customers benefit from mobile banking due to the constant access to their banking information. Customers are not the only ones to benefit from the innovation of mobile banking. Banks may have a better brand image, better responsiveness to the market, and an opportunity to maximize their profits (Romi, 2015).

SMS or text message banking has become an innovation in mobile banking. Customers can text a number provided by the bank to receive a balance inquiry. Alerts are also available via SMS messaging and email in the event that an account balance drops too low, a purchase is made without the card present, or an international transaction is made.

### **Mobile Banking Advantages**

It is obvious that the capabilities of mobile banking have several advantages. The ability for consumers to do more financial transactions with a mobile device continually increases. As well, banking institutions

have been able to reduce some operating costs associated with staffing branches. These advantages benefit both the consumer and the banking industry and will continue to do so.

Peoples Bank in Northampton has taken part in mobile technology innovation. It has begun to use two-way videos in the drive-up windows on iPad screens. Stacy Sutton states that customers receive a personal touch because they are able to see the teller, but the teller may be located at corporate headquarters (Bednar, 2016). "It would allow us to have longer branch hours and, from a staffing point of view, more tellers without having to spread them around the area," says Matthew Bannister, the bank's vice president. Customers will always need multiple ways to do their banking, such as online, mobile, physical banks, and ATMs (Bednar, 2016).

The mobile banking experience is also constantly changing. Customers can deposit checks and perform many other banking tasks online, including opening checking and savings accounts. It has been estimated that banks may save up to one-third of the cost spent per transaction if mobile banking is used (Boro, 2015). Time can also be saved in addition to cost. Mobile banking transactions are completed much faster than transactions processed at a bank.

Another advantage is the security of mobile banking. Transactions are currently conducted wirelessly over digitally encrypted signals. Secured transactions is a critical component in banking. Since communication is encrypted from the device to the destination consumers and banking entities can be confident that their funds will be secured.

Traditional banks and tech giants like Google recognize the potential for further advances in mobile banking. This space continues to evolve with deeper capabilities being offered via mobile. The convenience provided to consumers through mobile banking will continue to expand. Also, we will see traditional banking continually changed and shaped by how banking institutions interact with their customers.

### **Barriers to Innovation**

While innovation can lead to advantages for a company, there are always risks. The journal, *Consumer Adoption Versus Rejection Decisions in Seemingly Similar Service Innovations: The Case of the Internet and Mobile Banking*, discusses five adoption barriers that explain why customers may adopt, postpone, or completely reject an innovation. The five barriers are usage, value, risk, tradition, and image. Services that may be too complex and difficult to use can be delayed or rejected by consumers. Most mobile devices are small, which makes entering data more difficult and text harder to read (Laukkanen, 2016, p. 2434).

The second barrier, which relates to value and the intention to use, is also an issue with mobile and internet banking. The advantage of checking account balances on a consumer's mobile phone may be convenient but the app must work better than the alternative of going to the bank for a customer to change their minds about adopting this innovation. The most common risks associated with mobile banking are battery life and internet or wireless connection. Security is also a common risk, as data over a wireless network may not always be secure. A tradition barrier may also hinder consumers from adopting technological innovations. Paying bills through an application on a mobile phone is different from how bills are normally paid. Many older customers do not like change.

Image is the final barrier. It states that online banking may be difficult for customers because computers and the internet are hard to use (Laukkanen, 2016, p. 2434). This will also mainly apply to older customers. According to Laukkanen, men are more likely to adopt mobile banking innovations as well as internet

banking (2016, p. 2434). Additional challenges should be considered when implementing mobile banking. These challenges involve regulations to avoid banking crisis, economic environments, changing customers' behavior towards banks, and changing technology, as stated by Romi in *Mapping E-banking Models to New Technologies* (2015).

According to the American Banker, credit unions are also part of the mobile banking innovation. For example, a credit union in Washington will allow members to apply for loans on the app (*Five Mobile App Features that Show Yes, Banks Can Innovate*, 2016). Auto financing is also available in apps for credit unions. Mobile banking will continue to change for banks and credit unions. New technology will continue to allow these financial institutions to become more innovative and to provide greater benefits to customers across the globe.

### **New Trends in Banking**

Traditional brick and mortar banks are not only facing demands from consumers for more services. They are also being challenged by non-traditional sources. These looming forces are in the form of tech giants like Google. Traditional banking institutions are aware that radical change from technical giants may disrupt the banking industry. It is apparent that incremental change alone will not be enough for traditional banks to remain competitive in the near future.

According to Price Waterhouse Cooper (PwC) there are certain trends that are occurring in the financial industry that pose the industry for radical change. Among these changes are the changes in banking regulations that are forcing banks to have more money in reserves while lowering profits from fees. Technology is making transactions much less expensive for banks to conduct. Consumers now more than ever are likely to switch banks, as switching costs have been lowered - 9.6% in 2012 versus 7.7% in 2007 (PWC, 2014)

Being successful in today's competitive market means knowing your customers, meeting them where they are, and applying artificial intelligence to make the very best offer at the right time. It is the aspect in which the online banking has transformed, and will continue to transform our future, is through artificial intelligence (AI). Although there are already different countries that are using this form of technology, it is estimated that "almost every executive respondent business leaders in the banking industry will use AI by 2020" (Consultancy.uk, 2017). Currently, there are roughly 86% of businesses in the banking industry and FS sector that have stated that they are using some and or similar form of technology. In the configure shown in Figure 2 below, it transcribes different sections in which banks are already using AI.

### Where Banks are Using AI

(Banking and Financial Services): Percentage of Companies Using AI Today In Each Function



Figure 2. Where Banks are Using AI

Source: C. (2017, September 17). How Artificial Intelligence is transforming the banking industry

As AI continues to play a vital role in the future of the financial services sector (FS), it is important to understand the benefits that it can offer to continue to offer and create for the industries. According to Oliver Wyman, a manager at Management Consultancy Firm, one of the major ways a that technology is changing the banking and the FS industry is simply through automation. Currently, Barclays Bank has developed enhanced customer service expectations each day with use of AI. Right now, the company is creating an innovation that is like the phenomenon Siri, used in Apple iPhones, to allow consumers to talk to this device and receive information that they need for any transactions. Another substantial use for AI is assisting banks with loan management, determination of who can receive loans, investment management, and in which companies the bank should consider investing in. Venture Capital Firm Circle Up is currently using AI to determine which companies to invest in. Their online platform, Classifier, is assessing over 10,000 prospects in which deals can occur. Since 2014, Classifier has helped the company tremendously to increase the number of potential deals, and of course, to screen deals as well. Figure 3 provides clear statistics on where AI can have the largest impact by 2020.

### Where AI is Predicted to Have the Biggest Impact by 2020

(Banking and Financial Services): Business Function in Which AI Will Have the Greatest Beneficial Impact on Competitiveness by 2020

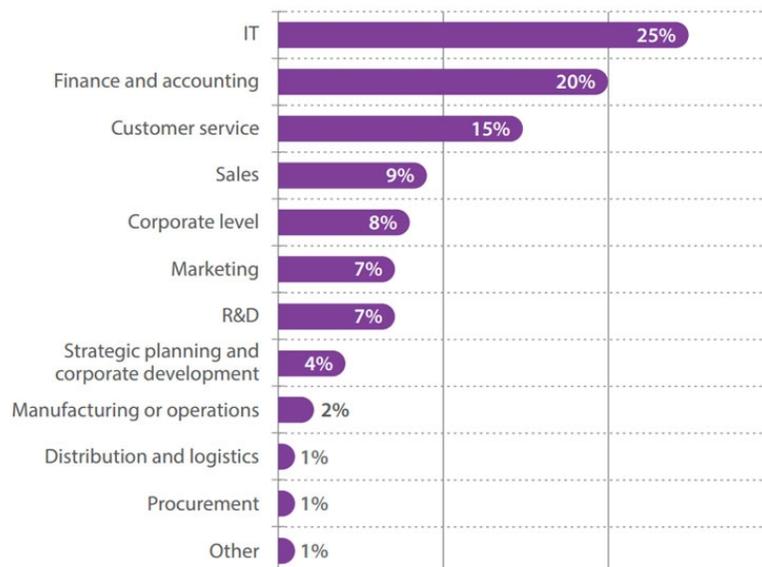


Figure 3. Where AI is Predicted to Have the Biggest Impact by 2020

Source: C. (2017, September 17). How Artificial Intelligence is transforming the banking industry

Another possible use for AI is banking security. With the use of AI, banks can obtain results from users with financial problems that might cause future issues with banks; as a result, banks can say no to risky consumers. Currently, 70% of FS executives are using AI technology to decrease and help secure banking from potential hackers and intrusions. With a great investment like AI, it is important to discuss the benefits that come with this form of technology. Based on TCS research, banking and FS executives found that “AI has helped decrease production cost by 13% and a total revenue increase by 17%.” Because of the use of technologies, companies will have to create new job opportunities for potential employers to manage and help develop these technologies. The banks that were surveyed calculated that there will be a 13% increase in new jobs that do not exist today by 2020. Overall, the use of AI has tremendously changed the banking world that we view today and will continue to grow and develop. The use of AI will not only decrease production rates, but it will increase total revenue and create possible new jobs for potential employees.

### Conclusion

Technology innovation is an integral part of today’s society. Its definition alone means new ideas, processes, and methods are being developed within the tech industry. Technology innovation has several phases and forms, including incremental, radical, and disruptive change. These changes typically are in phases of conception, approval, and implementation. Mobile technology is just one piece of the technological pie. Advances in mobile technology have moved from analog cell phones to wireless networks. The broadband capabilities of the wireless network provide the platform for mobile banking to

be established and advanced further. Mobile banking has advantages and barriers that will continue to shape the banking experience.

Consumers have yet to see the full potential of the advances of mobile banking. Mobile banking will continue to be enhanced as mobile devices become more prevalent in society. Traditional banking will change as technology innovators like Google begin to operate in the space. The technological innovations will result in more efficient banking that utilizes a highly accessible platform to deliver banking services to consumers in a secure seamless fashion. Both the banking industry and consumers will continually benefit from these advances well into the foreseeable future. The use of AI has tremendously changed the banking world that we view today and will continue to grow and develop. The use of AI will not only decrease production rates, but it will increase total revenue and create possible new jobs for potential employees.

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