# Disruption or Distraction: How Digitization is Changing Core Banking Systems?

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*Banking is now living in an omni channel world. Changing avenues for customers make banking easier, but nevertheless also potentially riskier. The transition of money — from physical money to e-money -- has also transformed the world of crooks as well; where petty thieves are now capable of committing online fraud. Retail banking has an impressive history of weathering the storms. Digitalization offers innumerable opportunities on one hand, while simultaneously posing new threats to banks globally. With each new day, the banking sector is a witness to at least one novel breakthrough in some corner of the world that has the potential to change the 'business as usual' approach in the coming years. The paper describes the key disruptive technologies impacting the banking sector, which are still at a low maturity stage in India and have the potential to grow big and create a defining impression. NFCs, Biometrics, E wallets, Social Media Analytics Predictive analytics, cloud technology and wearable technology have been discussed in detail. Digital technologies provide a great deal of growth benefits, alongside, providing the potential for greater efficiencies and reduced costs. The paper elaborates on the risks they pose, the impact they have on Indian as well as the global banking sector and recommends strategies to survive and prosper in the digitally challenging environment as existing banks no longer have large profitability buffers and are struggling to stand stable. This article explores whether the digital disruption of banking is a 'disruption' or more of a 'distraction' and aims to understand the concept of digital disruption of banking, what is driving it, what are the impacts on banks, and what are the impacts on financial system stability.*

***Keywords:*** *Disruptive technologies, banking, predictive analytics, cloud, NFCs, Biometrics, Social Media Analytics, wearable technology.*

## INTRODUCTION

Consumers now expect the same seamless digital services from banks as they receive from other industries. Hence, the banking industry is being 'digitally disrupted' as banks and technology firms race to meet this expectation. This article explores whether the digital disruption of banking is a 'disruption' or more of a 'distraction' and aims to understand the concept of digital disruption of banking, what is driving it, what are the impacts on banks, and what are the impacts on financial system stability. It finds that the disruption is occurring in all areas of banking but particularly in retail customer interactions. The introduction of new 'digital' competitors is driving banks to respond with digital strategies including the modernisation of their core banking systems. Digital disruption may impact financial stability both positively and negatively. A technological revolution is transforming the financial services industry by empowering consumers to connect with financial institutions and with each other in newer and faster ways. This revolution is positively impacting financial inclusion around the world as lower income consumers with limited access to services are benefitted in many ways through this.

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Impact of disruptive technologies growing in financial service sector especially in retail banking sector and 72% regard the threat as high or very high from at least one group of potential competitors (tech companies, start-ups, retailers, insurers and telcos). The highest perceived threat is from tech companies like Google and Apple, seen as high or very high by 45% of banks. The next highest perceived threat is from start-ups, rated high or very high by 41% of banks. Much less of a concern is the threat from telcos, retailers and insurers [(1)]

**A report from the World Economic Forum in collaboration with Deloitte says that** rapidly advancing technologies, evolving customer expectations and a changing regulatory landscape are opening doors to disruptive innovation in financial services. From crypto-currencies to big data to peer-to-peer lending, fintech innovations have captured the attention and imagination of customers, investors and incumbents [(2)]

Technology is upending workflow and processes in the financial services industry. Tasks once handled with paper money, bulky computers, and human interaction are now being completed entirely on digital interfaces.

The chart above explains the various technologies which is leading to digital disruption in banks across the globe.

It is no surprise that on similar lines the banking and the financial services industry are facing the storm of technological innovation. Indeed, for the last decade, digital startups have been making inroads in traditional banking. Banks face intense pressure to increase efficiencies and reduce costs while delivering next-generation digital services; however, incumbent application vendors have been slow to respond to new requirements, according to a new report from Gartner, Inc.

But there is reason to believe that banking will prove to be resilient and will fight back. Gartner predicts that by the end of 2019, 25 percent of retail banks will use startup providers to replace legacy online and mobile banking systems.

"Startups and emerging providers of digital banking platforms offer banks interesting opportunities for innovation," said Stessa Cohen, research director at Gartner. "However, CIOs must prepare to manage the challenges of evaluating and selecting new vendors that may not have proven track records in the financial

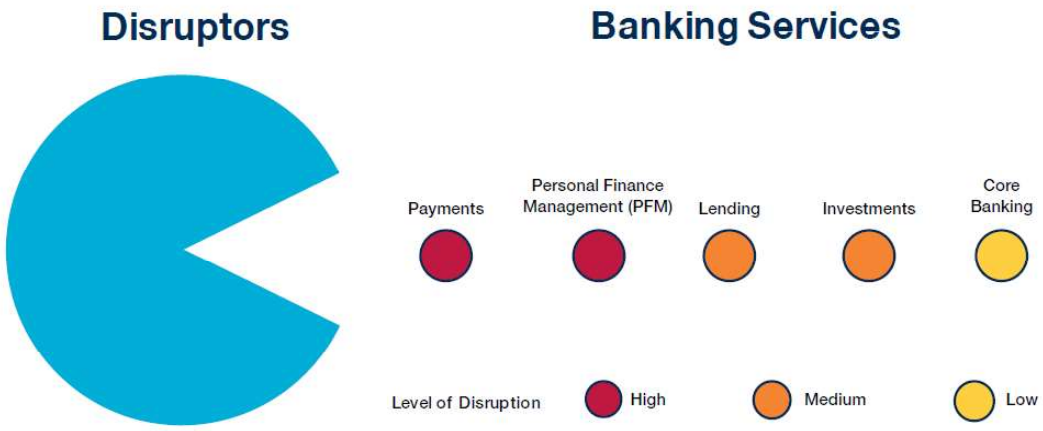



**Figure 1: Digital Disruption in Banking**

*Source: Capgemini Financial Services Analysis, 2015*

services vertical or may simply be new and untried without an extensive customer base. It can be difficult for CIOs to justify investment in their solutions to their boards and regulatory agencies, but don't use that as a reason to exclude new vendors."

A survey by McKinsey & Company of the customer segments and products of 350 globally leading financial technology firms (or leading 'disruptors') revealed that all banking segments are at risk of disruption. However, the main area of concentration of these disruptors is the retail sector, and the various products and services tied to payments, lending and financing[12]. Between 2000 and 2015, the global internet penetration grew seven fold from 6.5 per cent to 43 per cent, while in India, internet penetration for individuals grew exponentially - from less than a per cent to 30 per cent[4]. Moreover, the regulatory policies and the push on financial inclusion with intense competition from banking and non-banking players, have further sharpened the need for banks to go digital.

## Objective and Methodology

The paper describes the key disruptive technologies impacting the banking sector. Digital technologies provide a great deal of growth opportunities, alongside, providing the potential for greater efficiencies and reduced costs. The paper elaborates on the risks they pose, the impact they have on Indian as well as the global banking sector and recommends strategies to survive and prosper in the digitally challenging environment as existing banks no longer have large profitability buffers and are struggling to thrive.

## Data

Secondary data used for the paper were many research reports and white apers on the digital technologies impacting the banking sector.

As per the maturity assessment model, shown in Figure 2, the technologies which were at a low maturity stage in India, with however most of them in the mature stage in developed

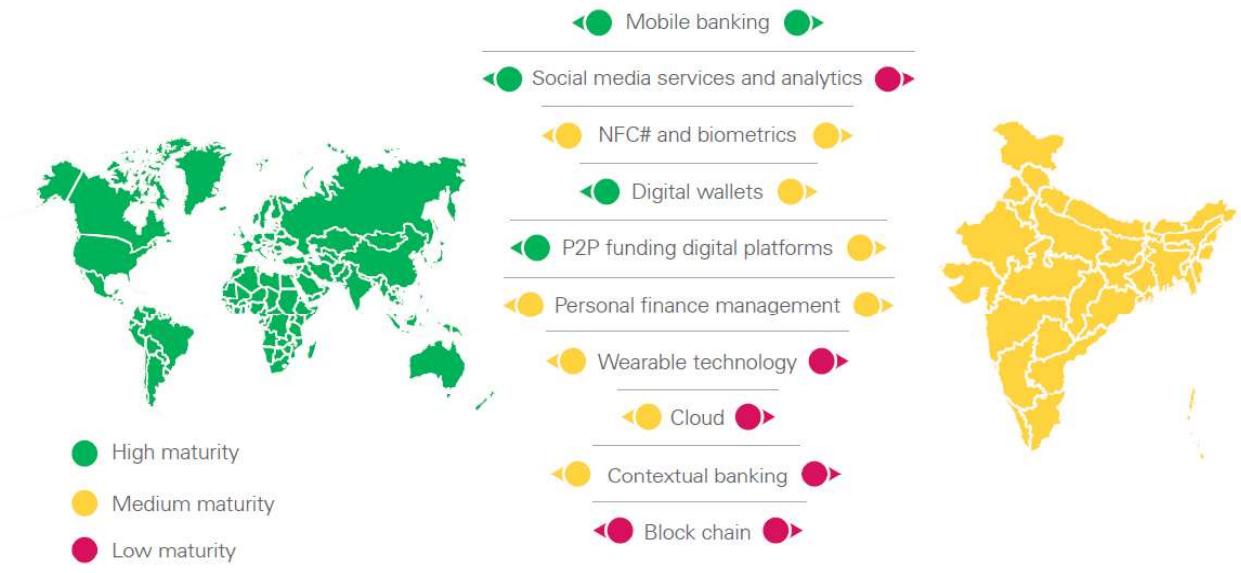



**Figure 2: Digital maturity assessment for global and Indian banking sectors***

*Source: KPMG in India's analysis based on industry discussions, 2016.*

nations have been discussed in detail because as they grow, they will have important implications on the workings of the banking sector. They are:

- E wallets
- Biometrics
- Predictive analytics
- Wearable technology
- Cloud technology

### *E Wallets*

These days' consumers are more inclined towards mobile payments. Mobile wallet usage has been rising steadily among consumers across. For many, it's more convenient than having to use cash or even a credit or debit card. Gartner estimates that mobile payment volume will nearly triple in the next three years.1 A mobile wallet lets a consumer choose between payment methods on the fly and the ability to control all of their payments through a single device. Banks and financial institutions' marketing teams that want to take advantage of mobile payments and the mobile wallet trend will need to act fast to capture this growing segment of the market.

A notable disruption in payments services is the rise of disruptors offering person-to-person payments and person-to-business payments. Payments innovations are attractive to consumers as they offer fast and convenient methods of making payments compared to the batch payments processing currently offered by retail banks.

Electronic wallets include PayPal, Apple Pay, Google Wallet, PushPay, and Visa Money Transfer. Generally these wallets operate as accounts (either online, on a mobile application

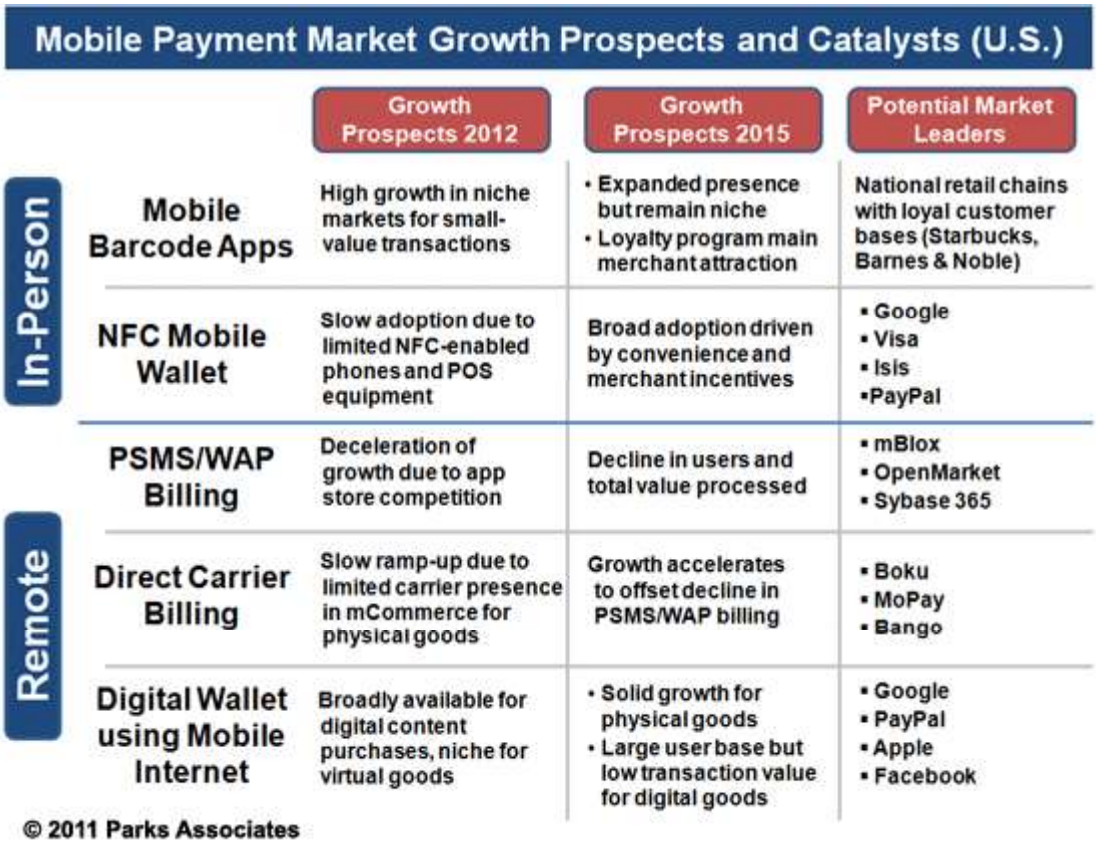



**Figure 3: Mobile Payment market Growth prospects and Catalysts.**

or attached to a credit card) where funds are loaded and stored in the E wallet, or where funds are uploaded into the wallet after a payment instruction has been made. Funds can be uploaded into the wallets via credit cards or direct internet bank transfers.

These wallets enable 'real time' funds transfers which mean that once funds are uploaded into the digital wallet they can be instantaneously transferred to a receiver's wallet by simply recording the new balance of each wallet. There is no lag time as all the funds are held within the wallet provider and only the respective wallet balances require updating.

Hence, the wallets provide a simple and fast payment instruction process and faster payment settlement between accounts. Some electronic wallets may operate more simply as a payment instructor that does not upload funds into an online account, but that instructs an internet bank transfer from one bank (of other financial institution that has the ability to act as a card issuer) to another.

*The emergence of electronic wallets is disruptive to banks as it has the potential to separate banks from their customers' payment data because the bank can no longer see where the money is spent – the bank can only see that payments are going to payment services. In addition, banks may lose some customer relationships as customers can use alternative payments services for payment instructions, despite the bank providing the back-end payments settlement services. If disruptors take a share of the customer relationship and data, they reduce the banks' ability to cross-sell and develop new products that anticipate customers' needs. This could then affect banks' profitability*

### Biometrics

Biometric technologies analyze unique biological traits that differentiate one human being from another, such as fingerprints, the retina or iris or the pattern of an individual's voice. Data gathered by some of these technologies, particularly iris patterns and fingerprints, are unique enough to distinguish a single individual from the entire global population.

Biometrics in banking has evolved over the years, starting from the 1970s, and has attained some level of maturity. On analyzing various press releases on the Finextra portal, a specific trend is seen emerging. Until 2005, the financial services world used fingerprints, signature recognition, vein pattern, and hand geometry; and after that (post 2005), the technology extended to include Voice Biometrics, Iris Scan, Face recognition, among others.

The negative factors in the growth of biometrics have been higher cost, ambiguity related to standards, and the proliferation of diverse technologies. The world needs simplicity and ubiquity for a technology to succeed. And, probably we are in one such watershed moment, where biometric standards are in place, and where mobile devices with fingerprint biometrics technology can shift the cost burden from bankers to the consumer. Fingerprint biometrics seems to be the new buzzword that will bring in disruption in the mobile banking transactions space. .

It assures the convenience of use and delivers the prospect of fraud prevention at the customer end — a secure first level access point to facilitate safe and seamless mobile transactions. While a few analysts still remain skeptical about the role of biometrics in future fraud-prevention capabilities, it looks like banking consumers are gradually embracing it. A survey commissioned by ANZ showed that 79 percent of Australians said that they are comfortable with fingerprint technology replacing banking PINs.

### Predictive Analytics

**Predictive analytics** ingests and analyzes diverse data types—including unstructured "big data"—to develop predictions about the likely behaviors of individual customers. It analyses historical experiences to ascertain the explicatory

variables of customer, risk, cost, and other key dimensions to predict the future behavior and outcome. It is a data mining solution and comprises methods and algorithms that are used on all data types (including structured and unstructured data) for predicting the outcome. This tool also provides the functionality of adaptive analysis whereby projections are continually updated and adjusted in response to a customer's interactions with the business.

### *Benefits*

- Reduce risk by combining structured and unstructured data to better evaluate claims, customers and applicants, enabling you to approve more customers for higher credit limits, without increasing default rates.
- Increase profitability and customer loyalty by managing segmentation rules for predicting, guiding and responding to customer actions.
- Eliminate errors with decisioning flows that can be managed and deployed across multiple environments, without the need for reprogramming.
- Satisfy regulatory mandates like Sarbanes-Oxley with access control and versioning history that increase transparency and consistency across all departments and roles
- Mitigate fraud by detecting anomalies and/or systematic characteristics of fraudulent transactions, whether processing large data volumes in milliseconds or flagging suspect incidents in real time

While retail banks leverage predictive analytics for cross-selling, reducing customer attrition, and acquiring customers; its use in wholesale banks is very low. Today, predictive analytics is not used much in wholesale banks for revenue preservation and growth. rather, it is primarily focused on the risk aspects — portfolio risk analysis, underwriting, fraud detection, etc. The revenue analysis tools that are used currently are rarely predictive, especially at individual customer level. Instead, they focus on the entire customer segment or portfolio. Analytics tools won't provide them any new insights. They rely heavily on personal relationships with customers to ascertain their needs and sales potential. This along with the fact that there are relatively smaller numbers of wholesale banks' clients has led to minimal adoption of predictive analytics. However, their usage is prevalent in some functions of the bank. They can be illustrated as follows:

Types of analytics used in banking: Broadly three types of analytics are used in banking. They can be stated as:

- Consumer behavior and marketing analytics
- Risk,fraud analytics and AML/KYC analytics
- Product and Portfolio optimization modeling

### Consumer Behavior and Marketing Analytic

Advanced analytics now offersbanks the power to study their customers and prospects like never before. Banks that leverage analytics to study customer behavior have been able to significantly improve marketing outcomes (greater topline impact, ability to leverage digital channels, and faster time-to-market) without aproportionate increase in marketing budgets. Key benefits reported include increased ability to identify profitable customers, expand wallet share with profitable customers, identify relevant cross- and up-sell opportunities,migrate customers from less profitable relationships to more profitable ones,acquire new profitable customers by targeted marketing campaigns, and launch new product offerings that are in line with customer expectations

### Risk, fraud analytics and AML/KYC analytics:

Risk modeling and analytics allow financial institutions to analyze any/all portfolios (of assets as well asliabilities) to forecast likely losses, and make provisions for those adequately.

Analytics also enables banks to understand risk dimensions faster, without expanding the pool of human resources. Advanced analytics solutions also help reduce the complex and expensive burden of compliance on AML and KYC departments.

Effective use of analytics to fight fraud helps improve profitability, reduce payouts and legal hassles, and most importantly, improve customer satisfaction. Analytics bolsters the ability of existing fraud experts to focus on real threats more efficiently and effectively (by expanding monitored transactions and reducing false alerts). Automated alerts can also be sent to the customer directly. Advanced analytics also helps recognize patterns of fraudulent transactions, and then use these to be one-step ahead of fraudsters, predict the next such fraud in progress, and recommend preventive action for saving both the bank and the customer. This also helps-banks in protecting themselves against potential fallout(non-compliancefines and reputation loss risk, amongst others) of AML incident

## Product and Portfolio Optimization Modeling

Advanced portfolio analytical solutions not only help determine asset pool quality, they also help to determine prepayments, delinquencies, defaults, and cash-flows. Analytics allow firms to adjust LTV ratios, in accordance with regulations, to meeting capital requirements. If the mortgage portfolio is used for trading/investment, it can also be used to calculate various portfolio risk measures (for instance VaR)

### *Wearable technology*

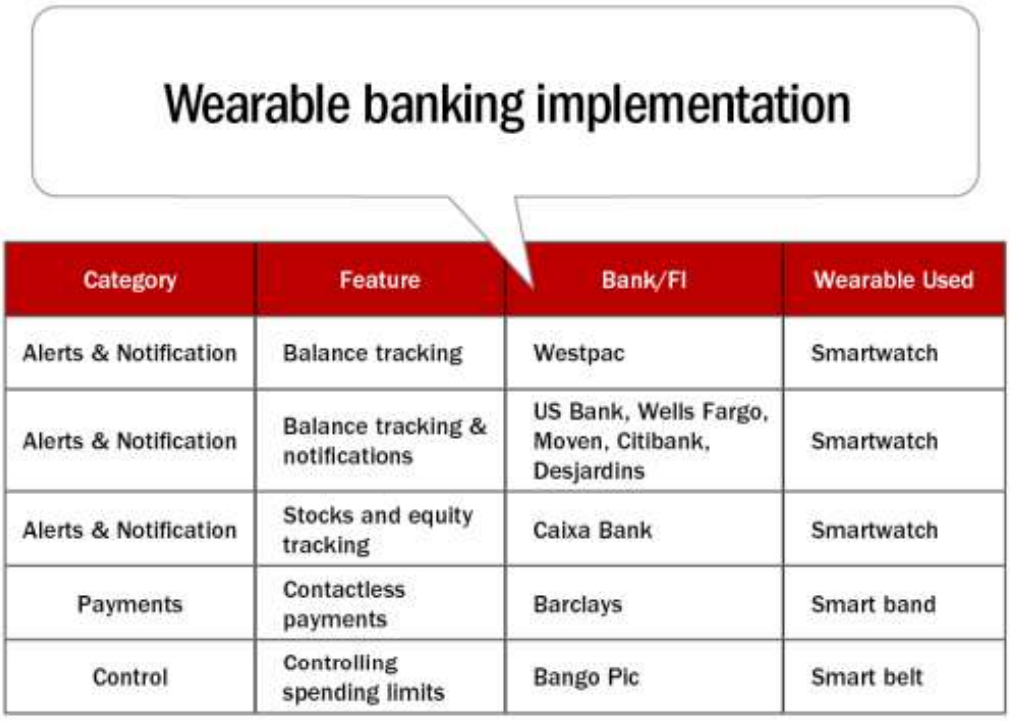
'Wearable technology' is everywhere, from Google Glass to the much anticipated Apple iWatch and the plethora of fitness trackers like Fitbit. More than 17 million wearable devices, including smart watches and fitness wristbands, will ship in 2014 alone, according to Mashable, global, multi-platform media and entertainment company. Wearable tech is not an isolated phenomenon, but part of the larger wave of the 'Internet of Things', with a potential economic impact of up to $6.2 trillion annually by 2025, according to a report by McKinsey.

"Wearables are going to be part of the future of banking, and not too long from now," says Clayton Locke, chief technology officer of Intelligent Environments, a British firm which built one of the first banking apps for the popular Pebble smartwatch. "It is about making banking and payments more convenient for the user. It won't be for everyone, but there will be enough people out there who will be wearing an Apple Watch that will want to have their financial information on their wrist."

And it's a lucrative market: by 2018 the number of shipments of wearable devices is predicted to reach 130 million – ten times higher than in 2013[5]. A combination of two factors-strong demand and high price points are expected to help push global retail revenue up to $19 billion by 2018[6].

Less conspicuous, and therefore more popular among consumers, are smart watches. Research published in May 2014 highlights a 250 per cent growth in global shipments of smart watches in the first quarter of 2014[4]. Current estimates predict that 91.6 million smart watch units will sell globally in 2018[7]. With the average smart watch selling for in the region of $100, that's a $9.2 billion market[8].

Accenture's Wearables Lead Brent Blum told **Bank Innovation** that 41% of people plan to buy a smartwatch in the next five years. Blum pointed out that "watch" is a bit of a misnomer for Apple's device. It is a wristband with many capabilities, including health monitors familiar to wearers of Fitbit and the like. Many claim the Apple Watch will be the driving force for the growing popularity of wearables. According to Canalys, the 720K Android Wear devices shipped in 2014 was a fraction of the 4.6 million smart wearable




| Category | Feature | Bank/FI | Wearable Used |
|---|---|---|---|
| Alerts & Notification | Balance tracking | Westpac | Smartwatch |
| Alerts & Notification | Balance tracking & notifications | US Bank, Wells Fargo, Moven, Citibank, Desjardins | Smartwatch |
| Alerts & Notification | Stocks and equity tracking | Caixa Bank | Smartwatch |
| Payments | Contactless payments | Barclays | Smart band |
| Control | Controlling spending limits | Bango Plc | Smart belt |

**Figure 3: Future of Wearable Technology**

*Source: The Financial Brand, May 2015*

bands sold. Still a few progressive and future focused banking organizations have started tech trials for particular wearable devices and may be ahead of the curve:

While it is very difficult to determine growth for new technologies, estimates were made as part of the BI Intelligence Wearable Market Report. Here are some of the expectations.

- **Wearable's are expected to see significant growth**: Globalwearable's market will grow at a compound annual rate of 35% over the next five years, reaching 148 million units shipped annually in 2019, up from 33 million units shipped this year.
- **The smart watch will be the leading product category and take an increasingly large share of wearable shipments**: Smartwatch shipments will rise by a compound annual rate of 41% over the next five years. Smartwatches will account for 59% of total wearable device shipments in 2015, and that share will expand to just over 70% of shipments by 2019.
- **The Apple Watch will kick-start growth in the overall smart watch market**: The Apple Watch will account for 40% of smartwatch shipments in 2015 and reach a peak 48% share in 2017.
- **Barriers still persist, and these will inhibit consumer wearable's adoption and usage**: Smart watches in particular must become standalone computing devices with more robust functionality for the devices to become mainstream. Other barriers include small screen size, clunky style, limited battery life, and lack of a "killer app" that can drive adoption.

We as a community are about to hit another massive shift in technology – a shift that will give rise to new companies, and kill or cripple those, including banks, that fail to adapt. Any day

now, customers may want to wear their bank. Can banks count on themselves to fashion this change?

## Cloud Technology

Banks are adopting cloud technology to implement virtualized banking and leverage big data in a more cost effective manner.[9] Cloud computing offers scalable and cheaper application portability across multiple devices instead of using in house servers and databases. The cloud is leveraged for CRM, data storage, application development, email, back-end services and virtual desks. Banks are also offering cloud services to consumers as an option to store banking-related documents.

## Defining Cloud Computing as Disruptive Technology

To analyze whether cloud computing could be considered a disruptive technology, three criteria as developed by Harvard Business School Professor Clayton Christensen in "The Rules of Innovation." The first two rules focus on the markets that cloud computing impacts, and the third centers on the ecosystems that support its success.

1. Cloud computing as an innovation must enable less skilled and/or less wealthy individuals to receive the same utility as was previously available only to more skilled and/or more wealthy individuals.
2. Cloud computing must target customers at the low end of a market with modest demands on performance. However, it must do this with a performance trajectory capable of exceeding those demands and take over markets tier by tier. As a corollary to this second criterion, the cloud computing business model needs to allow the disruptive innovator to achieve attractive returns at prices that are unattractive to the incumbents.
3. Cloud computing must be supported by an ecosystem structured as either a fully integrated end-to-end entity or a set of nodular, niche entities.

Cloud computing can help banks improve performance in a number of ways:

- Cost Savings and Usage-based Billing: With cloud computing, financial institutions can turn a large up-front capital expenditure into a smaller, ongoing operational cost. There is no need for heavy investments in new hardware and software. In addition, the unique nature of cloud computing allows financial institutions to pick and choose the services required on a pay-as-you-go basis.
- Business Continuity: With cloud computing, the provider is responsible for managing the technology. Banks can gain a higher level of data protection, fault tolerance, and disaster recovery. Cloud computing also provides a high level of redundancy and back-up at lower price than traditional managed solutions.
- Business Agility and Focus: The flexibility of cloud-based operating models lets banks experience shorter development cycles for new products. This supports a faster and more efficient response to the needs of banking customers. Since the cloud is available on-demand, less infrastructure investments are required, saving initial set-up time. Cloud computing also allows new product development to move forward without capital investment. Cloud computing also allows businesses to move non-critical services to the cloud, including software patches, maintenance, and other computing issues. As a result, firms can focus more on the business of financial services, not IT.
- Green IT: Organizations can use cloud computing to transfer their services to a virtual environment that reduces the energy consumption and carbon footprint that comes from setting up a physical infrastructure. It also leads to more efficient utilization of computing power and less idle time.

## Strategies to Survive Digital Disruption

So how does an incumbent banking organization survive or even thrive in the face of digital disruption? While there is no magic formula, there are strategies that can help organizations be more prepared for the inevitable change on the horizon.

1. **Assign Transformation Roles**: Accenture recommends governance built on three roles supporting 1) the technological changes required; 2) the impact on the current organization model, and; 3) the needs and trends of the digital consumer. "While taking on these important roles, these 'entrepreneurs' need to work in a highly collaborative manner, setting the digital vision, selecting the options to be launched, defining the digital capability development strategy and guiding the long-term transformation of the core bank to scale up innovations across the enterprise," states Accenture.

2. **Adopt a 'Digital Mindset'**: To respond to digital disruption, financial organizations will need to evolve their internal and external cultures. 'Being digital' requires rethinking all aspects of conducting banking in the eyes of employees and in the eyes of the increasingly digital consumer.

   Changing internal processes, moving to contextual engagement and operating in real-time are all foreign concepts for most financial institutions. A major internal change will also include the increased use of data and analytics to initiate and support decision making, product development and distribution.

   Attracting and retaining top digital talent that can support this internal culture shift will become a priority. According to Accenture, "Sixty-one percent of digital organizations see shortages of digital skills as a top challenge in digital transformation and are concerned about how they can attract and retain top digital talent."

3. **Monitor the Marketplace**: Leverage tools and marketplace futurists to recognize when change is on the way, and to help interpret the meaning behind seemingly random events with insight and clarity. The key is to learn not only whom to listen to and when, but also how to react once a trend or change in the marketplace occurs.

4. **Slow the Disruption**: While it is almost impossible to stop disruption once it has begun to gain scale, roadblocks can sometimes be put in the way of disruptors to slow the transformation. This may include the lowering of prices if the disruptor is competing on price, or competing with the new entrant on a new battlefield or by partnering with a competing offering. As with all of the responses to disruption, speed is of the essence.

5. **Exit Business Lines or Strategies**: Digital disruption can quickly result in a depreciation of value of a current line of business or strategy. Borders, Circuit City, Blockbuster and many other once revered brands are illustrations of how entire industries can be upended.

   In financial services, industry watchers may believe banks abandoned small business payments when few organizations responded to the infiltration by Square and PayPal. Other observers may wonder how long legacy banking organizations will continue to support massive, large footprint brick and mortar facilities at a time when there is a mass exodus to digital banking.

6. **Diversify**: "Diversification has always been a hedge against risk in cyclical industries, states Downes. "As industry change becomes less cyclical and more volatile, having a diverse set of businesses is vital." This is where ongoing innovation and the potential for financial and non-financial partnerships become important.

## CONCLUSION

Digital disruption is changing the way consumers interact with their banks both globally and in India. The disruption is driven by evolving consumer demands and enabled by new technologies. While basic banking services do not appear to be challenged by digitization, there is evidence of disruption at the front-end of banking services.

Banks must approach their digital opportunities and threats from the vantage point of senior business and technology leadership. Shrinking markets and global competition pose numerous challenges for banks. The disruptive technologies offers the speed, flexibility and real time information needed to meet those challenges on a cost effective basis.

Consequently, banks are motivated to adapt and develop new forms of providing their services in order to remain competitive. A key challenge that banks face in their ability to join in with the digital disruption is their large and complex core banking systems.

This disruption may ultimately improve the soundness of the financial system by reducing the systemic importance of individual banking institutions, thereby decreasing moral hazard and the potential impacts of a single failure. However, in the medium term digital disruption may introduce new risks to the systems if unregulated entities provide a significant portion of banking services and if existing banks no longer have large profitability buffers. The Reserve Bank will continue to monitor the impact of digital disruption on the banking industry in line with its statutory objective to promote the maintenance of a sound and efficient financial system.

Global economic situation to more stringent regulatory controls, nimble new competitors, and shifting customer expectations, bankers and others now face a dramatically different market reality. Banks must collaborate and technology must be part of that collaboration. This paper focuses on different types of disruptive technologies which are either at the growth stage or at the seed stage of development in India visa vis other developed countries. The paper also discussed few strategies which banks can adopt to survive the digital disruption like monitor the market or diversify. The paper would like to conclude that you can't avoid digital disruption in banking industry but can make strategies to adopt the same to increase revenue and growth.

In the last we would like to conclude that with disruptive technologies challenging the traditional banking model from every side, what can banks do? A piece of advice for banks: "Become customer advocates...Become digital delivery platforms...Understand change is good."

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