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DIGITAL Banking is the new paradigm that offers considerable benefits to banks in terms of increasing productivity and profitability. It is accomplished by leveraging state-of-the-art technology infrastructure to bring about changes in internal processes and external interfaces. It is expected to improve the 4Cs – cost, convenience, control and customer experience.

It is difficult to define exactly what digital banking is and to say when any bank has become totally digital. It is equally difficult for an individual bank to make an assessment of itself, draw plans and take necessary steps to attain the status of a digital bank. It is in this context that a need has been felt to provide a framework that can help banks in their efforts to move towards digital banking. The present framework presents a holistic way of defining and designing a digital bank. It provides goals, maps and signposts in the digital banking journey.

The framework comprises various definitions of a digital bank followed by the overview of distinct functions/dimensions of a digital bank. Then, the building blocks of a digital bank are spelt out followed by recommendation of a maturity ladder diagram, which identifies sequential levels in transforming itself into a digital bank. This maturity diagram can be used by all banks in order to assess them as to where they stand and steps to proceed further. A few international cases of digital banking implementation have also been presented to help banks.

The framework is the result of the collaborated efforts of the group comprising IDRBT research team, bankers, IT professionals and consultancy experts. It is expected that all banks, especially those which are in the process of setting up their systems, will be immensely benefited by the framework.

Date: November 16, 2016
Place: Hyderabad

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Director, IDRBT
Chapter 1

Introduction to Digital Banking

The term “digital banking”, just like any new buzzword, means different things to different stakeholders in a service organization. For instance, for customers, it can mean myriad new services and products resulting in a pleasurable buying/spending experience. For the decision-making team in the organization, it could mean setting up of state-of-the-art ICT infrastructure coupled with a good dose of analytics in order to provide an excellent customer experience, which is a precursor to having sustained and profitable customer relationships. For the regulator or third party, it could mean the ability to provide accurate and reliable information on the fly.

Fig. 1. The Digital Information Super Highway

To start with, let us distinguish between the terms “digitization” and “digitalization”.

The term “digitize” describes the process by which any form of data is converted into a digital format. For example, converting an analog audio signal into its digital form; converting credit records and applications into a soft copy, usually into a database, etc. In a broader business context, “analytics” can be considered as further digitizing the information into new knowledge or insights in order to make a decision.

The term “digital” is typically used to refer to the storage of data in the form of digital signals represented using the numbers 1 and 0. Here, the term refers to information and the format in which it is stored, such as digital music, digital customer records, etc.

The term “digitalization” goes beyond simply digitization. In this sense, books don’t simply become eBooks, but a complete interactive and multimedia experience; business processes give way to online dialogues between parties that were not previously connected directly. Thus, an organization in order to become digital might focus on the automation of processes to make it more efficient. A company focusing on digitalization might aim to realize more effective outcomes from those processes by improving the customer engagement. In view of the foregoing, henceforth, throughout the manuscript, digitalization would be used as digitization (which is a subset of it).
Digital Banking Definition

We cannot have a standard definition for digital banking. Different people have given different definitions. Some of them are as follows:

“Digital Banking—a new concept in the area of electronic banking, which aims to enrich standard online and mobile banking services by integrating digital technologies, for example strategic analytics tools, social media interactions, innovative payment solutions, mobile technology and a focus on user experience.”

“Embracing a fully digital strategy requires end-to-end modernization of a bank’s often outdated infrastructure. Equally important, it requires a transition from an account-based view of banking customers to one that knows them as individuals and enhances the customer experience with relevant, convenient and personalized products and services.”

“Digital Banking is the application of technology to ensure seamless end-to-end (STP in the 'old' jargon) processing of banking transactions/operations; initiated by the client, ensuring maximum utility to the client in terms of availability, usefulness and cost; to the bank in terms of reduced operating costs, zero errors and enhanced services.”

However, any definition of digital banking is only centered around enhanced customer service and user experience based on their engagement, expectations and experience, which can be captured in a variety of datasets resulting in a huge repository which is akin to a digital super highway (see Fig. 1).

Why To Go Digital – Advantages of Becoming A Digital Bank

Worldwide, the trends have been very clear and consistent:

- Customers are becoming increasingly comfortable with transactions on digital channels – whether for product purchases or services
- FinTech platforms and services have responded to e-commerce and mobility with disruptions across the board – resulting in loss of opportunities and value for the traditional banks
- The cost of meeting tough regulations, has eaten into the allocations for investment in business and IT, which then makes banks less competitive, eventually affecting their bottom line even more.

Basically, banks are facing questions of:

- Remaining relevant in view of ever-changing consumer behavior and changing business model for several industries
- Exploiting the ability to tap into increasing digital awareness, and huge amounts of digital information about the customer via social networks
- Reengineering extant business processes and building technology platform in order to manage customer expectations like personalized services and integration of information across channels for a seamless experience
- Facing challenge of competition from less regulated and more agile FinTechs
Coping with increasing cost and complexity of regulations and reporting. Digitalization is the only way forward to meet these demands.

**Expanding Digital Banking Generates Even Greater Opportunities**

Clearly, offering full-featured digital banking services can increase customer satisfaction for Financial Institutions (FIs), but doing so can also help them reach other business goals. One of the most immediate advantages is reduced costs. With the High Networth Individual (HNIs) customers placed (sited) on online and mobile channels, FIs have a rare opportunity to make investments that can increase customer satisfaction, loyalty and control costs.

Another important business goal is customer acquisition. Well-developed digital channels create opportunities for FIs to address this challenge as well as increase their share of wallet and expand their market share. The foundation of these opportunities is the data that digital channel transactions generate on customer behavior, such as buying habits. This data, which is objective and gathered without human intervention, can show how customers behave throughout all channels. When data from multiple channels is combined, FIs can see a clearer, more complete picture of their customers.

With an improved understanding of their customers, FI can personalize the customer experience and recommend new products and services, both of which aid customer retention. These advancements can, in turn, drive adoption of digital banking services, thereby improving FI efficiency, and attract new customers, especially those in younger demographics.
Chapter 2

Distinct Functionaries/Dimensions of a Digital Bank

In order to understand the key distinct functions of a typical digital bank, we need to understand and appreciate the fact that a bank has both external and internal facets. While the external facet refers to the customers (both retail and corporate) of the bank, the regulator and other competing banks and partners, the internal facet includes treasury, back office operations and HR department. The extant literature, including several survey reports, on digital banking places a lopsided emphasis on the external facet of the bank for the reason that it improves the bank’s bottom line. This framework takes a pragmatic view on digital banking and proposes a comprehensive strategy of digital banking that includes the internal facet as well and it is accorded at least as much importance, if not more, as the external one. Thus, this framework looks at digital banking in a holistic perspective and hence differs from the extant literature.

Under this framework, therefore, there are predominantly eight dimensions of a digital bank as depicted in Fig. 2. Let us briefly describe these dimensions:

**External Face:** This dimension subsumes regulatory and operational aspects of banking. In turn, operational aspect subsumes the dimension of customer/sales and services. These are the first two circles in Fig. 2.

**Customer/Sales/Services:** This is the very purpose for which a bank is set up, primarily because banking is predominantly a service industry. In this dimension, digital banking, essentially, concentrates on providing a seamless, pleasurable customer experience. In order to accomplish it, a digital bank is expected to implement holistic CRM (subsuming operational, analytical and collaborative CRM). Customer Centric Business Models are based on a holistic understanding of the customer, and are used to achieve a strong digital engagement, eventually leading to highly personalized, co-created products and services using data and analytics (along the Digital Maturity Continuum¹ with respect to product/service offering). Such a model requires strategic focus on:

- Developing an Omni-Channel Integrated Platform – to enable consistent user experience across all the channels (online, mobile and social)
- Developing the capability to acquire, integrate and analyze multiple sources of internal and external data – to understand the customer and her context better

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¹Limited services provided => Some services provided => Advanced services provided => Co-creating products and services.
• Understanding and defining relevance and timeliness for the customer – to tailor processes from the point of view of the customer.

Regulatory/Other Banks' dimension comprises seamless communication of several business-level, fraud-related reports to RBI. This process should be made as automatic as possible in order to become fully digital. This dimension also involves seamless communication between various commercial banks in order to have smooth banking operations.

Ability to proactively manage risk (financial, operational, reputational) and regulation in a demanding business environment, with exposure to constantly evolving technology platforms, is the most important benefit to be achieved from digitization. Integration of risk and compliance within the digital channel must improve, from being based on customer or regulatory complaints, to becoming embedded in the lifecycle/digital strategy for products and services. This requires the capability to allow underlying business processes to seamlessly exchange information – access changing sets of risk and regulatory requirements, rules and constraints as context for (or an aspect of) the business process itself, and at the same time proactively provide necessary data for managing business risks (which may require collation across business processes and verticals). Fundamental to this capability, is the handling of huge volumes of data at scale, sometimes generated as a byproduct of the core function itself.

Technology dimension involves core banking, implementation of sophisticated delivery and payment systems such as internet and mobile banking, e-wallets, m-wallets, omni-channel, data warehouse, service oriented architecture, offering non-critical applications on a cloud, implementation of sound and best practices of information/cyber/network security protocols, security operations center, etc.

The paradigm of SMAC stack plays a quintessential role in a digital bank. As is well-known, SMAC stands for the quadrumvirate Social-Mobile-Analytics-Cloud. All of them are customer facing, except the cloud aspect. Social perspective aims at growing business by getting connected to customers via social media, listening to and redressing their grievances, monitoring customers' sentiments about products and services, redesigning and rectifying products and services based on customer feedback, detecting fraudulent transactions, providing instant and personalized financial advices, etc. Mobile perspective talks about offering entire banking services on a mobile device by providing anywhere-anytime banking; analytics dimension acts like the brain of the bank and analyzes customers' transactional, demographic and psychographic data and brings out the insights into the customer purchasing and saving patterns, target marketing, segmentation, cross-sell/upsell, credit scoring, default modeling, churn detection, fraud detection, etc. Finally, cloud perspective talks about bringing down the cost of ownership of infrastructure that is required for running the CBS, CRM, risk management systems, etc., thereby reducing the cost to the bank significantly. The cloud dimension is different – in that a bank can become a fully functional digital bank without its services, data, platform, etc. being on cloud. While cloud aspect can reduce the capital
expenditure to a great extent, it is a business call a bank has to take considering security, sensitivity and criticality of customer data.

**Data dimension** consists of implementation of best practices of data governance that will ensure high data quality and master data management solutions. Success of digital banking heavily hinges on the data quality available in a bank. This dimension is described in more detail later on.

**Business process reengineering (BPR)** dimension advocates redesigning and reengineering of extant business processes in order to achieve the elusive customer centricity. Success of digital banking depends on the easy, uncomplicated and less time-consuming business processes. Unless this dimension is taken care of, a bank cannot claim to become digital, no matter how much investment is made in other dimensions such as data, people and technology. Business processes have to be continually monitored to ensure that they provide a pleasurable customer experience. This dimension also calls for either tweaking or total revamping of the extant organization structure within a bank so that redeployment of human resources takes place to ensure smooth conduct of internal and external operations of a bank while embarking on the digital journey. Therefore, in order to become comprehensively digital, any bank should carry out BPR exercises in both customer-facing and non-customer-facing departments in parallel. Then, a bank can claim to have become completely digital.

Analytics dimension is the brain of digital banking without which a bank cannot start and sustain the arduous journey of digital banking. This dimension influences the success of almost every other dimension of digital banking. Once reasonable customer data quality is ensured, analytics paves way for a pleasurable customer experience, successful resolution of several business problems such as customer segmentation, credit scoring, target marketing, market basket analysis (cross-sell and upsell), default (NPA) prediction, fraud detection, churn modeling, sentiment analysis, campaign design and measuring its success, customer lifetime value modeling and prediction, etc. Analytics is predominantly of three types: (i) descriptive (ii) predictive and (iii) prescriptive. Descriptive analytics involves answering complex, high-dimensional queries in a graphical form including bar charts, histograms, pie charts, stacked bar charts, hear maps, box plots, etc. They primarily convey the information content available in raw data, which could be historical or current. Predictive analytics looks for patterns/correlations and exploits them to predict future customer behaviour in order to solve the aforementioned business problems. It comprises advanced applied statistical algorithms and machine learning techniques. Finally, prescriptive analytics consists of applying optimization techniques to recommend future course of action based on the predictions made in predictive analytics stage. While all the three type of analytics are useful, descriptive analytics tells the top management of a bank where the business stands as of now, whereas the remaining two forms of analytics suggest ways of growing the business and profits.

**Internal dimension** comprises applications of sophisticated analytics for measurement, modeling and management of various kinds of risks a bank faces, when it is in operation. They
include credit risk, market risk, operational risk at the highest level and many other risks at a lower level. This dimension also calls for successful implementation of human resource analytics to optimize various operations in that department; successful FOREX rate prediction has a direct bearing on the efficiency of the treasury department.

**People dimension** calls for recruitment of well-qualified and suitably trained specialist manpower in a bank. The positions include data scientist, data warehouse specialist, data steward, information architect, segmentation manager, channel manager, business analyst/business intelligence specialist, Hadoop/Spark specialist, etc. People dimension should be accorded topmost priority because digital banking requires specialists to look after its various dimensions.

Whether the goal is to maximize revenues or meet regulatory requirements or to respond to the trends in the market and industry as a whole, digitalization has the potential to transform every aspect of banking. But realizing this potential will require long-term strategic thinking and initiatives around all the functions of the bank as depicted in Fig. 3.

![Fig. 3. Distinct Functions of a Bank that Can be Digitized](image)

<table>
<thead>
<tr>
<th>Internal</th>
<th>Bank</th>
<th>External</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Backend</td>
<td>• Biz Operations</td>
<td></td>
</tr>
<tr>
<td>• Cloud</td>
<td>• Customer</td>
<td></td>
</tr>
<tr>
<td>• Hardware</td>
<td>• Payment Systems</td>
<td></td>
</tr>
<tr>
<td>• Service Operation</td>
<td>• Retail</td>
<td></td>
</tr>
<tr>
<td>Architecture</td>
<td>• CIBIL</td>
<td></td>
</tr>
<tr>
<td>• Security</td>
<td>• Technology</td>
<td></td>
</tr>
<tr>
<td>• Software</td>
<td>• Corporate</td>
<td></td>
</tr>
<tr>
<td>• Service Operation Centre</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Risk Management</td>
<td>• Other Banks</td>
<td></td>
</tr>
<tr>
<td>• Operational Risk</td>
<td>• Regulatory</td>
<td></td>
</tr>
<tr>
<td>• Credit Risk</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Market Risk</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Treasury</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Human Resources</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Other Frameworks

A holistic framework for digital banking that includes foundational, differentiating and leading capabilities has been proposed by PwC and is reproduced in Fig. 4.

**Foundational Capabilities** is a set of behaviors and capabilities that banks should develop to lay a strong foundation for digital banking.

- **Digital IT Strategy**: Internalize and prioritize digital banking as a top goal from the board on down
- **CIO Collaboration**: Build a CIO-centric culture of collaboration and consistency from the top down
- **Robust Security**: Assess, design and implement security assessment programs, processes and controls
- **Data Quality Management**: Test security mechanisms with real-world exercises to understand weaknesses in the network and application infrastructure, prior to a hack attack or attempt
- **Integrated Risk and Compliance**: Use a comprehensive, structured data quality
framework to limit technical risk, produce improved data output, and support business and IT alignment.

**Differentiating Capabilities** – Building on top of the foundations will allow a bank to break from the traditional constraints of the past. To get there, banks should focus on:

- **Talent Management:** Use a talent assessment framework to identify skills gaps and transform the bank, such that learning, recruiting and culture enable innovation and collaboration. Expand the human capital strategy to recruit from think-tanks and tech-savvy RMs. Facilitate focused, on-the-job training, mentoring and peer coaching, and promote a culture of collaboration and innovation. Develop an innovation centre of excellence to impress the importance of imagination, creative thinking and inventiveness more deeply into the bank’s culture.

- **Integrated Multi Digital Channel Platform:** Target and overcome legacy system challenges with streamlined, future-state IT approaches. Build and deploy secure customer-facing applications to reap the benefits of a digital presence. Build the data assets as platforms and enterprise services to enable deeper and wider access to information throughout the bank.

- **Customer Analytics:** Use communities-of-interest and voice-of-the-customer opportunities to promote information sharing. Use sophisticated data analytics to build an understanding of customer behaviors, needs and trends.

**Leading Capabilities** – help the banks focus on their core business values. To evolve as market leaders in their areas, banks should seek out and cultivate employees with more sophisticated digital skills and a strong co-creation agenda.

- **Co-Creation of Products and Services:** Develop a co-creation strategy roadmap to pave a path for program implementation and to illustrate how value will be delivered and communicate this roadmap across the enterprise.

- Develop a platform and alleviate gaps between the current state and the future state of the architecture needed to support a robust customer engagement and omni-channel ecosystem. Build communities through customer workshops and engage key internal and external stakeholder communities to drive growth.

- Govern the process by facilitating engagement among key stakeholders to establish a culture of innovation and coach teams towards meeting objectives on time and within budget.
Chapter 3

Building Blocks of Digital Banking for Greenfield/Brownfield Bank in India

Many industrial giants and practitioners believe that the predominant building blocks of digital banking are the customer (sales and services subsumed), data and analytics dimensions that were already identified in the previous chapter, for the simple reason that these dimensions bring about a spectacular rise in the bottom line of a bank, even though we recommend an overarching framework here. Customer experience also encompasses payment systems sub-dimension around which many innovations are taking place at a breakneck speed. Hence, innovations in payment systems are also projected here as important building blocks of digital revolution.

Therefore, it is imperative that we expand on these dimensions in further detail.

Customer Dimension

People all over the world are living digitally – at work, at home and everywhere in between. The division between the digital and physical worlds is also becoming increasingly blurred. Technology fuels this duality by smartly using more and more signals as consumers fill their lives with new devices and services.

The digital needs model quantifies motivations that drive digital behavior as presented in Fig. 5. The model provides a map for marketers and technologists as they develop tools, content...
and experiences for consumers across digital devices and platforms.

These two axes result in four dimensions:

- Digital as external exploration
- Digital as internal control
- Digital as individual performance
- Digital as shared connection.

These four dimensions result in eight need states as presented in Table 1 and Table 2.

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Dimension Description</th>
<th>Need States</th>
</tr>
</thead>
<tbody>
<tr>
<td>External Exploration</td>
<td>Digital helps me to explore the world around me</td>
<td>Discovery: Search of new products &amp; experiences</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fun: Looking for pure entertainment</td>
</tr>
<tr>
<td>Internal Control</td>
<td>Digital helps me manage my internal needs</td>
<td>Balance: Seeking equilibrium</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Order: Manage uncertainty</td>
</tr>
<tr>
<td>Individual Performance</td>
<td>Digital lets me focus on myself as an individual</td>
<td>Status: Cultivating external image</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Achievement: Aiming for personal best</td>
</tr>
<tr>
<td>Shared Connection</td>
<td>Digital enables me to have shared experiences</td>
<td>Togetherness: Feeling part of bigger whole</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Intimacy: Deepening relationships</td>
</tr>
</tbody>
</table>

Table 1. The First Four Need States

These need states do not exist in isolation and these need states influence the customer behavior along the customer journey. Since 2014, there have been tremendous investments by banks in the space of mobility and payments. Banks also need to look beyond mobility and payments and understand the customer experience journey and map their digital strategy to the customer experience journey. Fig. 6 depicts a sample customer journey for a customer looking for banking products:

Fig. 6. A Sample Customer Journey for a Customer Looking for Banking Products
<table>
<thead>
<tr>
<th>Dimension</th>
<th>Need Status</th>
<th>Expectations in the customer journey in banking scenario</th>
</tr>
</thead>
<tbody>
<tr>
<td>External Exploration</td>
<td>Discovery: Search of new products &amp; experiences</td>
<td>Customers expect to be able to discover banking products whenever and on whichever channel they prefer</td>
</tr>
<tr>
<td></td>
<td>Fun: Looking for pure entertainment</td>
<td>Customers are not looking for colorful and static “web brochures” of the products; they are looking for a fun way (e.g., gaming) through which they can learn more about the products</td>
</tr>
<tr>
<td>Internal Control</td>
<td>Balance: Seeking equilibrium</td>
<td>Customers are looking for interactive smart digital planners and simulators through which they can balance their financial income and needs</td>
</tr>
<tr>
<td></td>
<td>Order: Manage uncertainty</td>
<td>Customers do not like being chased with mails and calls about products, but they are expecting the banks to provide expert advice to be able to deal with uncertainty better; and the customers expect this advice through digital channels</td>
</tr>
<tr>
<td>Individual Performance</td>
<td>Status: Cultivating external image</td>
<td>Customers are seeking to establish their relationship with the banks that reflect their external image; the banks’ image is reflected through the digital transformation</td>
</tr>
<tr>
<td></td>
<td>Achievement: Aiming for personal best</td>
<td>Customers are also expecting the banks to make the financial products available immediately rather than making them go through lengthy paper-based processes</td>
</tr>
<tr>
<td>Shared Connection</td>
<td>Togetherness: Feeling part of bigger whole</td>
<td>Customers are expecting the banks to engage with them through social channels—whether it is servicing through a social channel or engaging with them with offers through a social channel</td>
</tr>
<tr>
<td></td>
<td>Intimacy: Deepening relationships</td>
<td>Customers expect the banks to provide face-to-face interactions with the trusted advisers</td>
</tr>
</tbody>
</table>

**Table 2. The Other Four Need States**

These need states are driving the digital trends that offer both challenges and opportunities to the businesses. Microsoft is empowering businesses with the technologies that enable them to leverage the opportunity provided by the top digital trends.

**Top Digital Trends**

**Value Me (Quid pro Quo)**

Customers expect being valued as depicted in Fig. 7. Offering an advertising message that the customer doesn’t like is SPAM and offering an advertising message that the customer can use is a service. Consumers are increasingly aware that their digital information has inherent value.
The more consumers understand the utility of the value exchange and can see how they benefit (instead of only brands benefiting), the more open they are to sharing data. Brands have yet to prove the full value of data usage. About half of the consumers see how data can benefit brands, but say they don’t know how they can trade and get value in return. Until brands can connect the dots for consumers, consumers will continue to question why they should be sharing information.

There are opportunities for marketers to use personal, social and big data to enrich lives through enhanced suggestion and recommendation.

IntelligentlyON

Consumers want digital experiences to allow them to be more productive, do more of the things they want to do, and make better decisions. And IntelligentlyON is where this consumer desire meets the marketer need to use data and technology in the right place, the right time, and on the right screen as presented in Fig. 8. Customers expect continuity in their interactions with the banks. This is where banks should build intelligence omni-channel banking. Customer should be able to initiate a transaction or an interaction through one channel/one screen and complete it on another channel/another screen.

Real: Redefined

Now, consumers are shifting to embrace what we once referred to as “IRL” (in real life) experiences in purely digital environments; many of these purely online experiences have become just as real as anything one might touch and feel. Consequently, digital experiences are becoming just as important as offline experiences as presented in Fig. 9.

When the customers have to track their physical experiences (e.g., movies, cars, restaurants, etc.) and have to track how their bank (or even which of their banks) is fulfilling their need through offers, it creates a friction. Banks can reduce this friction by making available an intelligent personal digital assistant that recommends the right banking choices and
actions by knowing the customer’s needs. Banks should also consider integrating virtual reality in their interactions with the customers so that customers can experience the products or services through virtual reality and immediately sign up for financing with the banks.

**Right to My Identity**

Today, we are starting to see a shift away from a privacy focus as consumers are growing increasingly aware that they cannot hide their footprint. With this shift comes a growing desire to control their digital narratives. Interest in more automated tools to manage digital identities has grown (see Fig. 10). This new trend is a threat to the digital advertising industry. The less information that consumers make available online, the more challenging it is to target them with relevant, contextual advertising experiences. However, it is also an opportunity. Through their digital footprint customers are leaving digital signals that the banks can connect to build a social profile of their customers. Though this involves giving comfort to customers that their privacy is not being invaded, banks can leverage big data technologies to build a consolidated view of a social profile presented by the customers through publicly available information.

Banks could also leverage the social profile of customers to provide personalized and exclusive experiences through advanced digital branches.

**The New Age of Discovery**

Consumers expect brands to drive discovery. They are looking for recommendations, not just based on things they like or activities they’ve done; they are also seeking experiences that give them the option to move outside their comfort zone (see Fig. 11).

If brands can feed curiosity, ignite passions and get consumers thinking in a new way, they can forge more inspiring relationships with their customers. Invite consumers to keep coming back by seeding interesting content, ideas and products that consumers may not have thought of before. For this the banks need to forge newer alliances outside the banking domain and offer surprising and delighting experiences to the customers.
From a different perspective, digital customer expectations are captured in Fig. 12.

Customer Experience

According to a recent report, customer experience looks set to overtake price and product as the key brand differentiator by 2020. Companies need to examine their customers’ digital journeys and evaluate their experience in order to be successful. In the process, fixing broken journeys and identifying and resolving areas customers find problematic is essential. This in turn helps companies anticipate the needs of their customers, provide proactive customer care, and display more relevant marketing messages or promotions. The impact on the bottom line could be huge at present, it is estimated that brands in the U.K. are losing nearly £15 billion annually due to poor customer service.

All that what a customer expects from a bank is captured in Table 3.

<table>
<thead>
<tr>
<th>S No.</th>
<th>Customer Expectation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Find me</td>
<td>Finding customers not only on demographics, also on specific characteristics using visualization and analytics</td>
</tr>
<tr>
<td>2</td>
<td>Ask me</td>
<td>Consult customer on products, services and social issues</td>
</tr>
<tr>
<td>3</td>
<td>Advise me</td>
<td>Advise customer based on their transactional data, social data or whatever data banks have</td>
</tr>
<tr>
<td>4</td>
<td>Know me better</td>
<td>Get a 360-degree view of a customer to understand their need</td>
</tr>
<tr>
<td>5</td>
<td>Stick with me</td>
<td>Cover customer and family throughout life</td>
</tr>
<tr>
<td>6</td>
<td>Excite me</td>
<td>Surprise and delight your customer with unexpected service</td>
</tr>
<tr>
<td>7</td>
<td>Compare me</td>
<td>Provide peer analysis, i.e., who is buying what</td>
</tr>
<tr>
<td>8</td>
<td>Trade with me</td>
<td>Offer better products and value in exchange for customer data, location and new ideas</td>
</tr>
<tr>
<td>9</td>
<td>Educate me</td>
<td>Offer digital education and financial tips</td>
</tr>
<tr>
<td>10</td>
<td>Alert me</td>
<td>Alert customer about changes in market use real-time predictive analytics</td>
</tr>
<tr>
<td>11</td>
<td>Let me choose</td>
<td>Offer multiple choices in payment, investments, services and let the customer choose</td>
</tr>
<tr>
<td>12</td>
<td>Protect me</td>
<td>Provide multi-factor security which should protect instead of irritate.</td>
</tr>
</tbody>
</table>

Table 3. Customer Expectations from a Bank
DATA DIMENSION

Data Infrastructure for Digital Banks – Not All Data is Created Equal

Few industries have evolved as quickly as data processing, thanks to the effect of Moore’s Law coupled with Silicon Valley-style software innovation. So it comes as no surprise that innovations in data analysis have led to new data, new tools and new demands to remain competitive. Market leaders in many service industries are adopting these new capabilities, fast followers are on their heels, and the mainstream is not far behind.

Timely, Granular Data

Too often companies rely on data that is aggregated or trending data. This is not sufficient to truly understand the customer on an individual level. Neither is the approach of collecting data by tagging, as it is impossible to determine if the right components have been tagged. Companies need to collect all data at an individual level. And this extends to all the different channels that the customer has used to contact the brand, whether that is website, mobile apps, streaming or social media as well as all the devices they use for those interactions.

Moreover, companies need the data quickly. In a recent survey, 59% of marketers believe that data can speed up decision-making. If a company knows how an individual customer is interacting with the company’s digital channels, it will be able to react in a timely manner with appropriate responses that can influence the customer’s buying decision.

Fig. 13. What Kind of Customer Data Do You Collect?
Trying to build a 360° view of the customer without timely individual-level digital data is impossible and this is an issue that many companies are currently struggling with. Over 70% of respondents in a recent survey admitted to relying on aggregated data (see chart in Fig. 13).

By capturing and analysing every browse, click, on-site search, device type and mouse over, the company can then have a better and deeper understanding of the motivations behind the customer. This information, when integrated with the data that companies already hold on their customers, such as age, gender, purchase history or credit score, can allow them to be more effective when sending personalised offers or optimising website and mobile apps.

This renaissance has affected the nature of data warehouse in many ways. In the 1990s and earlier 2000s, the Massively Parallel Processing (MPP) relational data warehouse was the only proven and scalable place to hold data both internal and external to a bank. In the late 2000s, an explosion of new data types and enabling technologies led some to claim the demise of the traditional data warehouse. A more pragmatic view has emerged recently, that a one-size-fits-all approach – whether a traditional data warehouse or Apache™ Hadoop® – is insufficient by itself in a time when datasets and usage patterns vary widely. Technology advances have expanded the options to include permutations of the data warehouse in what is referred to as built-for-purpose solutions.

Yet, even seasoned practitioners who embrace multiplatform data environments still struggle to decide which technology is the best choice for each use case. But the best fit for data platform technologies is not as universally understood at this time.

Unified Data Architecture™ allows the analytics renaissance to flourish while controlling costs and discovering new analytics. As guideposts in this expansion, we have identified workloads that fit into built-for-purpose zones of activity:

- Integrated data warehouse
- Interactive discovery
- Batch data processing
- General-purpose file system.

By making use of this array of analytical environments, banks can extract significant value from a broader range of data – much of which would have been discarded just a few years ago. As a result, business users can solve more high-value business problems, achieve greater operational efficiencies, and execute faster on strategic initiatives. While the big data landscape is spawning new and innovative products at an astonishing pace, a great deal of attention continues to be focused on one of the seminal technologies that launched the big data analytics expansion: Hadoop. An open source software framework that supports the processing of large datasets in a distributed applications environment, Hadoop uses parallelism over raw files through its MapReduce framework. It has the momentum and community support that make it the most likely to eventually become the dominant enterprise standard in its space in a new breed of data technologies. However, MapReduce is recently being challenged by ApacheSpark. With its Resilient Distributed Dataset (RDD) feature, Spark is able to execute machine learning tasks in orders of magnitude faster compared to MapReduce.
Business Value Density

One of the most important concepts for understanding the Unified Data Architecture™ is BVD, defined as the amount of business relevance per gigabyte of data. In other words, how many business insights can be extracted for a given amount of data? There are various factors that influence BVD, including when the data was captured, the amount of detail in the data, the percentage of inaccurate or corrupt records (data hygiene), and how often the data is accessed and reused.

Before the digital revolution, organizations established clear guidelines to determine what data would be captured and how long it would be retained. As a result, only the dense data (high BVD) was retained. Lower BVD data was discarded, compounded by the absence of identified use cases and tools to exploit it.

The digital movement has brought a fundamental shift in data capture, retention and processing philosophies. Declining storage costs and file-based data capture and processing now allow banks to capture and retain most, if not all, of the information generated by business activities. Why capture so much lower BVD data? The reason is that the low BVD does not mean no value. In fact, many organizations are discovering that sparse data that was routinely discarded not so long ago now holds tremendous potential business value – but only if it can be accessed efficiently.

To illustrate the concept of BVD, consider a dataset made up of cleansed and packaged online sales information for a given time period such as the previous three months. This dataset is relatively small and yet highly valuable to business users in operations, marketing, finance and other functional areas. This sales data is considered to have high BVD; in other words, it contains a high level of useful business insights per gigabyte (see Fig.14).

In contrast, imagine capturing web log data representing every click on the bank’s website over the past five years. Compared to the order data described previously, this dataset is significantly larger. While there is potentially a treasure trove of business insights within this dataset, the number of people and applications querying it in its raw form would be less than the dataset made up of cleansed and packaged sales. So, this raw website data has sparse BVD, but is still highly valuable.

ANALYTICS DIMENSION

How to Get More Value From Your Customer Data

Analytics is the fastest-growing and fastest-changing dimension of digital banking. Every bank today wants to know how its customers are thinking and behaving online. And it is now possible to know about, understand, and even predict digital activities by customers and prospects with great precision.

Analytics is not just used for marketing purposes. They can also be used for defensive purposes – reducing transaction-related fraud, cyber frauds, process-related frauds or identifying customers likely to attrite or default on their loans or creditworthiness, etc.
Accordingly, analytics has many manifestations in a digital bank. They are customer analytics, aka analytical CRM (subsuming Marketing Analytics, Channel Analytics, Social Media Analytics, Collections or Recovery Analytics, Collaborative CRM, etc.), Fraud Analytics (subsuming Cyber Fraud Analytics and Process Analytics), Risk Analytics, Operational Analytics (ATM location and replenishment decision making), HR Analytics, Network Security Analytics (see Fig. 15). Interestingly, in all these distinct applications of analytics, the three flavours of analytics viz., descriptive, predictive and prescriptive have immense role to play.

Every organization wants to know its customers better and anticipate their needs, and it has become impossible to do so without employing analytics. What were once simple bar charts of “unique visitors” or “length of stay” have become sophisticated, multivariate statistics and machine learning techniques that shed light on virtually every aspect of customer behavior and attitudes. Banks who want to be able to paint a far more detailed and complete picture of their customer interactions need to record and capture every browse, click, on-site search, device type and mouse over. And with data becoming this granular, companies need to employ newer and more advanced types of analytics. Analytics that can:

- Enable the actions of individual customers across digital touch points to be pieced together to create that elusive Single 360o Customer View
- Anticipate which customers are most likely to buy and serve the right offers and promotions to them
- Optimise the digital customer experience, for example, ironing out areas where customers are getting stuck or dropping off your website or mobile app
- Maximise return on marketing investment by identifying which combinations of activities, campaigns and channels drive the highest value customers.

In all the six applications of analytics in a digital bank, except HR Analytics, Customer Data, directly or indirectly plays a significant role either in micro level or a macro level. In Customer Analytics, all business problems such as churn prediction, market basket analysis (cross-sell/upsell), customer segmentation, default prediction, sentiment analysis, customer lifetime value modeling loan recovery modeling, etc., are solved using analytical techniques. In Fraud Analytics, various kinds of cyber or non-cyber frauds are predicted and analyzed. In risk
Analytics, all kinds of quantifiable risks viz. credit risk, market risk and operational risks are modeled, analyzed and predicted. In operational analytics, all operational problems of a bank viz., ATM cash replenishment strategy, balanced score card based assessment of a bank's growth, assessment of a bank's performance w.r.t profitability, solvency, productivity, liquidity, etc., modeling grid-lock scenario in inter-bank payments, etc. In security analytics, vulnerability analysis, advanced persistent threat prediction, intrusion detection, data exfiltration detection, anomaly detection, etc. Finally, in HR Analytics, HR chiefs now can apply analytics to identify and recruit the right person for the right job at right remuneration, predict possible attritions by performing analytics on their social media pages, etc.

**Adopting an Agile Analytics Mindset**

For companies wanting to understand the relationships and dependencies between different multi-structured datasets such as web browsing, free form text fields and geolocation, it is not just new analytical tools that are needed. A whole new mindset has to be adopted by the organization.

Instead of finding the right answer to a set of predetermined questions, companies need to discover the right questions to ask. Employees should be encouraged to explore and experiment with the data, scope their questions and identify the signal or golden nuggets of insights. With this new model, companies are geared to learn, test hypotheses and either act quickly or move on – a very agile fail fast mentality.

To date, many companies are just not collecting data that is granular enough. And for those who do, there is a feeling that there is much that their data is not telling them. This is why more marketers today (87%) than in 2013 (46%) consider data their most under-utilised asset. In reality, armed with the data and analytics available today, companies can drill down deeper than before in areas such as digital marketing effectiveness, customer experience and business efficiency.

**Putting Data and Analytics in the Hands of Business Users**

The longer a company takes to collect the data and analyse it, the longer it would take for crucial decisions to be taken that could affect a customer’s buying journey.

The best way to ensure that does not happen is to put the ability to query the data in the hands of the employees, at an operational level, and not just strategic or middle-management levels. This means employees can get timely insights that inform decision-making. For marketing, sales, call centre operatives and customer services, this provides awareness of all the other touch points and conversations that a customer has had with the brand. This allows them to take the right actions to individualise their response to the customer.

According to a recent study, 37% of companies struggle to achieve this due to a lack of analytics expertise within the business. The technology exists to provide pre-built analytics with easy-to-use interfaces in the hands of business users and analysts, without putting strain on IT resources.

**Marketing Effectiveness**

McKinsey estimates that global marketing spend now exceeds US$1 trillion. However, they
estimate that up to one-fifth of that annual marketing spend could be refocused with little or no impact to return on investment, if companies deployed better marketing analytics.

Whether it is about the number of sales generated as a result of an email campaign, or evaluating whether the budget was better spent on online display advertising or social media, markets want to understand just how much value has been generated by their budgets. With four in five companies planning to increase their investment in digital marketing in 2016, timely data and analysis is needed to determine if value for money is being delivered to the business.

**Moving Forward on the New Marketing Journey**

In the digital banking era, there is simply too much customer information that changes too fast, spread over too many touch points, channels and campaigns for one CMO or even an entire corporate marketing team to capture, grasp and assess. Gut feeling, creativity and intuition alone will not suffice in this fast-moving, data-driven environment. One of the solutions to help marketing departments gather a 360° view of the customer and automate their decision-making, based on the vast pool of Big Data that’s available both in and outside the banks is the concept of a customer decision hub (see Fig. 16). It can be conceived as a holistic, fully integrated end-to-end customer intelligence engine that establishes value-driven marketing with true contextual, omni-channel communication across all channels.

The proliferation of technology and growing consumer engagement with all things digital are changing many aspects of customer behavior, from product research to buying patterns to banking. Consumer expectations are growing, too: Consumers now expect a seamless, high-quality experience across all digital channels, including online and mobile. Financial Institutions (FIs) are responding to consumer demand by providing these channels and

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**Fig.16. A Sample of a Customer Decision Hub**
developing new systems and features to satisfy customers. They are already reaping some of the rewards of digital banking capabilities, but much of transformative potential of digital banking remains untapped and unrealized.

Digital banking channels give FIs access to customer data that is generated in real-time and is unprecedented in its amount and detail. That data can catalyze FIs to improve their results, but it also presents challenges, including combining information from disparate sources and detecting patterns in massive datasets. Therefore, FIs are likely to find sophisticated but easy-to-use analytics tools to improve customer experience and to compete with global banks who will master analytics capabilities. The best analytics programs help FIs thoroughly understand their customers so they can design products and services and target them to the customers most likely to buy. These tools can also facilitate more efficient customer service in the increasingly omni-channel environment. For example, customers no longer have to repeat their problem to a call centre agent after attempting to resolve it themselves online. Instead, the agent sees what the customer has done and can quickly clear up the issue. This level of service matters to customers, even those who love to use digital channels.

With analytics tools providing real-time decisioning of personalized communications to customers who are in-session, FIs can accelerate progress to simultaneously improve satisfaction, revenues and profits. As FIs develop and execute on their omni-channel initiatives, high-quality analytics tools become essential.

As FIs broaden and improve their digital banking offerings to meet customer demand, they can operate more efficiently, deepen their relationships with customers and acquire new customers. The first step in achieving these benefits is recognizing what customers want that they’re not currently receiving – a task made possible by integrated marketing automation and advanced customer analytics tools. Then comes understanding how to integrate innovative new features into omni-channel enterprises so that they generate convenience and value. It’s those FIs that take these steps that will be best positioned to realize the full potential of digital banking.

**TECHNOLOGY DIMENSION**

Technology is driving the change in digital banking enablement. The following levers enable end-to-end digital banking.

- Connected and customized products and services enabled through **Internet of Things**
- Differentiated customer experiences using digital channels through **CRM and Omni-channel delivery platform**
- Automated business processes – connecting people and systems enabled through **workflow systems and robotic process automation**
- Data-driven business decisions through **analytics and machine learning capabilities**
- **Security Operations Centre**
- **Data lake/federated or logical DWH**
- **Cyber security infrastructure**
- **Blockchain**
- **Cloud**
PAYMENTS DIMENSION

Why Digital Banking? Why Customers Are Adopting It?

People are moving from personal banking to digital banking because of convenience, ease of use and accuracy of information at their fingertips. Most bank customers would trade personal banking for digital banking (Source: Gallup http://www.gallup.com/). In a survey conducted with 6,000 banking customers (not in India), it has come out that 53% would give up their personal banking in favour of digital banking. In India, people using digital banking (multiple channels) like ATM, bill payment through online banking and check deposit through kiosk has increased enormously. Banks must go out of their way to ensure a satisfying customer experience in each of those channels, preferred by them to retain and increase numbers of customers.

Worldwide, we are seeing mobile banking is picking up very fast. With smartphone penetration going up very rapidly in India, banks should focus on mobile banking. The survey conducted in 2014 in a foreign country has the following statistics (see Fig. 17).

![Fig. 17. The Mobile Banking Trends](image-url)
Presently, the above statistics may not be true in India, but with tech-savvy people using it, mobile banking would increase the adoption drastically. With limitations in the infrastructure, traffic conditions in urban and major cities would force customers to adapt to digital banking.

In 2014, smartphone users’ share in India was 21.2% of the mobile phone users. It is expected to reach 39% by 2019 (Source: http://www.statista.com/). However, while focusing on digital banking, Indian bankers should keep the following survey findings in mind:

- **Digitize account opening and onboarding:**
  This can be achieved in India because e-KYC through UIDAI is enabled and legalized

- **Content and Functionalities:**
  The ability to offer basic as well as value added content and functionalities through digital channels

- **Design and Ergonomics:**
  The simplicity of design, availability of contextual offers and ability to personalize the experience

- **Navigation:**
  The ability to leverage customer insight for improved information access

- **Safety/Security:**
  The level of enhanced security available to protect identity and funds access. Improving a bank’s digital maturity ensures higher efficiency in some processes (e.g., account opening, onboarding, credit offering, etc.) and improved interaction and customer experience. To reap maximum advantage in an increasingly digital society, organizations will need to provide above average performance in all categories. “Banks will have to increase their operational efficiency and improve the customer experience if they want to keep their position in core markets. Non-traditional and digitally mature companies are winning market share partly because they are able to match the digital expectations of the 21st-century customers.”

Table 4 presents products offered by some of the mobile-only banks, which surely has important inputs to brown-field banks.

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<thead>
<tr>
<th>Region</th>
<th>Name of the Bank</th>
<th>Description</th>
<th>Products/Services</th>
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</table>
| UK     | Atom Bank        | - Founded in the year 2014 by Anthony Thomson with funding of $167.16Mn in two rounds from four investors  
- As a mobile-only “challenger bank,” Atom brings biometric banking to the UK, using biometrics instead of passwords in their innovative mobile app  
- Atom Bank was listed at eight in KPMG’s Global FinTech Innovators 100  
- Atom is building the UK’s first bank designed specifically for the digital realm, offering easy and convenient banking along with unique and engaging ways to manage money. | Mobile banking app, savings account |
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<th>Region</th>
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<th>Description</th>
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| Monese | Monese           | • Founded in the year 2013 by Norris Koppel with funding of $1.8Mn  
• Monese is a digital banking service that lets users open a UK banking account on their mobile in minutes regardless of their citizenship  
• It targets immigrants who face daunting tasks in opening a UK bank account as a foreigner by letting the user open a current account and get a Visa debit card in 3 minutes with a snapshot of their passport and a selfie. | Branchless mobile banking, cash withdrawals, card payments and international money transfers, current account |
| Osper  | Osper            | • Founded in the year 2012 by Alick Varma with funding of $11.22Mn  
• It is a prepaid debit card and mobile banking service that empowers young people to manage their money responsibly  
• It offers a safe MasterCard prepaid debit card and a simple mobile banking app with separate logins for young people and parents. | Osper App, Osper Link, prepaid debit card, Osper Allowance, etc. |
| Mondo  | Mondo            | • Founded in the year 2015 by Gary Dolman, Paul Rippon, Jonas Huckestein, Tom Blomfield, Jason Bates with funding of $3.14Mn  
• It provides smart banking services to make money easy for everyone by pricing it at a low cost  
• Users are given access to Mondo’s iPhone app and a MasterCard prepaid debit card  
• They can load money onto the card every month and spend it at shops, ATMs and online. The users also receive real-time feedback regarding their spending. | Mondo App for digital banking services |
| Starling| Starling         | • Founded in the year 2014 by Anne Boden with funding of $70Mn  
• Starling is aiming to lure mobile-focused customers and provide a superior current account service to those offered by the incumbent high-street banks. | Digital banking services using real-time intelligence technology |
| Tandem | Tandem           | • Founded in the year 2013 by Matt Cooper and Ricky Knox with funding of $34.79Mn  
• In December 2015, it was granted a license by the Bank of England  
• It is in the process of constructing its technology platform and meeting capital requirements. | Full-service digital banking |
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<th>Region</th>
<th>Name of the Bank</th>
<th>Description</th>
<th>Products/Services</th>
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| US     | Simple           | • Founded in the year 2009 by Shamir Karkal, Alex Payne, Joshua Reich with funding of $15.29Mn  
• Simple combines technology, user experience and behavioural economics to help its customers spend smarter and save more  
• The company offers a bank account that has all the tools users need to manage their money built right in  
• The company’s banking services are accessible via intuitive web, iPhone and Android apps  
• In 2013, it recorded a 330% growth and more than $1.7 billion in transactions  
• Simple was acquired by BBVA in 2014. | Budgeting tools, bank account |
|        | Moven            | • Founded in the year 2011 by Brett King, Alex Sion, Richard Nearn with funding of $24.41Mn  
• Moven is a mobile-centric banking app  
• Moven’s app, debit card and contactless payment sticker provide real-time spending insights to its customers to make smarter decisions and save more. | Mobile banking app, savings account, debit card, contactless payment |
|        | BankMobile       | • Founded in the year 2015 by Jay Sidhu, Luvleen Sidhu  
• It is the first bank to offer free checking and savings accounts without any fees as well as a line of credit, access to over 55,000 surcharge-free ATMs, and a higher savings rate than the top four banks in the country. | Free checking account, remote check deposit and picture bill pay, P2P payments, online Banking, high-yield savings account |
|        | GoBank           | • Founded in the year 2013 by Green Dot Corporation  
• It is the first bank account designed from scratch to be opened and used on a mobile device  
• It enables checking balances, viewing transaction history and transferring funds between accounts from supported mobile devices  
• It’s owned by Green Dot, which is an active player in card management industry in US  
• It offers its products and services exclusively online or over the phone, because it does not operate through physical branches. | Online banking and checking account with direct deposit and bill pay, cash & direct deposit, photo check deposit, etc. |
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<th>Region</th>
<th>Name of the Bank</th>
<th>Description</th>
<th>Products/Services</th>
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| Australia | National Australia Bank | • Founded in the year 1982  
• The Group is a financial services organisation with over 12,700,000 customers and 42,000 people, operating more than 1,700 stores and business banking centres globally. NAB’s online banking platform has around 900,000 logins on average per day  
• Its major financial services franchises in Australia are complemented by businesses in New Zealand, Asia and the United Kingdom  
• Each of its brands is uniquely positioned, but built on a common commitment to provide customers with quality products and services, fair fees and charges, and relationships built on the principles of help, guidance and advice. | NAB Flik, Quick Balances feature, ATM locator tool, schedule your funds transfers and BPAY® transactions, international payments using real-time rates, transfer funds, pay your bills on your phone, transfer up to $20,000 a day, etc. |
| India | digibank by DBS | • Founded in the year 2016  
• Not only does it let you deposit, withdraw and transfer money with lightning speed, it also lets you set goals and draw out a plan to achieve them  
• It is India’s first ever bank that lets you open an account without any paperwork or signatures  
• Only Aadhaar number and biometrics are required for authentication  
• Customers can start with an e-wallet and convert to a full bank account at any time. | Paperless, Signature-less and branchless banking, virtual debit card, digiSavings account, 24×7 Virtual Assistant, budget optimizer and e-wallet |

**Positioning to Cashless Payments – Building Less Cash Societies – Smart Cities Initiative**

RBI’s Vision Statement for Payments is “To proactively encourage electronic payment systems for ushering in a less-cash society in India”.

Smart cities can issue to its citizens an NFC-based identification card which enables smart city citizens to unlock services and facilities across the entire city in a secure way. This will be a unique identification and payment tool making it easy for citizens to use and pay for everyday services securely. This is not limited to accessing your work place, but it can also provide a digital wallet with a simple tap and go convenience. This can be extended to use NFC-enabled mobiles to eliminate the card if photo identification is not necessary.

Smart cities rely on technologies that put citizens first and promise social, environmental and economic sustainability. A vast array of new technologies, as well as social and economic trends, will enable cities to deliver on this promise. Technical trends such as context-
aware devices, displays and mobile devices everywhere that connect to everything, human-centric computing and continuous access to massive amounts of data will make city workers and citizens more efficient at work and continuously connected to family, friends and information. This common Community (Citizen) Card for people of smart cities not only serves as an integrated identity and payment tool, but can be envisioned providing various applications in the areas of public services, utility services and business services using a simple and quick secured “Tap and Go” convenience.

People often need to carry multiple cards to enable them to access public services, which can be inconvenient. The Community Card can enable a user to access a range of public services, a welcome development arising from the policy of sharing the fruits of advanced technologies with the general public as people go about their daily activities.

Card holders can pay for medications bought from designated drugstores, pay for medical services received at designated hospitals and clinics, pay pension premiums, and access personal social security account information. No need to worry about the change for small transactions like auto and bus fare, and no need to worry about how small and how many times a person can do the transaction without much cost per the transaction.

When linked to a bank account, card holders can access their bank account records to check the balance, payment and withdrawal records, personal loans, and so on, only when needed. All small ticket transactions can be done without touching the bank account.

Smart ID Card can enable the digital wallet facilities of transferring one time from the bank account to the wallet and use the wallet as many times as they want with the convenience of the mobile or Smart Card. When receiving medical services, card holders can access community medical services, including disease prevention, health care and treatment, rehabilitation, health education, and family planning guidance.

When it comes to utility service payments, working people are often inconvenienced by having to spend time queuing up to deal with matters such as payment of electricity and water bills and for other essential services or provisions. The Smart City Card, a small “e-wallet”, can be used to pay for public utilities such as water, electricity, gas and cable TV charges at one time. The Smart City Card can also be used by employers to pay wages to employees, thereby improving business efficiency.

For cultural and tourism services, the Smart City Card can be used to pay for the public library, cinema, museum, gym, theatrical performance and amusement park tickets or entry, a complete change from the existing methods and far more streamlined.

In the transportation services, the card can be used to pay for the bus, taxi, ferry and metro train fares. It can also be used to pay for highway and bridge tolls and for fuel and parking.

Banks can position to get the benefits out of promoting small-ticket and high-volume payments without touching the bank account unless it is necessary.
Digital Payments – Mobile Wallets – Prepaid Instruments

Prepaid card mobile wallets were introduced with a view of withdrawing or using a small portion of the account balance; the customer's main balance doesn't need to be exposed. Secondly, to handle small ticket payments without touching CBS would reduce the load on the core banking system. Each transaction touching the core banking system is expensive in terms of transaction time it takes, costs per transaction, etc. More importantly, a bank account is not necessary to perform an electronic transaction. Benefits of cashless payments are manifold (see Fig. 18).

Banks can position themselves to provide wallet services to reduce the cost and increase the customer convenience without compromising the security and not exposing their entire bank account. The digital wallet platform should be built as per RBI’s norms under the Payments and Settlements Act and has many modules to provide many functions of the wallet service. The platform can facilitate transactions from smart cards or mobile applications. It is imperative to support feature phones to bring digital banking to the masses, where simple OTP and SMS are used as an authentication mechanism.

All the wallet holders are provided virtual account numbers which are linked to the escrow account. The various modules of the digital wallet platform are mentioned below:

**End-to-end Digital Wallet Platform consists of the following modules.**

- Call Centre Dashboard
- MIS Reports
- Bank Integration
- Gateway Integration
- RECON Process
- Settlement Process
- Smart Card / Mobile App
- Kiosk, PoS, Tablet Ready
- Integrated with Aadhaar for Authentication or e-KYC
- IMPS and AEPS ready
- Mobile Top-ups, Bill Payments

![Fig. 18. Benefits of Cashless Payments](image-url)
e-KYC–Aadhaar-based Payments – Direct Benefit Transfers

Background

RBI has mandated banks and other financial institutions to strictly follow the instructions regarding Know Your Customer (KYC) to ensure the authenticity of the customer and the information provided by them. To access any financial product, proof of identity and proof of address are key requirements. Till now these things are being produced in paper form by the person requiring the services. The originals are taken, copied and attested by the competent authority and submitted. Then, the person accepting the same verifies it by referring to the original or writing to the concerned authorities to confirm its correctness. This is time-consuming and also has some element of risk by way of forgery. It also creates a lot of work for the institution concerned. There is also a process of scanning the documents once received and sent to the verification agency in the email, which delays the verification completion process time by a day or two.

At present most of the financial service providers have used ID cards issued by the government authorities (like Election Commission ID Card, Passport, PAN Card, Driving License, Ration Card, Aadhaar Card, ID issued by Central/State Government) as proof of address/identity and also telephone bill, rental agreement, bank account statement, letter from any recognized public authority, electricity bill, etc. are used as proof of address.

In January 2009, Government has established Unique Identification Authority of India (hereinafter referred as UIDAI) with the mandate for providing a Unique Identification Number (named as Aadhaar) to all residents of India. As part of this exercise, while generating Aadhaar number UIDAI has collected and stored the following information of the individual:

- Demographic details such as the name of the resident, address, date of birth, and gender
- Biometric details (3) such as the fingerprints, iris scans, and photograph
- Optional fields for communication, such as the mobile number and email address.

UIDAI started providing Aadhaar authentication service wherein Aadhaar number, along with other attributes (demographic/biometrics/OTP) is submitted to UIDAI’s Central Identities Data Repository (CIDR) for verification; the CIDR verifies whether the data submitted matches the data available in CIDR and responds with a “Yes/No”. No personal identity information is returned as part of the response.

The above services are provided through ASA and AUA.

The UIDAI has set up a scalable ecosystem for the purpose of instant authentication of residents. The UIDAI has appointed a number of Authentication Service Agencies (ASAs), who in turn are appointing various government and non-government organizations as Authentication User Agencies (AUAs). The UIDAI, in partnership with STQC (Standardisation Testing and Quality Certification), has also laid down the technical standards for biometric devices, and certified a number of them.

Aadhaar authentication is a process wherein the Aadhaar number, along with other attributes (demographic/biometrics/OTP) are submitted
to UIDAI’s CIDR for verification. The CIDR verifies whether the data submitted matches the data available in CIDR and responds with either a yes or a no.

- **Unique Identification Authority of India (UIDAI):** UIDAI is the overall regulator and oversees the Aadhaar authentication system. It owns and manages the Central Identities Data Repository (CIDR) that contains the personal identity data (PID) of all Aadhaar-holders.

- **Authentication Service Agency (ASA):** ASAs are entities that have secure leased line connectivity with the CIDR. ASAs transmit authentication requests to CIDR on behalf of one or more AUAs. An ASA enters into a formal contract with UIDAI.

- **Authentication User Agency (AUA):** An AUA is any entity that uses Aadhaar authentication to enable its services and connects to the CIDR through an ASA. An AUA enters into a formal contract with UIDAI.

- **Sub-UA:** An entity desiring to use Aadhaar authentication to enable its services through an existing AUA. Examples: (i) the IT Department of a State/UT could become an AUA and other departments could become its sub AUAs to access Aadhaar authentication services, (ii) a Hoteliers Association becomes an AUA and several hotels could access Aadhaar authentication as its sub AUAs. UIDAI has no direct contractual relationship with sub AUAs.

- **Authentication Device Technology Service Provider:** These are the devices that collect PID (Personal Identity Data) from Aadhaar holders, transmit the authentication packets and receive the authentication results. Examples include PCs, kiosks, handheld devices etc. They are deployed, operated and managed directly by the AUA/sub-AUA, or through a technology service provider.

- **Aadhaar Holders:** These are holders of valid Aadhaar numbers who seek to authenticate their identity towards gaining access to the services offered by the AUA.

  The Aadhaar e-KYC service provides an instant, electronic, non-repudiable proof of identity and proof of address along with the date of birth and gender. In addition, it also provides the resident’s mobile number and email address to the service provider, which helps further streamline the process of service delivery. e-KYC may be performed at an agent location using biometric authentication, as well as remotely using an OTP on a website or mobile connection.

**Salient Features of the e-KYC Service**

- **Paperless:** The service is fully electronic, and document management can be eliminated.

- **Consent-based:** The KYC data can only be provided upon authorization by the resident through Aadhaar authentication, thus protecting resident privacy.

- **Eliminates Document Forgery:** Elimination of photocopies of various documents that are currently stored in premises of various stakeholders reduces the risk of identity fraud and protects resident identity. In addition, since the e-KYC data is provided directly by UIDAI, there is no risk of forged documents.
- **Inclusive**: The fully paperless, electronic, low-cost aspects of e-KYC make it more inclusive, enabling financial inclusion

- **Secure and Compliant with the IT Act**: Both end-points of the data transfer are secured through the use of encryption and digital signature as per the Information Technology Act, 2000 making the e-KYC document legally equivalent to paper documents. In addition, the use of encryption and digital signature ensures that no unauthorized parties in the middle can tamper with or steal the data

- **Non-repudiable**: The use of resident authentication for authorization, the affixing of a digital signature by the service provider originating the e-KYC request, and the affixing of a digital signature by UIDAI when providing the e-KYC data makes the entire transaction non-repudiable by all parties involved

- **Low Cost**: Elimination of paper verification, movement and storage reduces the cost of KYC to a fraction of what it is today

- **Instantaneous**: The service is fully automated, and KYC data is furnished in real-time, without any manual intervention

- **Machine Readable**: Digitally signed electronic KYC data provided by UIDAI is machine readable, making it possible for the service provider to directly store it as the customer record in their database for purposes of service, audit, etc. without human intervention making the process low cost and error-free

- **Regulation-Friendly**: The service providers can provide a portal to the Ministry/Regulator for auditing all e-KYC requests. The Ministry/Regulator can establish rules for secure retention of e-KYC data (e.g., storage method, the period of storage and retrieval among other things). The data provided to the service provider is fully in compliance with the Information Technology Act (IT Act), 2000.

The e-KYC service is compliant with the latest standards notified in the Information Technology (Certifying Authorities), Amendment Rules 2011 – 25th October 2011(GSR 782(E) and GSR 783(E)-Standards (Hash & key Size), usage period of private keys, and verification of Digital Signature Certificate.

The Aadhaar e-KYC API22 can be used (only with the explicit authorization of the resident through biometric/OTP authentication) by an agency to obtain latest resident demographic data and photo data from UIDAI. The resident servicing agency is called the KYC User Agency (KUA). The KUA accesses the e-KYC service through a KYC Service Agency (KSA). The KSA provides connectivity to the UIDAI’s Central ID Repository (CIDR).

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**Fig. 19. The Data Flow for an e-KYC**
The e-KYC front-end application captures the Aadhaar number along with the biometric/OTP of resident and forms the encrypted PID block (see Fig. 19).

The KUA forms the e-KYC XML by encapsulating the PID block, affixes the digital signature and sends it to the KSA (the digital signature step can be delegated by the KUA to the KSA).

The KSA forwards the e-KYC XML (affixing the digital signature if delegated by the KUA to the KSA) to UIDAI’s Aadhaar KYC service.

The Aadhaar KYC service authenticates the resident. If the authentication is successful, it responds back with a digitally signed and encrypted demographic and photograph in XML format.

The demographic data and photograph in response are encrypted by default with the KUA’s encryption key. Upon the KUA’s request, this may be instead encrypted with the key of the KSA.

The KSA sends the response back to KUA, which interprets the result for service delivery. The e-KYC service can greatly reduce the KYC risk in the financial and telecom sectors. The PMLA (Prevention of Money laundering Act) Rules, 2005 have been amended in 2010 vide Government of India, Gazette Notification GSR 980 (E) dated 16th December 2010. This amendment includes the letter issued by the Unique Identification Authority of India containing details of name, address and Aadhaar number in the list of officially valid documents. This has been followed by notifications from the sector regulators accepting Aadhaar as a valid KYC document. The Aadhaar e-KYC service is in full compliance with the provisions of the IT Act, 2000 and later amendments.

Closed Group Payment Systems

Smart card-based solution is specially designed for universities, colleges, residential complexes, large medical hospitals.

The smart card-based products allow students to pay tuition, exam and library fees, and also pay canteen transport and any other service available in a university or college campus. The cards can be funded online from banking channels (NEFT) or by cash. The student does not need a bank account.

The very easy tap and go technology facilitates quick service at the touch points and improves efficiency. The security of the transaction is taken care of by using PIN or biometric authentication. All information stored on the chip of the card is completely encrypted and cannot be duplicated at all.

The smart card can also be used as an ID card, attendance card, access control card and library card along with the payment services offered by products. The integration with other applications can be done easily. The biggest advantage of the smart card is that it is truly multifunctional and can be integrated with multiple applications.

How Does the Technology Work?

The Closed Payment products provide linkage to a pool account with a bank and using the NEFT process get the funds transfer advice from the bank from time-to-time. These products
maintain all virtual accounts of card holders and maintain the balance details of each account holder.

Any transaction from PoS reaches the central server which takes care of all the card-level transaction details. During the day, for all the transactions which are done, the end of day settlement process would take care of settlement to various physical accounts. So, in case, the cards were used in the canteen during the day, the end of day process would take care of settling to the canteen account automatically.

**Benefit of Smart Cards**

The smart card is a multi-functional card which can be used as an ID card, access control card, library card and attendance card. The card carries the e-wallet for the students which they can use to keep funds and pay for various fees and services inside the college or university campus. The smart card secures the transactions and students do not have to worry about theft or small change in the campus.

**New Features Added to the Carry Cash in Card Product**

- **Smartphone Support:** Mobile application which is linked to the same wallet as the card. This would allow card holders to use their mobile too for payments. Again the balance in the account can be distributed to card and wallet usage as per the requirement of the customer.
- **Rewards Program:** Points-based reward system to encourage the use of cards. A student can accumulate points which they can redeem in canteen or cafeteria.
- **Touch Screen Kiosk:** Touch screen payment and information kiosk which can be installed in the reception area of the college.
- **Mobile Recharge:** Students can use the touch screen kiosk to recharge their mobiles from any operator using their cards.
- **Mobile to Mobile Transfer:** Students can transfer money to their friends using their mobile.

**Some of the Benefits to Various Stakeholders are as follows:**

**Benefits to Banks**

- One more product to the banks’ bouquet of consumer products and “assured” revenue earner.
- No long queues in front of cash counters.
- Increases operational efficiency and reduces operational expenses as the need for handling cash is reduced.
- Assured “float” for the banks as C3 is a prepaid card.
- It is a highly secured way of handling voluminous low-value transactions.

**Benefits to Students**

- No need to carry wads of currency notes – Simple plastic does the magic.
- No worry of loss or theft as it cannot be used by anyone as it is biometric-enabled.
- Avoid long queues to pay for any services by using any of the PoS terminals.
- Highly secure – Card can be used only by the owner.
- Above all – No hassle of maintaining a bank account.
- No change problem.

**Benefits to Universities/Colleges**

- No long queues at the cash counters.
- One Card – Multiple uses – Student ID, attendance monitoring and access control
- Reduce operational expenses as the need for handling cash is reduced
- Ability to provide secure cashless transactions to students across their entire campus
- Enhance the college reputation
- Daily reconciliation of all transactions and receive funds the same day or the next day
- Return on investment in the first six months.

**Bharat Bill Payments (Source NPCI)**

Bill payment is a major component of the retail payment transactions in India and is characterised by the presence of a large number of billers who provide a variety of payment options to their customers. However, a large number of payments continue to be either through cash or cheque. The present payment infrastructure arrangements are mostly biller-specific and do not provide an interoperable payment system which allows seamless and efficient bill payment mechanisms to the customer. These challenges in the service delivery presented an opportunity for a centralised bills payment system in the country. Considering the requirement of an interoperable bill payment system in the country, RBI constituted a GIRO Advisory Group (GAG) to study the feasibility of implementation of GIRO-based payment systems under the chairmanship of Prof. Umesh Bellur (IIT, Bombay).

The GAG recommended a tiered-structure wherein the Bharat Bill Payment System (BBPS) will be the authorized standard setting body (also handling the settlement functions) while the Bharat Bill Payment Operating Units (BBPOUs) will be the authorised operational units, working in adherence to the standards set by the BBPS. NPCI has been mandated by RBI to implement an integrated, interoperable, accessible and scalable bill payment system in the country which will provide the customers the facility of anytime, anywhere payment of bills. The Bharat Bill Payment System (BBPS) will function as a tiered structure for operating the bill payment system in the country under a single brand image. National Payments Corporation of India (NPCI) will function as the authorized Bharat Bill Payment Central Unit (BBPCU), which will be responsible for implementing business standards, rules and procedures for technical and business requirements for all the participants. NPCI, as the BBPCU, will also undertake clearing and settlement activities related to transactions routed through BBPS. Existing bill aggregators and banks are envisaged to work as Operating Units to provide an interoperable bill payment system irrespective of which unit has on-boarded a particular biller.

The BBPCU will not own any transaction financially from a payment system perspective, working only as a medium to connect multiple billers and agents through various Operating Units. In addition to setting standards and ensuring transaction security for the entire ecosystem, it will also ensure that queries, requests and complaints raised by customers are monitored and resolved on time. The BBPS will act as an independent brand and is expected to increase the confidence level of the customers with respect to transaction convenience, security, reliability and accessibility.
Unified Payments Interface

The Unified Payments Interface offers architecture and a set of standard API specifications to facilitate online payments. It aims to simplify and provide a single interface across all NPCI systems besides creating interoperability and superior customer experience.

The key aspects of the Unified Payments Interface are:

- The Unified Payments Interface permits payments via mobile app, the web, and other applications
- The payments are both sender (payer) and receiver (payee) initiated
- The payments are carried out in a secure fashion aligned with the extant RBI guidelines
- The payments can be done using mobile number, Aadhaar number, virtual address, account number and IFS code
- 1-click, 2-factor authentication, biometric authentication and use of payer’s smartphone for secure credential capture, etc., are unique features.

UPI App Approach

- **Independent Mode** – Bank developing a separate UPI app, and/or converting their existing mobile banking application to be extended to facilitate UPI services.
- **Embedded Mode** – The UPI compliant app/module is embedded in other (merchant) apps by bank giving the binary/SDK to the merchant to integrate into their apps. Merchants may choose to include more than one UPI compliant app from different banks.

Blockchain Technology

Blockchain technology is picking up very fast across the globe.

A blockchain is a place to store any data semi-publicly in a linear container space (the “block”). Anyone can verify the information publicly and securely. The blockchain behaves like a database, except that its “header” is public. The data stored can be a token of value or a crypto money balance. The blockchain acts as an alternative value transfer system that no central authority or potentially malicious third party can tamper with because of the encryption process. The blockchain is based on the public/private hegemony, which is the yin-yang of the blockchain – public visibility, but the private inspection. The blockchain transfers authority and trust to a decentralized virtual network and enables its nodes to continuously and sequentially record transactions on a public “block,” creating a unique “chain”. Each successive block contains a “hash” (a unique fingerprint) of the previous code; therefore, cryptography (via hash codes) is used to secure the authentication of the transaction source and removes the need for a central intermediary. The combination of cryptography and blockchain technology together ensures there is never a duplicate recording of the same transaction.

Digital banking will promote all these initiatives to reduce the use of cash and secure electronic payments. Banks should have a strategy and plan in place to be part of this financial transformation.
Chapter 4

Digital Banking Maturity Model

By now, it is abundantly clear that digital banking is a long journey and Indian banks are at various stages of this journey. Therefore, to help banks (both greenfield and brownfield ones) gauge where they are and what lies ahead for them, a maturity diagram is provided here in Fig. 20. In what follows, the constituents of all the four stages of the maturity diagram are described in detail. Further, we also spell out what needs to be accomplished in order for bank to move from one level to another.

**Level 1: Initiated**

To start with, all technology-related people with requisite skillsets and experience are recruited at various levels. Technology paraphernalia including necessary hardware, software are procured and installed in order to have the capability of internet banking, mobile banking, omni-channel; security-related software is tested and installed. Security department is formed informally. Importance of quality of customer data in bringing about growth in profitability and improvement in customer relationships is thoroughly understood and data quality tools are procured and installed. Business processes are re-engineered in order to bring out perceptible change in the way customers are serviced. Analytical thinking and reporting is initiated and inculcated in the bank at the top level using visual analytics or descriptive analytics. Operational CRM is fully implemented, wherein sales and services are carried out through the OCRM software. A data scientist is recruited to take care of analytics initiatives.

Apart from the above qualifying criteria, in this level, banks start analyzing all business related activities such as business per branch and zone, business per employee, ROE, ROA, fraudulent incidents, security related incidents, etc., using visual analytics tools.
Level 2: Managed

Data about customers should be collected and stored in a centralized repository such as data warehouse (either federated or logical or traditional enterprise wide) in order to achieve the elusive 360° view of the customer. Data warehouse specialists such as data modeler, ETL specialist, BI specialist should be recruited. Modern security-related software is procured and specialist is recruited to head this department with a team of CISOs. IT governance structure is fully in place. Customer data quality is improved throughout the bank. State-of-the-art analytical tools with text analytics features are procured in order to solve some of the business problems having structured data alone. In other words, analytical CRM is implemented in some form. Campaign management is conducted with the help of ACRM and OCRM tools. A couple of data scientists are recruited. BPR is carried out to bring in customer-centricity and enhancing customer experience. Security department is formally formed and analytical tools are procured to monitor and analyze past events and predict future events.

Apart from the above qualifying criteria and having tasted success in the previous level, banks in this level start building customer churn models for churn prediction, which in turn help in effective customer retention and perform target marketing based on scientific customer segmentation (based on clustering algorithms). Lift charts are built to aid in decision making in churn and customer acquisition.

Level 3: Optimized

Data quality becomes a separate function within a bank and Chief Data Quality Officer is recruited to take care of data quality improvement at every level of customer touch point. Data stewards and information architects are recruited. Master data management tool is procured to take care of data quality issues. Data warehouse of central repository becomes fully functional and it covers almost all branches. Chief Analytics Officer (CAO) is recruited to the analytics team having half a dozen data scientists and business analysts. The organization structure is tweaked so as to accommodate the CAO to whom a bunch of specialists such as data miners/scientists, channel managers, segmentation managers, etc., report. Bank starts analyzing the unstructured data in the bank such as call centre data and social media data to understand more about customers' needs, interactions, transactions and observations. Full-fledged and matured analytical CRM is implemented. State-of-the-art fraud detection analytics tools are procured to analyze, react and proactively identify transaction-related frauds in almost real-time. Digital and mobile wallets are introduced. BPR encompasses more areas so that new business and technology initiatives are in total alignment and aim towards getting maximum customer satisfaction.
Apart from the above qualifying criteria and having tasted success in the previous levels, banks in this level start building market basket analysis models for performing cross-sell/upsell, default prediction models, fraud detection models, customer sentiment analysis models etc. As a consequence, cross-sell ratio increases and default rates will come down, fraudulent incidents will come down and based on customer sentiments, products will be improved and services will be bettered.

**Level 4: Governed**

Data governance structure is fully in place with appropriate organization structure to completely take care of all data quality-related issues. Data lake is fully established to take care of both structured and unstructured data of customers and achieve full 360° view of the customers. All forms of analytics become all-pervasive in every department of the bank including customer-facing and non-customer-facing departments. Analytics becomes a commodity. Collaborative CRM, where analytical CRM is performed while servicing the customer, and geo-location analytics for better service to customers is fully implemented with big data analytics in the bank. Security Operations Center is in place to take care of all security-related issues in the bank. Marketing automation and optimization is completed. New technology initiatives with many possible ramifications in business such as blockchain, etc., are attempted and put in place after thorough testing. BPR continues to be carried out at frequent intervals in order to have customer-centricity.

Apart from the above qualifying criteria and having tasted success in the previous levels, banks in this level start building customer life time values models, credit recovery models based on unstructured data analysis, etc. Customer life time value is estimated and based on that personalized marketing is performed, which is the holy grail of marketing. Geolocation analytics models are built to personalize marketing efforts. Full-fledged operational, risk, fraud and HR analytics will be implemented and their benefits are felt throughout the bank.

At every stage, data quality is improved, new positions are created and people are recruited to take care of all analytics initiatives.
Chapter 5
Digital Banking Case Studies

INTERNATIONAL BANKS

Nedbank

Nedbank Group is a large banking group in South Africa with US$74 billion assets. The bank provides banking, insurance and asset management services through a set of 1,100 customer-assisted outlets. As Nedbank has seen growth through mergers and acquisitions, the IT landscape is highly duplicated and it resulted in different productivity, collaboration and CRM environments distributed throughout the enterprise. Nedbank wanted to standardize and simplify the IT infrastructure. They wanted to integrate technology plans with business plans.

Solution: Nedbank initiated with adoption of Microsoft Services Enterprise Strategy for three years. Certain critical domains for prospective change have been identified following the engagement between Nedbank senior IT and business leadership. As part of developing an integrated channel strategy, Nedbank used Microsoft Enterprise Architect to build a strategic roadmap and evaluate ways of interacting, communicating and transacting more efficiently with its customers. Using Microsoft Enterprise Architect, Nedbank was able to develop solutions to manage customer relationships and resolve issues regarding the use and scalability of Microsoft Dynamic CRM, Microsoft Lync Server 2010, and Microsoft SharePoint Server 2010. The Enterprise Architect organized sessions for Nedbank business and IT leaders on application of portfolio management; social customer relationship management; and how to capture, store and analyze large sets of “big data”.

With input from Microsoft Services Enterprise Strategy Program, Nedbank launched pilot initiatives. To help the bank meet changing demand for technology, the Enterprise Architect helped Nedbank produce a strategic plan, an architecture plan, and a business case for adopting a diverse array of end-user computing devices.

The Enterprise Architect played a key role in delivering a cohesive unified communications plan for internal and external collaboration via technologies such as the Microsoft Lync 2010 client for instant messaging and web conferencing. Microsoft Services Enterprise Strategy Program helped Nedbank to enhance business processes, identify prospective areas of cost reduction, and realize more technology value. It resulted in 5-15 percent real estate costs and realize additional savings with solutions that improve employee productivity and help them balance their work and home lives. Enterprise Strategy Program helped Nedbank to improve value realization from technology. The bank is also driving business and IT innovation in bringing the products such as video-banker program that will deliver more customer value.

Metro Bank

Metro Bank is a new age bank established in UK. It has focused on eliminating the all-too-familiar pain points experienced at a bank – the long
waits, complex rules, confusing processes and barrage of marketing offers. It has used multiple measures to address these aspects.

**Increasing the Speed of Business: Technology Reduces Wait Time**

Usual processes involved with the customers are made more efficient. If a customer requires more complex banking needs, the right colleague can be messaged to solve the customer's needs immediately. Communication within employees of Metro Bank is managed through Yammer, a Microsoft Enterprise Social Network. Various activities of the bank such as monitoring branch traffic patterns or a customer's account activity are performed using Dynamics CRM Online and Power BI for identifying and addressing the problems before they affect the customers.

In order to create happy customers, Metro Bank understood that this proposition begins inside out – with happy employees. Employees with easy access to consistent, current and correct information can respond to customers faster, creating a positive experience for everyone. To achieve this, Metro Bank uses Microsoft technology for its internal knowledge system, Metropedia. It provides employees with information on everything about the bank's services and customer service – from how to open an account or apply for a loan, to how to consistently provide positive communication and experiences for customers. Metropedia is instrumental to Metro Bank’s commitment to turn customers into fans.

Using Microsoft Dynamics Employee Self-Service, Metro Bank turned Metropedia into a user-friendly, searchable knowledge system that inspired employee adoption, engagement and everyday use. Some of the new features include:

- Customization to fulfill Metro Bank employees search and functionality requirements
- Ease in creating, editing, publishing and sharing content
- Real-time ratings and feedback to make quick improvements and add to content
- A customer service focus that empowers front-line agents, who can be confident they are delivering the best, most current and consistent answers across every channel.

**Juntos & Bancolombia: Automated Mobile Messaging Driving Usage among New Accountholders**

As access to basic financial services expands globally, in most part due to the ubiquity of mobile devices, adoption and usage of said services has become a critical and complex next step in achieving full financial inclusion in developing markets. Despite growing mobile money usage, active use of low-cost digital financial services remains low. Latest numbers from the Grupe Spécial Mobile Association (GSMA)² depict this challenge: In 2015, 37 markets around the world carried 10 times more mobile money agents than bank branches and at least 19 markets boasted a greater number of mobile money accounts than bank accounts. However, from the 411 million registered mobile money accounts globally, only 134 million were considered active – recorded at

least one transaction in 90 days by the end of December of 2015.

Juntos is a Silicon Valley technology company, created as an interactive mobile messaging platform aimed at bridging the engagement gap between Financial Service Providers (FSPs) and customers. Juntos started in 2010 at the Stanford School of Design and drew attention from investors and FSPs as a way to drive customer engagement. It has received the G20 Innovation Award for Financial Inclusion at the 2012 Mexico G20 Summit.

Juntos’ platform promotes real-time, two-way customer interactions using an automated, conversational SMS platform. Leveraging behavioral research and customer data analytics, the platform communicates with newly banked customers with low usage rates through text messages and adapts the frequency and content of messages based on customers’ reactions. The tool is designed to be conversational and adaptive. A customer can text a question to Juntos, not only to receive a helpful response, but also answers to potential follow-up questions and encouragement to act on key topics, such as savings for a specific goal.

Juntos is focused on building a relationship with the customer, helping break the lack of understanding on how financial products work – and the isolation it can cause – through an informal and friendly text message conversation. Lack of confidence and trust are often significant barriers for people’s interaction with FSPs and use of financial services. Newly banked customers often shy away from clarifying questions with bank representatives in person, fearing embarrassment. Having an informal and somewhat anonymous communication channel helps some customers get the information they need and voice concerns without feeling overwhelmed.

**Deploying Juntos**

Before a deployment, Juntos conducts in-country ethnographic and market research to understand what triggers people’s financial behavior and potential issues around trust. Leveraging these insights, Juntos configures its platform to address the local context, using human-centered design concepts. For the first deployment with Bancolombia, a large commercial bank in Colombia, this initial research took two weeks and involved in-depth interviews with approximately 10 consumers. Juntos then designed initial messages for testing and recruited a randomly selected group of consumers (not necessarily customers of the FSP partner) to refine tone and content of the messages. The sandbox testing is a fast, iterative process during which potential mistakes or misperceptions can be quickly identified and corrected.

During the first couple of months of a deployment, Juntos runs many concurrent A/B message testing with small numbers of users – for example, six batches of 200 customers at a time – observing how customers respond or not to the various messages. Once deployed, the system adapts its message frequency to individual user behavior, sending more responses if the customer is highly engaged, or fewer messages if the customer is not as responsive.

Juntos also ensures that customers do not have to pay for their SMS replies. In addition, in order to comply with local regulations, in some countries Juntos is required to ask customers to opt-in to the service to kickoff engagement.
Bancolombia Results

In the deployment with Bancolombia, Juntos has achieved some promising results when considering customer response rate, targeted behavior change, and increased trust and confidence of customers.

- **Customer Response Rate:** Juntos' response rate increased from 4% after one month to 32% after 3.5 months. This is considerable, especially when compared to other similar tools, such as email marketing, which typically generate less than 1% response rates. Bancolombia conducted a randomized phone survey asking its customers about the mobile money product and the service provided by Juntos. In this survey, nine out of 10 customers on average indicated they were “very satisfied” with the service.

- **Transactional Behavior Change:** Juntos' platform was successful in driving many customers to use more efficient agent and mobile channels, or to simply make a transaction using a mobile wallet. This behavior change resulted in per customer cost reduction – transaction costs at a bank branch were approximately five times higher than the cost of transactions at agents; increased savings balances; and drove revenues from withdrawal fees – still a lower cost to customers than visiting a branch.

- **Trust and Confidence:** Juntos targeted Bancolombia's customers' right after account opening, which appears to be a crucial time period to successfully engage new clients. During this early stage of the customer relationship, Juntos' messages aim to provide immediate value (such as information about agents where customers can transact for free) and consistent flow of content. At the same time, Juntos requests little to no personal information from customers during this time. These strategies help Juntos build trust with consumers. Three months after the introduction of Juntos, active new accounts increased by 32.5% and average account balances by 50% compared to the control group during the pilot phase.

At the six-month mark, compared to accounts that were not exposed to Juntos, inactivity rates were 14% lower and balances increased almost twice as much in six months. The effects were largest with customers who actively engaged with Juntos.

Following the deployment in Colombia, Juntos has already made successful strides in replicating similar results with partner-FSPs in Mexico, Tanzania, and the Philippines, among other countries.

**Using Big Data and Consumers' Digital Footprints to Score “Invisible” Borrowers**

Extending loans in underserved markets has always been challenging to formal lenders. In the absence of easy-to-access information about the creditworthiness of unbanked or underserved consumers, lenders had to resort to cost-intensive, high-touch models for credit due diligence or not lend to them at all. Even though these segments have steady income and resources to invest in their future, they still find it difficult to get access to credit, because they lack a formal credit history. In India, more than 400 million people borrowed money in
2014, but fewer than one in seven were approved for a formal loan.

The digital revolution is rapidly changing these dynamics and creating new opportunities to address many of the longstanding barriers in financial services and India is poised to seize these opportunities. Well over 650 million adults in India – four out of every five – already have a mobile phone in their pocket, and most of these devices will be smartphones by 2020. More than 400 million Indians have access to the internet and 125 million have a Facebook account. Seven in 10 users of mobile broadband smartphone in the country regularly stream videos on their phones.

And every time these individuals make a phone call, send a text, browse the internet, update their status on social networks, or top-up their mobile accounts, they deepen the digital footprints they are leaving behind. These digital footprints are helping spark a new kind of revolution in lending in emerging markets around the world. In India, this new approach to risk assessment can potentially bring between 100 and 160 million new customers to the consumer credit market, which would mean tripling the current addressable market for retail lenders in the country.

Lenddo, a technology solutions company, is an early contributor to this revolution. Through its innovative proprietary algorithms, Lenddo is helping formal lenders, such as traditional banks, non-bank and online lenders, to extend credit to consumers in the aspiring middle-class by using non-traditional data such as consumers' digital footprints to verify their identities and assess their credit risk.

Generating the Lenddo Score

Lenddo has analyzed over 2.6 billion individual pieces of digital information to create its decision-making algorithms. The data is loaded into Lenddo’s proprietary platform and through complex modeling and statistical techniques, the algorithms are “trained” to comb through all this information to surface insights into consumers' attitudes towards credit. For a typical borrower who applies for a loan and opts-in to share their private data, Lenddo analyzes as much as 12,000 data points, generating a score using multiple derived features. After years of lending in multi-markets to train algorithms and perfect the technology, in January 2015, Lenddo made its Application Program Interface (API) available to traditional and alternative lenders globally.

In Colombia, Lenddo was able to test their model alongside a commercial credit bureau. An online lender issued more than 2,000 loans, capturing each borrower’s commercial credit score and a Lenddo Score. Lenddo’s calculations estimate that, using a traditional credit history score, a bank would likely only approve the top decile (10.26%) of a pool of prospective loans, but would still have a high default rate of 20.45%. With the same pool of prospective loans, the model combining traditional credit scores and the Lenddo Score achieved a default rate of 9.57 percent. The combined model also improved approval rates by 52% and reduced risk in 12%. These results clearly benefit both borrowers and lenders.

In a recent survey with Colombian consumers, about 70% of the participants indicated they were willing to share information they consider
private – such as social media activity and web browsing history – with companies like Lenddo to improve their chances of getting a loan or a bigger loan.

**Market Customization and Machine Learning**

Lenddo’s algorithms are continuously improving through machine learning techniques and with each new market, lending partner and potential borrower, the model accesses more data, becoming more accurate. Lenddo also builds custom algorithms to meet the needs of specific clients and tailors and customizes its data collection and analytical models for their specific use cases.

**Smaller Case Studies and Success Stories**

- ING Direct was one of the earliest in the digital-centric model and successful (including the ING Direct USA sale for USD $9 billion to CapitalOne)

- Movenbank is a good international example of how mobile-first approaches are bringing about disruptive change to the process of retail banking and payments. Numerous FinTech startups closer to home are disrupting all traditional financial services arms in some way or the other (some examples are provided here, a comprehensive overview of how blockchain technology is going to displace banks from its intermediary position)

- Disruptions in India are already happening in the credit sector, like for instance servicing the needs of the “unbanked” retail borrowers (e.g., CreditMantri), commercial loans for digital-based SMEs (e.g., Capital Float), etc. Disruptions in the payments industry is already well-known as witnessed by the large PE inflow into companies like PayTM and MobiKwik.

**Anonymous Case Study: Identifying and Targeting Mortgage Prospects using Analytics**

A leading financial services provider wanted to identify quality leads for their sales and marketing teams. They decided to look at how customers may show interest in a mortgage before even starting an application. They thought that by looking at the sequence of web pages browsed, the combination of pages browsed and the complete journeys that customers took through their website, before filling in an online application form, they would be able to quickly identify pre-purchase intent.

The company used browsing data from customer sessions, including the pages visited, the clicks registered, the time spent and the number of visits a customer made to their website in the past month to predict a customer’s propensity to buy a mortgage.

They then created new variables using these pre-application interactions and introduced them to their existing analytical models to better predict which customers were most likely to buy mortgages. The results were impressive. They achieved a 50% uplift in mortgage conversion while at the same time expanding the pool of high-performing leads. Instead of passing leads on to sales teams monthly, they were able to pass them on daily, improving the timeliness of any follow-up actions. Finally, the company put in place a programme to win back visitors that had abandoned the application process. These
insights generated many millions of incremental sales revenue, a great result.

**Anonymous Case Study: Improving Online Forms and Processes for Better Customer Experience and Profits**

A retail bank knew that many of its customers were dropping out at various points in their online application processes, but did not know why. The bank wanted to recreate customer journeys by time sequencing interactions in abandoned sessions in order to identify customer pain points.

Using visualisation of the most frequent paths though the website, they identified the main points at which customers were rejected, where on the page or form this was happening, and the experience for the customer when this happened. It turned out that if a particular field was completed in a particular way it would send customers back to the start of the process. This affected over 50% of customers attempting to complete the form. Further analysis revealed the nature of the “bug” which the existing web reporting had not been able to identify. The root cause related to a validation rule sitting behind the field which was very simple to fix. Resolving this, had a huge positive impact on form completion and customer experience.

This analysis was then repeated across a range of online processes and application forms and the bank was able to pinpoint which forms needed to be redesigned, and which customers had been affected by problems previously.

A side benefit of this analysis was the reduction in calls to the call centre by visitors unable to complete their online applications, freeing up valuable resources and lowering operational cost.

**Anonymous Case Study: Preventing Lost Opportunities by Decoding Customer Conversations**

For a bank, the free-format text generated by the web chat facility on their website proved to be a treasure trove of valuable information about how their customers felt about the bank’s products and services. In order to analyse the free-format text, the conversation logs had to be put into a structured format. Next, text analytics was used to group conversations based on key words or phrases. This enabled topics of conversation to be identified, such as usability issues, new feature requests, hot leads or difficult processes.

Then, sentiment analysis was used to detect whether the words or phrases used in each topic had a positive or negative connotation. For instance, words such as “poor”, “not as good as”, or “disappointed” would all fall into the category of negative sentiment.

As a result of continually monitoring the topics of conversation and their sentiment, the bank could identify and resolve customer issues quickly and effectively. The bank was able to reach out to disgruntled customers to win them back with a specific action or offer. In another instance, the company found usability issues with their website and put in place a new design to remove those issues. These actions were instrumental in recovering the customer experience and increasing revenue for the company.

**Anonymous Case Study: Business Efficiency**

An Insurer Uses Predictive Campaign Optimisation to Maximise Conversion of High Value Customers: For many companies, the
conversion rate for visitors to the website is around 1% to 2%. For one insurer, this represented a big missed opportunity as the customers in the country which this insurer operated in, could only change their insurance supplier on a set date once a year. As such, this insurer decided to focus on the 98% of visitors to their website that they had not managed to convert.

To do that, this insurer wanted to identify which campaigns were most valuable, not in terms of driving lead volumes but, more importantly, generating the most profitable leads. First, the team built data models comparing the online behaviour of visitors from different online marketing campaigns in order to understand which campaigns were driving the highest-value visitors. They tracked every action a visitor performed on the site in realtime, and attributed a value to the complete online customer journey, from the first visit to the last visit. They then developed predictive models which allowed them to predict, with more than 90% accuracy, whether a visitor was likely to convert on this or a future website visit based on their online behaviour.

By applying these models to their marketing campaigns, the team could predict whether a specific campaign would be successful or not within 24 hours of its launch. Prior to that, they had to wait a few weeks for enough data to be collected in order to be able to judge a campaign's success. And with a short annual campaign period of around three months, waiting weeks to reallocate spend meant time and resources wasted on a campaign that was not working.

By using predictive campaign optimisation, the marketing department now had the insight to dynamically allocate resources and budget to the most appropriate activities much earlier than previously, thereby minimizing spend and maximising results.

**NATIONAL BANKS**

**HDFC Bank – Journey in Digital Banking**

The emphasis of HDFC Bank has always been digitizing the entire enterprise in every aspect. The bank began the digital journey by launching Net Banking services in 1999, and SMS banking in 2000. Since then, the bank has progressed on this journey, having developed a mobile site and subsequently a mobile application for its customers. The bank implemented a strong data warehouse and analytics through analytics CRM system in 2005 and also implemented a robust analytics on credit and lending portfolio through Enterprise Data Warehouse and Basel programs. The bank setup an in-house credit and analytics team and developed in-house skills on data statistics and data modelling. The bank clinched the top position in mobile banking transactions across India’s banking sector for the period 2014-15.

Customer convenience is central to the concept of being “digital”. As part of the bank's “Go Digital” offering, it launched “Bank Aap Ki Muththi Mein”, an initiative that virtually transforms a smartphone into a bank branch. It offers customers the option of carrying out a wide range of over 75 financial and non-financial transactions without needing to visit a branch or an ATM. It is a technology-agnostic initiative available on the three popular smartphone platforms of iOS, Android and Windows.
The focus of digital is all about speed and design. In this regard the bank deployed a strong origination and underwriting platform, coupled with intelligence from Credit Bureau data. It was able to approve and disburse loans within 10 seconds – a unique achievement in the banking industry. The bank also implemented a strong SOA framework to make the business process agile and had a strong focus on STP (end-to-end) to make the enterprise truly digital and responsive. The bank has launched an array of internet and mobile applications in the last couple of years which are described below.

**Smart Buy – Hyper Market Place**

As part of the digital journey, HDFC Bank launched its Smart Buy offering. Smart Buy is a comprehensive online bulletin board giving a 1-click browsing experience and best offers across all the merchants to facilitate One View & One Stop Shop for our customers. Smart Buy has a variety of offers for flight and hotel bookings, movie ticketing, online bill payments, recharges and e-tailing offers.

**Chillr Application**

In March 2014, the bank launched Chillr in partnership with MobMe, a technology firm based in Kochi. Chillr is a mobile app that is linked directly to the customer’s bank account and allows them to instantly transfer money to any contact in their phonebook 24 hours a day, seven days a week. With this app, customers no longer have to ask for account information and wait for a set duration of time in order to add beneficiaries when they wish to transfer money. Further, no passwords are stored on the phone and the app can be accessed only with an M-PIN known to the customer alone.

Chillr also acts as an important tool for financial inclusion in rural markets, allowing migrant workers to remit money to their families back home in a secure manner. The bank also piloted the use of Chillr for its Sustainable Livelihood Initiative (SLI), a programme that reaches out to people at the bottom of the pyramid by providing them with livelihood finance and skills training. In just five days of its launch, Chillr was among the Top-10 Free Financial Apps on Google Play Store. Chillr has been a phenomenal success among customers which has resulted in exponential growth in both downloads and cashless money transfers.

**PayZapp**

PayZapp is a comprehensive mobile payment application, where users can link their multiple credit and debit cards and make one-click payments on partner sites, without having to “load” money into a prepaid wallet (no other bank or PPI wallet has this functionality). Services available in PayZapp are: merchant payments, bill pay/recharge, money transfer, booking flights, bus, hotels, movie tickets, gifting – all with an in-app shopping and payment experience.

Subsequently, the bank launched PayZapp for Business, a utility which enables merchants to send a bill to customers through SMS or email, using a desktop/laptop/tablet/mobile and for the customer to make instant payment using any bank card with any smartphone device. This initiative targets conversion of Cash on Delivery to Card on Delivery and also advances/balance payments into digital mode. This product can be used by merchants for bulk collections as bulk SMS/ email facility is supported. Some use cases are home delivery, education institutes, cable operators, service providers, etc.
**HDFC Mobile Banking Lite** application allows the banking transactions to be done without requiring internet connection. It uses SMS banking for achieving this, making it work in remote areas also where internet connectivity is poor. HDFC Home Loans application allows both prospective customers and existing customers to know various details about loans. Existing customers can get information like account statements, payment details, disbursement details and also an option allowing users to get their tax details. Prospective customers can get all the information about loans such as home loan and car loan, and they can even interact with a loan advisor through the application.

HDFC Mobile Banking application seamlessly integrates with the Apple Watch product. The customer who sets up the mobile application with the watch will be able to do traditional applications usually performed on the mobile to be performed on the watch. HDFC provides an application to manage mutual funds too. The HDFC SMS banking provides a unique option allowing users to get mobile recharges with a mere missed call to a designated number. Family members of the account holder too can avail this facility. Focusing on the troublesome cycle a customer goes through in purchasing an automobile, HDFC has built an application called Autopedia, making all the requisite information about the automobile models available for the customers at one place. These are some of the customizations HDFC has been doing to facilitate the users' interaction with HDFC to be hassle-free.

**ICICI Bank**

ICICI Bank, the largest private sector bank in India, has always prided itself on being a technology bank. The focus on technology served multiple strategic objectives – enhance convenience for the customer with any time access, optimise operating costs by reducing load on high cost channels like branches and push the boundaries of technology driven banking. At the core of this strategy is the 'customer', as is most aptly captured by the bank’s brand promise of 'Khayaal Aapka'.

The digitisation journey for ICICI Bank began very early, right from the days when the Bank was set up in the 1990s. Technology was one of the key elements of our strategy that would allow us to leapfrog the strong presence of the incumbent banks in India. As technology cycles become shorter, new opportunities arise and move from concept to mass adoption much faster. So what began as a strategic choice to adopt technology as part of our early years has now evolved into a digital way of life. As individual consumers we are exposed to the same trends in digital technology and with higher global connectivity at the same time as the rest of the world, sometimes even before the rest of the world. The original guiding principles of customer convenience, optimising costs and challenging what can be done with digital technologies will continue to be a driving force.

The strategy at ICICI Bank revolves around various pillars or objectives.

The first is to provide best in class services and features on all the digital channels of the bank, and ensure that customers can avail of the most comprehensive list of services on the digital
platforms. The bank strives to ensure that services on digital platforms are extremely convenient and easy to use.

Banking transactions are now a routine part of everyone’s life. The primary focus for the bank is to provide a comprehensive suite of services and products to all customers on digital or self-service platforms. The digital channels also provide complete view of all relationships of the customer with his bank including accounts, term deposits, cards, loans, investment accounts etc. Internet and mobile are the two primary digital channels which the bank focusses on to provide this comprehensive customer experience.

ICICI Bank is the pioneer in Internet Banking in the country, and this platform now provides more than 250 services. The customer has been empowered to choose from multiple options to transfer funds, pay bills to 1000+ billers, and make payments to thousands of online merchants. Customers can also service the accounts like statements, account modification, cards services and tracking of deliverables.

Another example of a comprehensive digital platform is the bank’s flagship retail mobile application, called as iMobile. iMobile is an end-to-end Banking solution for customers enabling them to perform over 150 services on their mobile phone, effectively serving as a bank on the phone. This application has consistently brought innovation in the form of new age ways of servicing such as live chat, better authentication through use of biometrics as well as new products such as card-less cash withdrawals. As a testimony to the acceptance and wide use of these two key channels of internet and mobile, today close to 65% of the overall transactions of the bank happen through these Digital Channels.

The second important goal of the bank is to drive innovation in this space and be ahead of the curve in bringing the new services. In line with this goal, the bank introduces first in category products across its platforms, and has been driving innovation in payments and social banking. Over the last few years, ICICI Bank has been introducing new to industry products and services with this strategic objective in mind. A few examples include introduction of social banking through transactions on Facebook, where ICICI Bank was one of the first to do this globally. The Bank also introduced India’s first digital bank on mobile, 'Pockets’. This comprehensive application allows anyone, even those who are not customers of ICICI Bank to instantly download, fund the wallet from any bank account and use it. 'Pockets' is also the world’s first mobile application to integrate mVISA payment solution that enables QR code based payments.

Then again, as part of an industry-first payment innovation, ICICI Bank recently unveiled ‘touch&pay’ on 'Pockets', the country’s first contactless mobile payment solution to facilitate in–store payments using smart phones.

Thirdly, the bank believes that true digital transformation can only be achieved by an end to end digital and holistic journey, and just as front end channels need to change and improve over time, transformation must also be achieved at each stage of the customer journey starting from front end channels to mid-office to back office processes and application. ICICI Bank has therefore endeavored to embrace digital
technologies in all stages from front end sales to backend processes and has emerged as a strong and mature digital organization. Continuous digital transformations are carried out across processes and products, from account opening, lending products to SME product solutions and branch processes to name a few. For example, the bank has been using software based robotics in its operations shops successfully in various operational tasks to automate the services, reports generation and bring about TAT improvement. As part of overall transformation, the bank has also invested in self-service at all customer touch points. For example, the bank has deployed cash deposit machines and Insta banking kiosks at branches to enhance self-service, and these have seen wide scale adoption by customers.

The bank has simultaneously invested in platforms and technologies such as a multi-channel campaign management architecture as well as Big Data platforms to ensure that best in class use of data and analytics is guaranteed in customer engagements.

**State Bank of India & The Buddy Wallet**

According to the RBI Vision Document on Payment Systems, the value of banknotes and coins in circulation as a percentage of GDP (12.04%) is very high in India when compared to other emerging markets, like Brazil, Mexico and Russia. Similarly, the number of non-cash transactions per citizen is very low in India (6 transactions per inhabitant) when compared to other emerging markets.\(^1\) This imposes significant costs on the economy in terms of cash minting and handling costs, fraud and counterfeiting costs, and evasion costs from non-traceability of transactions.

Hence, RBI’s overall regulatory policy stance is oriented towards promoting a less cash/less paper society, and hence the increased emphasis on the use of electronic payment products and services that can be accessed anywhere and anytime by all at affordable prices.

At SBI, ATM transactions have grown at 18.66% as opposed to 17.22% for the industry as a whole. However, the rupee value of ATM transactions at SBI has grown at 5.48%, as against a 13% growth rate for the industry as a whole. This indicates that SBI’s customers tend to perform more small-ticket transactions than the average banking customer in the country.

This is also reflected in the fact that PoS transactions for SBI customers have grown at 86.95%, while the rupee value has grown at only 35.01%. The corresponding figures for the overall industry are 48.3% and 24.33%, respectively.\(^2\) Moreover, PoS transactions account for only 4.1% of ATM transactions (by value) at SBI, as compared to 6.0% for the industry as a whole, again highlighting the over-reliance of the average SBI customer on cash transactions. This is exacerbated by the large rural footprint of SBI’s branch network, where there is a paucity of PoS acceptance devices.

While the growth in transaction volumes is a natural outcome of a growing business, the cost of servicing a transaction is relatively inelastic for a given channel, irrespective of the transaction size. So, it is more cost efficient for

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\(^1\) RBI: PAYMENT SYSTEMS IN INDIA VISION 2012-15

the bank to have a large ticket withdrawal than a small ticket transaction. Our analysis shows that SBI customers conduct over 4.4 million small cash withdrawals (Rs. 500 or lesser) a month from ATMs and at Teller stations. There is a far greater occurrence of these small ticket transactions in Urban- and Semi-Urban branches than in Metro-branches, because of the relatively lower penetration of electronic payment modes in these centres.

A fraction of the 10 million plus retailers in the formal sector in India have card payment acceptance infrastructure. SBI has 296,000 PoS terminals across the country, compared to HDFC Bank’s 281,000, Axis Bank’s 258,000 and ICICI Bank’s 200,000 PoS systems. These four banks together dominate this space and contribute to three-fourth of the total 1.4 million PoS terminals deployed in India – and this infrastructure needs to be grown exponentially to effectively cover this sector. During 2016-17, SBI plans to add a further 100,000 terminals to enhance card acceptance infrastructure, particularly in Tier-3 and below centres.

Of the merchants currently on SBI’s platform, there are over 37,000 small retail merchants [average ticket size Rs. 1,000 or lesser]. It is expected that the number of cash transactions at these merchants would be large and that these merchants represent a significant opportunity for migrating to Buddy and thus reducing the overall volume and cost of servicing the cash transactions.

The key elements to realizing the vision of a less-cash society are: Accessibility, Availability, Awareness, Acceptability, Affordability, Assurance and Appropriateness. Different payment mechanisms have different advantages and disadvantages, but it is electronic Prepaid Payment Instruments (PPIs) that come closest to meeting the requirements of the seven ‘A’s above.

It is in this context that SBI’s Wallet program, Buddy, acquires increased significance. Buddy is a full-functional Wallet launched by SBI in August, 2015.

It is a fully electronic Prepaid Payment Instrument (PPI) which allows customers to transfer funds from the user’s wallet to any third party, thus enabling Peer-to-Peer payments as well as Merchant payments of various kinds. Its capabilities include Wallet Loading, Merchant Payments including Utility and Bill Payments, Peer-to-Peer transfers, initiated either by sender.

Fig. 21. Distributions of Buddy Customers and Wallet Loading Transactions
or payee, and other user conveniences. Buddy is bank agnostic and allows its users to fund the wallet from any bank account through net banking, debit card or through IMPS.

Buddy usage is capped at Rs.10,000 of incremental funds loaded during a calendar month, making it ideal for small ticket transactions.

Buddy has clocked up some impressive growth numbers since its launch.

SBI’s Buddy team launched the “Hello Buddy” campaign, which offered incentives to both customers and staff to boost the popularity of the newly launched initiative. For the distribution of buddy customers see Fig. 21.

The campaign owed its success partly to the continuous engagement of the staff across the branch network, and partly to the widespread marketing efforts which involved print, outdoor and television media.

Stringent metrics collection and publication processes were put in place to monitor the progress of the campaign.

A strong platform having been set, the bank has now plans in place to further boost the growth and usage of Buddy. Awareness and Acceptability are two dimensions where significant improvements are being planned to ensure that Buddy grows to its full potential.

- Expand merchant enrolment in Buddy to cover a large proportion of its existing PoS merchant network, including incentivising merchants to boost Buddy acceptance over cash
- Enhanced features for Merchants to maintain their own micro-sites that will be featured on Buddy
- Integration of the Buddy app with the SBI mobile banking platform, and auto-enrolment of customers
- Enhanced features on Buddy to further improve ease of use including Geo-contextual search and selection
- Marketing and media campaign focused on Urban- and Semi-Urban centres to boost Buddy awareness, including Outdoor, television, online and ATM screens.
- Promotion of Peer-to-Peer transactions
- Promotion of “Green-Channel” banking transactions to familiarize customers with electronic payment modes
- Key Performance Indicators tracking and monitoring –
  - number of active Buddy users, and activity levels
  - number of active merchants, and activity levels
  - number of transactions (Peer-to-Peer and Merchant)
  - reduction in cash transactions corresponding to growth in Buddy usage
  - product awareness and preference tracking.
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Mr. Patrick Kishore,
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Acknowledgements

Mr. Kumar Ravi, Research Fellow, Mr. B. Shiva Krishna, Mr. Yogesh Khandelwal
and Mr. K. Rakesh Varma Research Associates, IDRBT

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For restricted circulation in the Indian Banking & Financial Sector.
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