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ATM industry: changing landscape and emerging trends

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1 Introduction

Introduction of Automated Teller Machine (ATM) in the banking sector can be demarcated as a major milestone in its evolution. The cash dispenser was born almost 50 years ago, in 1967. For many this was the first tangible evidence that retail banking was changing. The introduction of the ATM marked the dawn of contemporary digital banking. Even after nearly five decades of existence, the ATM channel is still proving to have retained its central role as a core banking touchpoint with customers.

Currently, the ATM industry in India is rapidly transitioning from traditional methods of ATM operations into internationally accepted ones. The business of ATM outsourcing has been growing exponentially in India, since the ATM industry continues to move from bank's managed services to end-to-end deployment of service vendors. The ATM industry offers a wide range of services—ATM site sourcing, site development, electronic journal (EJ) and switch management services, managed services, maintenance services and installation services. Cash management is another aspect of the ATM industry. The current cash cycle management of ATM involves cash pickup, cash movement, grading, counting, replenishment and others.

In an effort to extend banking services in India, especially in rural areas, white label ATMs have been introduced by the Reserve Bank of India. Following this, Federal Bank of India became the first bank in India to deploy white label ATMs in India through a tie-up with Tata Communication for Payment Solution Limited (TCPSL).

Increasing involvement of customers with the banking and financial organisation is resulting in overall growth in the market size of the ATM industry. Consistent efforts taken by the Government and institutions to reduce the unbanked and under-banked population in emerging economies is favouring industry growth significantly. However, card skimming, card tapping, online frauds and inappropriate network connectivity are major factors hindering the growth of ATM's market share. With the growing technological advancements, the ATM industry has managed to curb these potential threats from malpractices. Global regulatory authorities are organising security standards and system to reduce fraud prevalence, due to which global ATM market size is expected to witness acceleration over coming years.

Many technological standards are formulated to overcome the problems faced by customers, banks and ATM service vendors, such as, Scrutiny Standard Council (SSC), International Organization for Standardization (ISO), European payment Council (EPC) and Payment Card Industry (PCI). Currently PCI PIN Security Requirements and PCI PTS POI Security Requirements are most accepted standards among these.

Recently, the Deputy Governor of the Reserve Bank of India delivered a keynote address at NPCI National Payments Excellence Awards function, Mumbai. There he said, "*…there is a need to debate and put in place the following in the best possible manner. They are–*

- *Robust data collection, big data analysis and analytics framework for creating benchmarks.*
- *Platforms for industry wide sharing of fraud data.*
- *Need for self-regulatory organisations amongst various industry sectors.*
- *Security standards for mobile payments, including Internet of Things' devices and security aspects of social networks-based payments.*
- *Leveraging block chain or distributed ledger technology.*
- *Encouraging contact less payments, including through QR code, tokenisation.*
- *Innovation through regulatory sandbox."* [1]

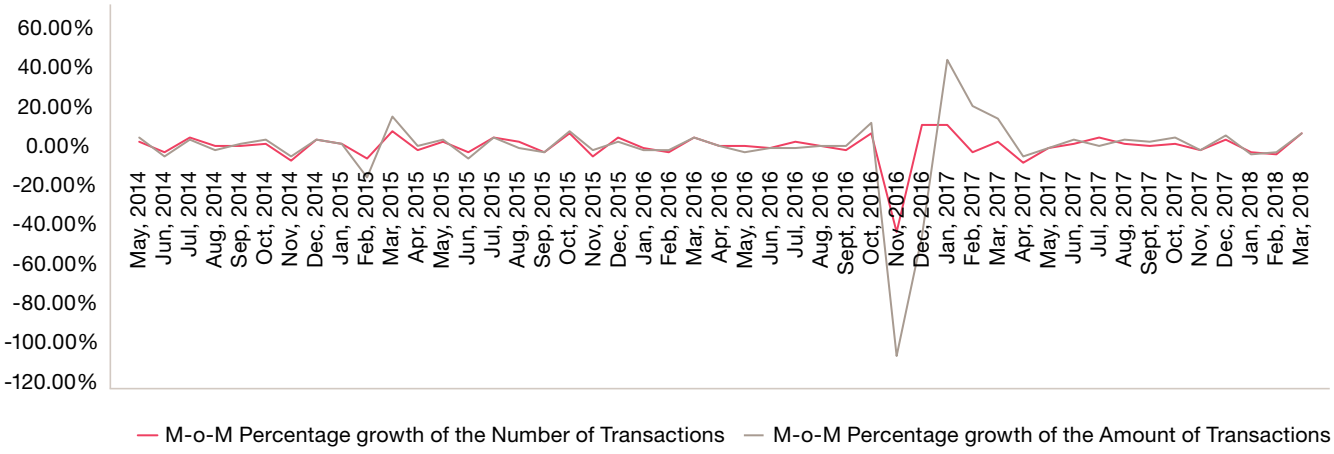
1 https://rbi.org.in/scripts/BS_SpeechesView.aspx?Id=1058

2 Trends

Over the years, the ATM industry in India has seen a fair growth until 2016, which was marked by one of the boldest step taken by any Government—demonetisation. Due to demonetisation the calibration of ATMs had to be changed. There were various restrictions on amount of withdrawals that can be done by account holders.

Month-on-month ATM transactions using debit/credit card growth chart

Source-Compiled and analysed based on data from RBI



If we analyse the data for the last four financial years (2014-2018) and reflect upon the pre and post era of the demonetisation we will be able to observe the following:

Particular	Period	Average m-o-m percentage growth of number of transactions	Average m-o-m percentage growth of amount of transactions
Pre-demonetisation	May'14-Oct'16	1.16%	1.04%
Post-demonetisation	Nov'16-Mar'18	-0.76%	-3.31%

However, it should be noted that during the last financial year, i.e., 2017-18, it was observed that there is a positive 0.64% average m-o-m percentage growth of the number of transactions and a positive 1.16% average m-o-m percentage growth in the amount of transactions. Therefore, it can be concluded that the effect of the demonetisation is fading with the passing time.

As far as mergers and acquisitions are concerned, NCR Corporation, a global leader in omni-channel solutions, announced that it has completed the sale of a significant portion of its assets and related customer contracts in respect of its outsourced ATM business in Kerala, Bihar, Jharkhand and Lakshadweep to Electronic Payment & Services Pvt. Ltd. (EPS), a leading payment system company headquartered in Mumbai[2].

A report by Hexa research suggests that the worldwide ATM market is projected to garner more than 26 billion US$ by 2024, growing at around 9.8% CAGR in the forecast period (2016-2024). It had a value of 12.5 billion US$ in 2015. Technological breakthroughs and innovative security standards amid growing wireless devices should propel the market in the near future. This can reduce fraud and lead to safe financial transactions.[3]

2 http://bfsi.eletsonline.com/ncr-completes-sale-of-its-atm-outsourcing-business-to-eps/

3 https://www.hexaresearch.com/research-report/atm-market

3 Innovation in a time of change

With time, technology evolves and as it is correctly said, 'today's technology is tomorrow's scrap'. Various leading global banks, in order to enhance customers' experience, are evolving their ATMs.
Few such enhancements are mentioned below:

Cardless ATM access:

Many global payment leaders have introduced technologies, which allow the customer to carry out transaction without a card, through their smartphones. With growing use of smartphones, many mobile manufacturers are ensuring that their devices are near field communication (NFC)-enabled, which allows the smartphone to communicate with devices in certain proximity.

SunTrust Bank plans to introduce this technology at their ATMs so that customers can use their NFC-enabled smartphones to access the ATM. Wells Fargo has rolled out a similar technology, which will link its digital wallet Android Pay and plans to further add wallets such as Apple Pay and Samsung Pay, which enables customers to carry out transactions without using their cards.

While the global industry has adopted these measures, Indian companies have also adopted technologies, which enable the customer to access ATMs without the card and PIN.

Biometric ATMs:

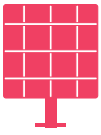
- DCB Bank has launched its Aadhaar-based ATMs, which enables customers to use their unique Aadhaar number and Aadhaar fingerprint (biometric) instead of the debit card and PIN to dispense cash from the bank account.
- DCB Bank ATMs are not only enabled to facilitate such cardless transactions, but also several money transfer transactions.
- ICICI bank, Bank of India and Axis bank have initiated money transfer transactions via their ATMs. These facilities enable customers to transfer funds without logging in to their net banking facilities.

Varying bill denominations

- With the fixed denominations dispensed in cash form, many banks have enabled their ATMs to dispense cash to the exact change requirement and provided additional flexibility to the customer when it comes to their cash withdrawals.

Live teller video conferencing:

- Various global financial institutions have upgraded their ATMs with remote bank associates, which function like any regular bank branch.
- Such facilities enable the customer to carry out complicated transactions with the help of associates. This also enables financial institutions to expand their banking services in rural or remote areas in a very efficient way.
- These facilities move transactions away from the counter and prove to be cost effective. Users can opt for the speed and convenience of self-servicing with remote teller for assistance for more complicated transactions.



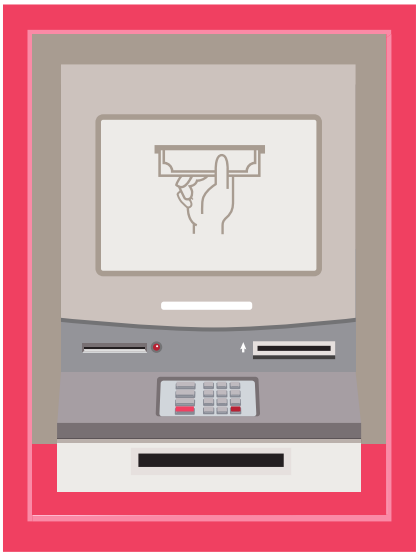
Solar-powered ATMs

- ATMs in urban areas consume substantial amount of electricity. However, in rural areas the Government is coming up with ATMs run on solar energy, which will enable the banks to provide services in those areas where there is shortage of electricity. In Assam, the Chief Minister inaugurated a solar-powered mobile ATM of United Bank of India in Dispur. According to NABARD, around 5,000 such ATMs will be operational across India. NABARD will provide funds of around 250 crore INR. This move will benefit 2.5 million people living in rural areas with poor power and internet connectivity. Installation of 5,000 such sets was expected by end-December 2016. Banks may buy the entire set or avail it on rent for five years. For each ATM, NABARD will pay 0.5 million INR.

States such as Rajasthan, Chhattisgarh, Odisha, Assam and Madhya Pradesh have requested for several such machines followed by Gujarat, Kerala, Punjab, Haryana, Delhi, Mizoram, Orrisa and Tamil Nadu have sent less than 10 proposals to the NABARD.[4]

4 http://www.greenworldinvestor.com/2017/02/08/solar-powered-atms-advantages-components-working-mechanism/

4 Challenges faced



While the previous section discusses how the ATM industry is adapting to the changing technology and better customer interface, which is facilitating better quality experience for the customer, it is of utmost importance that the challenges in this transition period are also recognised.

- **Data collection and implementation**

  Speaking at the World Economic Forum's annual meeting in Davos, PM Modi said, "Today, data is a real wealth and it is being said that whoever acquires and controls the data will have hegemony in the future. The global flow of data is creating big opportunities as well as challenges."[5] But the overall implementation of systems and such processes, which capture the data, record and maintain it in order to facilitate the flow and processing into useful information is an uphill task. The collection of primary or secondary data requires both meticulous understanding of the information requirement and the adequate processes/systems, which process such data into information.

- **Cost management**

  It is said that every good thing comes with an expiry date. The management of obsolete technology and upgrades to new systems and processes is the need of the hour. However, such upgrades will require significant investments in research and development. Once it comes to the implementation stage, it will again require more investments in hardware, software, systems and control implementation. Therefore, the cost of the upgrade becomes a challenge as technology requires considerable investments.

- **Adherence to required regulations/standards/security concerns**

  The RBI has recently come up with circular related to cash management activities of banks, standards for engaging the service provider and its sub-contractor.[6] The circular provides guidance to the cash-in-transit (CIT) companies or cash replenishment agencies (CRAs) regarding various controls, which are to be implemented to have better security. The circular also talks about self-regulatory organisations (SRO) and adherence to its guidelines. There are numerous global standards, which provides guidelines on security and control. Therefore, it is a major challenge for ATM service providers and other related parties to manage regulatory requirements and also maintain the level of controls up to the requirements of global standards within the changing landscape of the technology in the industry.

- **Upgrading obsolete technology**

  Change is the only constant in the market. These technological changes are focused towards better services to the customer. Due to this, the banks or ATM service provider or other related parties, which did not upgrade their existing infrastructure following technological changes may face various threats discussed in the coming section. As indicated in various past cases that those who are not able to cope and act according to the change in the market, always end up in losing market share or may even have to shut down the entire unit.

- **Cash replenishment and uptime**

  With increased focus on customer facilitation, the service level agreements (SLAs) between the bank and the ATM service provider or the ATM service provider and the CRA provide for minimum level of uptime, which should be maintained. If the actual uptime is less than the level as provided by the SLA, there are penalties charged by the bank from the ATM service provider, which is, in turn, recovered by the ATM service provider from its vendors for reasons attributable to them and related to low level of uptime of the ATM. Therefore, with emerging technology, ATM providers will have an increased responsibility of maintaining uptime level as well as have such controls in place, which ensure that the penalties charged by banks are in line with agreed terms as per the SLA and these penalties are recovered from respective vendors or CRAs for reasons attributable to them.

5 https://analyticsindiamag.com/modi-wef-davos-data-control-real-wealth/

6 https://www.rbi.org.in/Scripts/NotificationUser.aspx?Id=11245&Mode=0

5 Frauds related to emerging technology: past and present scenario

Lack of control activities, strong governance mechanism, systematic risk management and the monitoring as well as review controls is likely to result in various processes being exposed to fraud risk. These frauds can be perpetrated by internal or external personnel.

- **Card skimming**

  Card skimming is a wide-spread method used by people to steal card-related information by installing a device or technology in an otherwise legitimate credit or debit card transaction. In case of ATMs, the same can be done by installing undetectable camera nearby in order to steal information entered while performing the transaction in ATM. Card skimming may also result from tailgating. This kind of fraud maybe eliminated with technology such as biometric system in ATMs.

- **Data theft**

  Theft of data is going to be a major concern with each day and changing technology. Ensuring data confidentiality is one of the major concern that will have to be addressed by banks as well as ATM service providers. Various cybercrimes such as viruses, worms, malwares, piggybacking, etc. Such crimes intend to either steal the money by penetrating overall security controls or steal the data from the transactions performed on the machine. Therefore, with each emerging technology the vulnerability towards data theft is increasing.

- **Data leakage by third party vendors**

  The ATM industry is highly dependent upon vendors who perform every related activity. Whether it is CRA for an ATM service provider or an ATM service provider for the bank, the third party risk management is a major concern that has to be diligently dealt with by banks or ATM service providers. The data, which is shared or processed by a third party to perform activities under the SLA is prone to leakage if security controls implemented by the third party are not strong enough to mitigate these risks. Both banks and ATM service providers are exposed to this risk.

- **Salami slicing**

  ATMs may also be prone to penny shaving. It is an activity in which small quantities, which is usually rounding down the financial transactions to the nearest rupee, and putting the fractions in another account. Such frauds are generally done through computers or installing other devices, which enable such transactions to go undetectable. This technique makes it difficult to detect the fraud as the customer is unable to realise that there has been theft of money from his account.

- **Frauds related to hardware**

  Salami slicing is not the only way frauds are perpetrated. Lately several cases of fraud were committed by tampering with the hardware, since there is a lot of dependency on digital and technological enhancements. The ATMs are tampered and card numbers are recorded, which could assist in card skimming techniques. Not only with cards but some ATM money dispensers are blocked with money straining boxes, which detects the cash dispensed and stores it in straining boxes and the actual customer does not receive any cash.

In India we have faced significant hardware issues and we have seen several burglaries at ATMs with entire ATMs being robbed.

Apart from above challenges, there are various threats which are described in the next section.

6 Threats

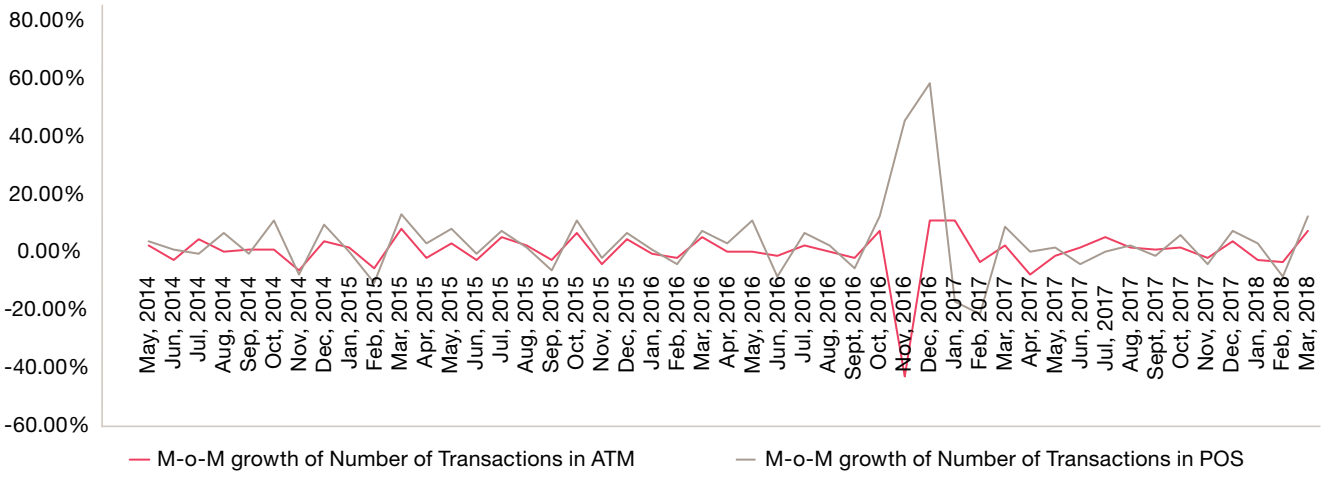
Various other technologies also pose a threat to the ATM industry as a whole. As can be seen from the earlier section how the past year marked a negative growth in the number of ATMs deployed, it is important to note the major threats faced by the ATM industry in the recent time.

• Wallets and digital payments

The Government is moving rapidly towards its agenda of making the economy cashless, through digitisation of payments and evolution of e-wallets for making various payments. This enables easy performance of day-to-day transactions.

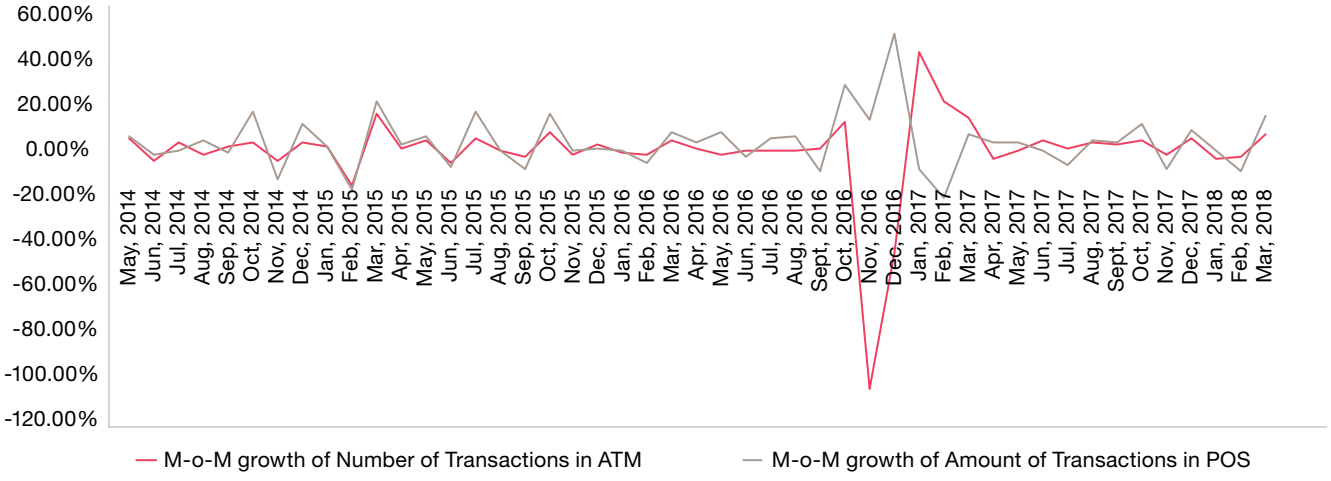
Month-on-Month ATM / POS number of transactions using debit/credit card growth chart

Source-Compiled and analysed based on data from RBI



Month-on-Month ATM / POS amount of transactions using debit/credit card growth chart

Source-Compiled and analysed based on data from RBI



If we analyse the data for the last four financial years (2014-2018) and reflect upon the pre- and post-era of demonetisation, we will be able to observe the following:

Particular	Period	ATM		POS	
		Average m-o-m percentage growth of number of transactions	Average m-o-m percentage growth of amount of transactions	Average m-o-m percentage growth in number of transactions	Average m-o-m percentage growth in amount of transactions
Pre-demonetisation	May'14-Oct'16	1.16%	1.04%	2.93%	3.20%
Post-demonetisation	Nov'16-Mar'18	-0.76%	-3.31%	5.51%	4.01%

Therefore, it can be observed that making payments at POSs is growing at a much faster pace as compared to ATM transactions. People have started making payments directly by using debit or credit cards rather than withdrawing cash from ATMs and making payments in cash.

Various modes such as netbanking, phone banking, e-wallets, etc., are slowly growing their operations in India. The ease of operations, as well as advantage of mobility and various benefits offered by sellers or vendors or government for making payments digitally have started attracting users, who till date, have believed in a cash-driven economy. The RBI, in its master directions for prepaid payment instruments (PPIs), had proposed the idea of interoperability among digital wallets, following which digital wallets present in the ecosystem will be able to interact or transact with each other.[7] Interoperability will allow a user of one e-wallet to make payment to user of another e-wallet. With this customer facilitation will be increased due to the ease of making such payments. This poses a major threat to the ATM industry in the long-run.

• Cryptocurrency

In India, the RBI has set up an inter-departmental committee to explore feasibility and desirability of starting its own digital currency in future.[8] However, with the concept of cryptocurrency gaining more and more relevance globally, in the long run India cannot be expected to remain backward in this domain. Therefore, till the time when the cryptocurrencies in India are given legal status, it is going to be a major challenge for ATM service providers to facilitate the change and develop technologies for payments in cryptocurrency as well as convert cryptocurrency into fiat currency. It will also be a challenge for Indian ATM service providers to facilitate cryptocurrency through ATMs and stay relevant in the market. This will also affect the way ATMs as well as ATM service providers operate in the market. The revenue and billing cycle for an ATM service provider will undergo change to factor in consequences of facilitating cryptocurrency ATMs. The future of bitcoins in India is largely dependent on the RBI directions. The norms and directions given by the RBI will decide the fate of the cryptocurrency and therefore, the fate of cryptocurrency ATMs in India. The notable point is that globally, cryptocurrency has carved a niche for itself in the economy. People have started accepting cryptocurrency and there are various corporate houses, which are performing various research and development projects in this field in order to understand and leverage the use of cryptocurrency.

In the Indian context it is to be noted that the public at large prefer transacting through cash and thus, the Indian economy is still considered to be a cash-driven economy. The rural economy in India is still not developed and the public is yet to accept and understand various concepts such as cryptocurrency, e-payments and online banking, etc. However, these concepts are highly accepted and practiced outside India. The security concerns related to e-wallets, digital payments environment and cryptocurrency is a major concern, which is causing a set-back in widespread usage of these modes in place of cash payments through ATM usage.

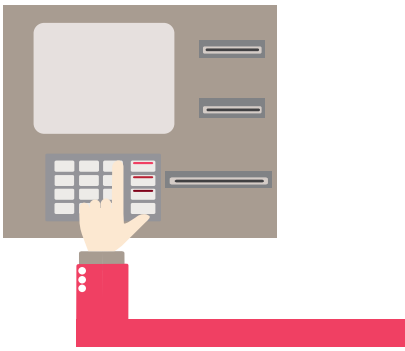
Therefore, the above mentioned factors can be threats in the long-run, but with advancement in various aspects of the way the ATM industry works, the ease and customer facilitation is going to be top priorities.

7 https://www.thehindubusinessline.com/money-and-banking/wallets-to-become-interoperable-soon/article23763056.ece

8 https://www.ndtv.com/business/cryptocurrencies-bitcoins-battle-with-government-diktats-rbi-warnings-1865290

7 Way forward

With the increasing trend in use of POS as compared to ATMs, majority of banks are trying to enhance their ATM banking and interface. Banks are in the process of enhancing the customer interface with the ATMs, which enables ATMs to not only dispense cash, but also enable the user to carry out various transactions based on their technological advancements.
These can be done by developing three major components—enhanced hardware and interface, security requirements and adherence to regulatory guidelines and technological changes. This will enable ATMs to act as traditional ATMs and enhance the customer interface. ATMs should not only dispense paper currency, but with the growing currency advancements, they should be able to dispense such currencies as well.



Enhance ATMs

To curb competition, banks are using various techniques to provide enhanced services, which not only provide the customer easy access to paper money but also enhance customer interface.

- **White Label ATMs**

White label ATMs are owned and operated by non-bank entities and sponsored by a particular bank, which provide cash. Mostly financial institutions operate these ATMs and they don't have any the bank's logo. These ATMs are regulated by the RBI, since these companies have to obtain licenses and permission from the RBI to run them. These ATMs are now being installed at various location by banks to enhance accessibility to paper money, which enables banks to enhance customer experience.

- **ATMs on wheels**

Given these challenges, majority of banks have enhanced their ATM banking solutions latest addition to which is ATMs on wheels. This enables money mobility and assist customers to access cash as and where required.

These were a few examples of how the ATM industry has acted to enhance their current processes and products. However, with such enhancements, banks and regulators also have to focus on building a secured environment where the customer can transact without any hesitation.

Security and adherence to regulatory guidelines

- **Security standards**

Multi-layered security and the permutation and combination of various layers working together will provide a safe and secure environment. Human intervention is required not only for such technological enhancements but also to identify incidents, which is not likely to be picked up by a machine. Employees and cash replenishment agents should carry out their scheduled activities as well as inspect the ATM for skimming devices and conduct random checks to ensure that abnormalities are not found.

- **Regulatory reporting** [9]

The RBI has issued various circulars regarding customer protection, especially with respect to ATM banking, which highlights the following:

- The systems and procedures in banks must be designed to make customers feel safe about carrying out electronic banking transactions.
- These processes should be strong and foolproof.
- There needs to be a process of reporting of unauthorised transactions to banks by customers.
- Customer should have limited liability.
- There should be reversal timeline for zero liability or limited liability of customer.
- There should be a board approved policy for customer protection.
- The burden of proving customer liability in case of unauthorised electronic banking transactions shall lie on the bank.
- Reporting and Monitoring Requirements should be well defined by the bank which should be monitored and report customer liability cases to the Board or one of its committees.

9 https://www.rbi.org.in/scripts/NotificationUser.aspx?Id=11040

Technological enhancement (currency)

In recent time not only have the ATM technology advanced, but also the currency that are being traded in the system. With such inventions in the currency need for new technologies and security systems are required. Mentioned below are few examples of recent advancements, which enable the ATM industry to trade in different currencies and obtain currency exchange solutions:

- **Crypto to fiat currency ATMs** [10]

Fiat currency is 'legal tender' backed by a 'central government'. It can take the form of physical dollars (for example paper Federal Reserve notes), or it can be represented electronically, such as with bank credit. The government controls the supply and you can pay your taxes with it. Whereas **Cryptocurrency is not 'legal tender' and it is not backed by a central government or bank (it is decentralised and global)**. Its form is more like bank credit sans the bank (in that it is represented digitally, but not backed by a bank or government).

ATMS are enabled to convert crypto currencies to fiat currencies, which makes it legal to process the transaction and you can obtain the local fiat currency in no time. Banks are not only using such technologies to convert crypto to fiat currencies but also track the currency and monitor its end use thereby reducing money laundering activities.

With such upcoming currency enhancements, which are being transacted via ATMs, currency exchange is possible. However to ensure security, Distributed Ledger Technologies (DLT) are being used by the banks.

- **Distributed Ledger Technology (DLT)**

This technology is described as a ledger that is maintained by banks via nodes in a decentralised form across multiple locations, various transaction and multiple individuals.

All the information is then stored and utilised by multiple banks within the nodal network who use these transaction and history of account to assess the credibility of the account or individual.

This gives an enhanced security for transactions linked with such technologies, which may not only transform the usage of traditional ATMs but also eliminate the use of cards.

With every enhanced level of customer service and new technologies, banks are improving the face of ATM banking. Multiple levels of security, convenience and personalisation will enable the automation to be successful. This will not only personalise the experience but also create a seamless banking environment. DLT technologies, will allow banks to use customer data to drive acquisition, retention and ultimately revenue. The automation, which will be incorporated in such scenarios, will provide an enhanced level of security with intervention of human checks. It will enable the industry to assess transactions and also enable to understand and deal with multiple exceptional transactions and provide an enhanced, secured transactional environment.

The landscape of the Indian economy as a whole is changing, due to various economical, technological and regulatory reforms, which in turn is affecting the ATM industry. However, in the long run, to eliminate or mitigate the effects of an ever-changing landscape, strong and effective external risk management and evaluations, along with enterprise risk evaluation, is required which will not only enable the business to survive in the market but will also achieve the objective of better customer facilitation and financial inclusion. Unless the change is embraced by the industry and its constituents, which obviously requires strategic management and innovation, the industry may find it difficult to sell secure services to customers.

10 http://www.greenworldinvestor.com/2017/02/08/solar-powered-atms-advantages-components-working-mechanism/

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Contacts

Vivek Iyer
Partner, Financial Services
Risk Assurance Services
+91 9167745318
vivek.iyer@pwc.com

Dnyanesh Pandit
Director, Financial Services
Risk Assurance Services
+91 9819446928
dnyanesh.pandit@pwc.com

Preeti Sawlani
Assistant Manager, Financial Services
Risk Assurance Services
+91 9870359219
preeti.sawlani@in.pwc.com

Harshit Agarwal
Article Assistant, Financial Services
Risk Assurance Services
+91 9022651823
harshit.a@pwc.com

pwc.in

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