IX PAYMENT AND SETTLEMENT SYSTEMS AND INFORMATION TECHNOLOGY

Imperative to the greater adoption of electronic payments are speed, efficiency and security, as also creating trust and safety of operations in the minds of the users. In line with its vision of encouraging electronic payments in the country and achieving a less-cash society, the Reserve Bank continued its endeavours in making the payment systems safer and more secure, gearing its policies towards addressing risks, if any, in the payment systems. Several initiatives for infrastructure enhancement during the year included introduction of white label ATMs, cardless cash withdrawal facility for unbanked persons, introduction of next generation RTGS and enhancing the capacity of the NEFT system for larger volumes and efficiency. The trend of greater acceptance of electronic payments over paper cheques by the general public received further boost during the year.

IX.1 The efforts made by the Reserve Bank in migrating to electronic payments are reflected in the high volumes witnessed under various electronic payment systems during the year (Table IX.1). Alongside acceptance of electronic payments, the volumes processed under paper-

Table IX.1: Payment System Indicators - Annual Turnover

Item	Volume (million)			Value (₹ billion)		
	2011-12	2012-13	2013-14	2011-12	2012-13	2013-14
1	2	3	4	5	6	7
Systemically Important Financial Market infrastructures (SIFMIs)						
1. RTGS	55.0	68.5	81.1	539,307.5	676,841.0	734,252.4
Total Financial Markets Clearing (2+3+4)	**1.9**	**2.3**	**2.6**	**406,071.2**	**501,598.5**	**621,569.6**
2. CBLO	0.1	0.2	0.2	111,554.3	120,480.4	175,261.9
3. Government Securities Clearing	0.4	0.7	0.9	72,520.8	119,948.0	161,848.2
4. Forex Clearing	1.3	1.4	1.5	221,996.1	261,170.1	284,459.5
Total SIFMIs (1-4)	**56.9**	**70.8**	**83.7**	**945,378.7**	**1,178,439.5**	**1,355,822.0**
Retail Payments						
Total Paper Clearing (5+6+7)	**1,341.9**	**1,313.7**	**1,254.0**	**99,012.1**	**100,181.8**	**9,3014.8**
5. CTS	180.0	275.0	589.3	15,103.7	21,779.5	44,203.1
6. MICR Clearing	934.9	823.3	439.0	65,093.2	57,504.0	31,129.8
7. Non-MICR Clearing	227.0	215.3	225.7	18,815.1	20,898.3	17,681.8
Total Retail Electronic Clearing (8+9+10+11+12)	**512.5**	**694.1**	**1,108.3**	**20,575.3**	**31,881.1**	**47,856.3**
8. ECS DR	164.7	176.5	192.9	833.6	1,083.1	1,268.0
9. ECS CR	121.5	122.2	152.5	1,837.8	1,771.3	2,492.2
10. EFT/NEFT	226.1	394.1	661.0	17,903.5	29,022.4	43,785.5
11. Immediate Payment Service (IMPS)	0.1	1.2	15.4	0.4	4.3	95.8
12. National Automated Clearing House (NACH)	-	-	86.5	-	-	214.8
Total Card Payments (13+14+15)	**678.1**	**931.7**	**1,262.1**	**1,562.5**	**2,051.5**	**2,576.3**
13. Credit Cards	320.0	396.6	509.1	966.1	1229.5	1539.9
14. Debit Cards	327.5	469.1	619.1	534.3	743.4	954.1
15. Prepaid Payment Instruments (PPIs)	30.6	66.1	133.9	62.0	78.7	82.4
Total Retail Payments (5 to 15)	**2,532.4**	**2,939.5**	**3,624.4**	**121,149.9**	**134,114.4**	**143,447.4**
Grand Total (1-15)	**2,589.3**	**3,010.2**	**3,708.0**	**1,066,528.5**	**1,312,554.0**	**1,499,269.4**

- : Not applicable

Note: 1. Real time gross settlement system (RTGS) includes customer and inter-bank transactions only.
2. Settlement of government securities clearing and forex transactions is through the Clearing Corporation of India Ltd. (CCIL).
3. Banks from 27 Magnetic Ink Character Recognition (MICR) Cheque Processing Centres (CPCs) and 67 non-MICR CPC locations; 20 MICR CPCs and 3 non-MICR CPC locations; and 21 MICR CPCs and 1 non-MICR CPC locations are participating in CTS-Chennai, Mumbai and New Delhi Grids respectively. Consequent upon migration of total cheque volume to cheque truncation system (CTS) in various CPC locations, the total number of MICR CPCs in the country reduced from 66 to 19 (as on May 21, 2014).
4. The figures of cards are for transactions at point of sale (POS) terminals only.
5. The NACH system was started by National Payments Corporation of India (NPCI) (in December 29, 2012), to facilitate inter-bank, high volume, electronic transactions which are repetitive and periodic in nature.
6. Figures in the columns might not add up to the total due to rounding off of numbers.

based clearing systems, relative to other non-cash payment means, continued to show a declining trend. Overall, the payment and settlement systems registered a healthy growth in volumes at 23.2 per cent and value at 14.2 per cent during 2013-14.

TRENDS IN PAYMENT SYSTEMS

Paper clearing

IX.2 The on-going endeavour and efforts to migrate from paper to electronic payments had a positive impact, leading to a reduction in paper-based transactions in volume as well as in value terms. During 2013-14, in volume terms paper-based transactions accounted for 34.6 per cent (43.4 per cent during 2012-13) of total non-cash transactions. In terms of value too, the share of paper-based transactions reduced to 6.3 per cent (7.6 per cent during 2012-13).

IX.3 The cheque clearing system at present mainly comprises: (i) the grid based cheque truncation[1] system (CTS) at Chennai, Mumbai and New Delhi, (ii) MICR CPCs at 19 large centres, and (iii) express cheque clearing systems (ECCS) at 1,339 smaller centres. Grid-CTS clearing facilitate clearing of all cheques drawn on bank branches within the grid jurisdiction as local cheques, thus eliminating the levy of speed clearing charges/outstation cheque collection charges, etc. As of May 2014, the introduction of grid CTS had enabled migration of the entire volume of 47 MICR centres to the grid centre, thus leading to their closure. The ECCS application package is used at centres with low volumes and also enables 'local' level clearing for participating banks at that centre.

Electronic payments

IX.4 During 2013-14, the RTGS processed around 81 million transactions valued at ₹734 trillion. As on April 30, 2014 the number of RTGS-enabled bank branches stood at 109,506.

IX.5 As on April 30, 2014, the national electronic funds transfer (NEFT) facility was available at 111,619 branches of 158 banks. During 2013-14, NEFT handled 661 million transactions valued at around ₹44 trillion. In March 2014, NEFT processed a record volume of 82.8 million transactions.

IX.6 During 2013-14, the electronic clearing service (ECS) debit-handled 193 million transactions valued at around ₹1,268 billion and ECS credit processed 152 million transactions valued at around ₹2,493 billion. With the gradual expansion of the regional electronic clearing service (RECS) operations, the volumes at many ECS centres have completely subsumed to RECS centres. The number of ECS centres now stands at 34 in addition to the 12 RECS centres in various centres and the national electronic clearing service (NECS) in Mumbai.

IX.7 During 2013-14, 509 million transactions valued at ₹1,539 billion were transacted through credit cards, while 619 million transactions valued at ₹954 billion were undertaken through debit cards.

IX.8 During the year, mobile banking services handled 95 million transactions valued at around ₹60 billion.

White label ATMs (WLAs)

IX.9 To supplement the efforts of banks in providing banking services to people in unbanked/under-banked areas, non-bank establishments were permitted to install and operate ATMs with greater focus on Tier III to Tier VI centres. Out of the 18 applicants, 12 entities were given in-principle approval, of which 6 entities have been granted final authorisation to install ATMs. A total of 1,960 WLAs had been deployed as on April 30, 2014.

[1] Image-based clearing.

Authorisation of payment systems

IX.10 During 2013-14, with the addition of 17 new entities, the number of authorised payment system operators grew to 58, comprising prepaid payment instrument issuers, cross-border money transfer service providers, WLA operators, ATM networks and card payment networks besides CCIL and the National Payments Corporation of India (NPCI). In addition, 8 other entities were issued 'in-principle authorisation' to issue and operate prepaid payment instruments (PPIs). During the year, 3 payment system operators (PSOs) issuing PPIs were put under the 'winding down' process. Operations of one overseas principal engaged in the cross-border in-bound remittance service under money transfer service scheme (MTSS) ceased completely due to non-compliance of guidelines. NPCI which operates the 24x7 Immediate Payment Service (IMPS) was accorded permission to introduce multiple settlement sessions. In-principle approval was also given for setting up cardless cash withdrawal systems (Box IX.1).

POLICY INITIATIVES

Cheque clearing systems: Checks and balances

IX.11 Over the years, the Reserve Bank first automated all clearing houses for settlement purposes and then leveraged the core banking solution (CBS) of banks for enabling processing of outstation cheques locally under speed clearing. Later, CTS and grid-based CTS were introduced for building further efficiency in cheque clearing. However, even after years, non-CTS 2010 standard cheques continued to be presented at CTS grids posing risks. A system of separate clearing at less frequent intervals was hence introduced at the 3 grid CTS locations from January 1, 2014 for non-compliant cheques still in circulation. Banks were advised against the continued use of post-dated cheques in locations where the ECS facility was available.

Box IX.1
Cardless Cash Withdrawal Facility for Unbanked Persons

During the year, 2 entities were granted 'in-principle authorisation' to set up a payment system in India which will facilitate unbanked persons to withdraw remittances initiated by 'senders/remitters' from their bank accounts. The proposition behind the cardless service is to enable bank account holders to transfer/remit funds, within permissible limits, to an unbanked beneficiary using a mobile number as the identification of the receiver and pin codes for enabling withdrawal. The service will be made operational on submission of system audit reports by the said entities. A brief schema of the approved systems is given below.

Remittance will be possible by an account holder to a non-account holder using the internet or his debit card at an ATM. The sender will use any participating bank's ATM to transfer funds to the receiver by activating a special button. Thereafter he will be prompted to provide the following information:

- Receiver/beneficiary's mobile number
- 4-digit sender code of his choice
- Amount to be remitted
- Own (sender's) mobile number

The beneficiary will be able to withdraw the money in full at any of the ATMs of the participant banks using a set of pin codes - one received from the bank and the other from the remitter. At the ATM, the beneficiary will need to activate the special button and provide the following information:

- His own (receiver) mobile number
- The sender's code (received on phone/short message service (SMS) from remitter)
- The transaction pin (generated by the bank and sent to him by SMS)
- The amount (also received from the bank and remitter by SMS)

On successful completion of the transaction, the remitter will get an SMS of successful delivery of the value. The service will be chargeable to the sender. The withdrawal can also be enabled through a micro ATM (hand held device with a business correspondent (BC)) to extend the reach of the system.

IX.12 As a customer service measure, banks were advised that cheque return charges should be levied only in cases where the customer is at fault and responsible for such returns, and not otherwise. An arrangement of uniform holidays was put in place at the 3 grid-CTS locations for streamlining the procedures and ensuring faster cheque realisations across different states covered by the grid.

Enhancing efficiency and security of electronic payments

IX.13 The NEFT system was enhanced for handling larger volumes and efficiency. To improve customer service, banks were advised to adhere to the NEFT procedural guidelines concerning charges to customers, adherence to return discipline, facilitation of remittance for walk-in customers and *suo moto* payment of compensation for delayed credit or return.

IX.14 Banks were advised to facilitate quicker lodging of complaints relating to ATM transactions and proactively registering mobile numbers/e-mail IDs of customers for sending alerts. As a fraud control measure, banks were also advised to enable time-out sessions for all screens/stages of ATM transactions keeping in view the time required for such functions in the normal course.

IX.15 The facility of e-KYC for opening accounts, available to banks, was also extended to non-bank entities authorised to issue PPIs. PPI guidelines, first issued in April 2009 were amended and consolidated in March 2014. To address the concerns of operational risks, the revised guidelines tightened the entry point norms in terms of capital and net worth requirements for entities seeking authorisation as issuers of PPIs, outlining the permissible debits and credits to escrow accounts which were put in place to ensure protection of customer funds.

IX.16 To ensure safety and security of card payments, the Reserve Bank has mandated the migration to Europay, MasterCard and Visa (EMV) chip and personal identification number (PIN) for all international cards as also the need for a PIN for all debit card transactions at point of sale (POS) terminals. While these requirements were to be complied by card issuing banks, similar requirements were placed on the banks which have installed card acceptance infrastructure for compliance to payment card industry data security standards (PCI-DSS), terminal line encryption (TLE) and unique key per terminal (UKPT)/ derived unique key per terminal (DUKPT) security. Banks were also advised that customer losses accruing on account of non-adherence were to be borne by the banks responsible for such losses. Over a period of time, both card-not-present and card-present transactions have been strengthened through the use of the additional factor of authentication (AFA).

IX.17 As on May 31, 2014, 86 banks, including 10 RRBs and 19 UCBs, had been permitted to launch mobile banking services (Box IX.2).

Clearing Corporation of India Limited (CCIL)

IX.18 The Reserve Bank issued a policy document on 'Regulation and Supervision of Financial Market Infrastructure' (FMI) describing in detail the criteria for designating a FMI, its oversight and other related aspects. CCIL has been advised to adopt the principles for financial market infrastructures (PFMIs) issued jointly by the Committee on Payment and Settlement Systems (CPSS) and the International Organisation of Securities Commission (IOSCO). CCIL was declared a qualified central counterparty (QCCP) in the Indian jurisdiction on January 1, 2014.

IX.19 During the year, CCIL has been granted several permissions/approvals: i) doing away with physical exchange of confirmation for trades in the currency options, ii) commencement of interest rate swaps (IRS) guaranteed settlement, iii) in-principle approval for introduction of the payment *vs* payment (P*v*P) model in USD/INR settlement, and iv) portfolio compression in USD-INR forex

Box IX.2
Technical Committee on Mobile Banking

With a view to leveraging the high mobile density in the country and to study the feasibility of providing an affordable means of carrying out payment transactions to enhance the financial inclusion objective through this medium, a Technical Committee on Mobile Banking was constituted under the Chairmanship of Shri B. Sambamurthy. The committee submitted its report in January 2014.

The committee identified the challenges faced by banks in providing mobile banking services to customers, including customer enrolment, technical issues and SMS/unstructured supplement service data (USSD)/application-based mobile banking. The report emphasised the need for a standardised and simplified procedure for registration/authentication of customers, a cohesive awareness programme and adoption of a common application platform across all banks to be delivered to the customers independent of the handset being used. The report has indicated the use of SMS and USSD with encryption technology for providing the necessary level of security in financial transactions.

The issuance of necessary guidelines by the Telecom Regulatory Authority of India (TRAI) prescribing the optimum service parameters, as also the ceiling on transaction costs for extension of the USSD services by telecom operators to banks and their agents, has been appreciated and the committee has recommended that the implementation of TRAI's regulations must be expedited by all the stakeholders.

forward trades for members. CCIL is being monitored for compliance against PFMIs. PFMI suggests that 'FMIs may use the assessment methodology to periodically conduct, full or partial, self-assessments of observance of the principles'. Accordingly, CCIL has been advised to carry out self-assessment against the 'PFMIs-disclosure framework and assessment methodology' document issued by CPSS-IOSCO in December 2012.

IX.20 As per the on-going monitoring, CCIL was advised to carry out a comprehensive review of its bye-laws, rules and regulations. CCIL had reviewed its bye-laws and rules and regulations with respect to forex forwards and IRS segments (Box IX.3). The amendments include a new chapter on

Box IX.3
Forex Forward Trade Compression

Trade compression is a risk mitigating process carried out by reducing the notional amount of trades outstanding in the market by a process of termination/partial termination of economically redundant trades. By trade compression, members off-set between the trades, which causes significant reduction in their outstanding trades and associated risks.

Members who desire to participate in the portfolio compression exercise have to indicate to the service provider their willingness and acceptance of the defined parameters. The participants generally specify a threshold limit for mark-to-market (MTM) loss/gain caused due to the early termination of trades and the trades eligible for early termination based on these tolerances. This involves execution of a mathematical algorithm to arrive at the optimum solution. The compressions are executed as 'cycles'. Generally, the live cycle is preceded by a mandatory trial run and the entire exercise is spread over 4 to 5 business days.

The benefits arising from this new strategy include reduction of counterparty credit risks, operational risks, costs, risk weighted assets and balance sheet size of the financial institutions. Portfolio compression is recognised globally as an important risk mitigating tool. Periodic portfolio compression will eliminate the capital charge for risk weighted assets appearing on the balance sheets of banks/ financial institutions.

CCIL, based on the approval of the Reserve Bank has been providing trade compression for interest rate swaps (IRS) only.

CCIL has now been accorded approval for carrying out portfolio compression in USD-INR forex forward trades for members of the segment. CCIL will remain responsible for settlement of all these trades whether through portfolio compression or at the time of settlement of those trades on maturity.

bankruptcy in CCIL, bye-laws which cover CCIL default and members' right to set-off in such circumstances.

Oversight of payment systems

IX.21 The oversight framework is based on three parameters: monitoring, assessment and inducing change. It is managed through self-assessment by the authorised entity, evaluation of the self-assessment and on-site inspection by the supervisors, complemented by off-site monitoring and market intelligence.

Committee on Payment and Settlement Systems (CPSS)

IX.22 CPSS promotes the safety and efficiency of payments, clearing, settlement and related arrangements, thereby supporting financial stability and the wider economy. It serves as a forum for central bank cooperation in related oversight, policy and operational matters including the provision of central bank services. India continues to be a member of this important forum.

PFMI implementation and monitoring

IX.23 In April 2012, CPSS and IOSCO issued the 'Principles for Financial Market Infrastructures' (PFMIs) (Box IX.4). The scope of PFMIs is to enhance safety and efficiency in payments, clearing, settlement and recording arrangements, and more broadly to limit systemic risks and foster transparency and financial stability. CPSS and IOSCO members are required to strive to adopt PFMIs in their respective jurisdictions. CPSS-IOSCO started the process of monitoring the implementation of PFMIs with the intention of promoting consistency in implementation across jurisdictions. The first stage of implementation monitoring (Level-I) assessed whether the jurisdictions have completed the process of

Box IX.4
Financial Market Infrastructure Framework

Financial market infrastructure (FMI) is defined as a multilateral system among participating institutions including the operator of the system, used for the purposes of clearing, settling or recording payments, securities, derivatives or other financial transactions. The term FMI generally refers to systemically important payment systems, central securities depositories (CSDs), securities settlement systems (SSSs), central counterparties (CCPs) and trade repositories (TRs) that facilitate the clearing, settlement and recording of financial transactions.

As a member of the Financial Stability Board (FSB) and of CPSS, the Reserve Bank is committed to the adoption and implementation of the 'Principles for Financial Market Infrastructures' (PFMIs). The policy on supervision and regulation of FMIs regulated by RBI describes in detail the criteria for designating a FMI, applicability of PFMIs to FMIs, oversight of FMIs and other related aspects. Hitherto the oversight was based on international standards such as Core Principles for Systemically Important Payment Systems (CPSIPS), Recommendations for Securities Settlement Systems (RSSS) and Recommendations for Central Counter Parties (RCCP).

In line with international developments, and as indicated in the 'Payment Systems in India: Vision 2012-15', the Reserve Bank has adopted the standards set out in PFMIs for regulating and supervising FMIs under the aegis of the Board for Regulation and Supervision of Payment and Settlement Systems (BPSS). All the FMIs determined by the Reserve Bank are expected to comply with PFMI requirements as applicable to them. The FMIs regulated by RBI are RTGS, SSS, CCIL and Negotiated Dealing System-Order Matching (NDS-OM). RTGS and SSS for government securities are owned and operated by the Reserve Bank.

The assessment of FMIs, including those operated by the Reserve Bank, will be against the PFMIs as per the document 'PFMIs-Assessment Methodology' published by CPSS-IOSCO in December 2012.

The oversight of FMIs is carried out through a combination of off-site supervisions which include self-assessment, call for information, system of alerts, external and/or internal audits of control measures and prior approval of changes, on-site inspection and other measures which include periodic meetings with the boards and the senior managements of FMIs to discuss developments, oversight concerns and expectations.

adopting the legislation and other policies for implementing the 24 principles for FMIs and the responsibilities for authorities.

IX.24 The purpose is to identify gaps between implementation measures and the principles, keeping in mind the materiality of the impact of the gaps. In the Level-1 assessment report, India was rated[2] as '1' in adopting PFMI principles and '4' in adherence to the responsibilities of FMIs in the survey results published in August 2013. Consequently, steps were taken by the Reserve Bank as also by the Securities and Exchange Board of India on making it public on adoption and applicability of PFMIs to the FMIs. The second round of the survey was published in May 2014 wherein India has been rated '4' for both adherence to principles as also responsibilities.

Legal Entity Identifier (LEI) and Local Operating Unit (LOU)

IX.25 The Reserve Bank is a member of the Regulatory Oversight Committee (ROC) as also its executive committee. CCIL has been accorded approval to act as a LOU for issuing globally compatible LEIs in India. As a LOU, CCIL will be issuing unique identifier codes to all eligible and desirous legal entities participating in the financial market.

SAARC Payment Council (SPC) meeting

IX.26 The Reserve Bank hosted the 14th meeting of the SPC in Kerala on December 9, 2013. SPC came out with a roadmap for developing payment systems in the SAARC region and identified 8 major areas of focus: i) implementation/improvement in high-value payment and settlement systems; ii) development of electronic retail payment systems; iii) risk mitigation measures for payment and settlement systems; iv) promotion of competition among market participants/access to new participants; v) improvement in the legal and regulatory framework; vi) improvement in the governance structure; vii) commencement of a financial literacy programme (first programme was subsequently held in Nepal on the sidelines of the 15th SPC meeting in May 2014); and viii) improvement of cross-border payment and settlement systems. Further, SAARC formed a technical committee and came out with a concept paper on the harmonisation of payment systems in the region, covering two areas for harmonised payments: i) card payments: inter-connectivity of main switches of ATMs of a country to route cross-border transactions; and ii) connecting e-payment gateways to enable integration of POS gateways between regional countries for acceptance of payment cards.

INFORMATION TECHNOLOGY INITIATIVES FOR THE BANKING SYSTEM

Automated data flow

IX.27 Under automated data flow (ADF), banks were advised to submit automated returns to ensure flow of data from their CBS or other IT systems to the Reserve Bank in a straight-through manner without any manual intervention. To ensure continuity and sustenance of ADF implementation, banks have been advised to set up internal returns governance groups to constantly monitor progress.

Next-generation real time gross settlement system (NG-RTGS)

IX.28 The new RTGS system was launched on October 19, 2013. The system settled a record number of 0.48 million transactions on March 28, 2014. Globally, it is for the first time that the ISO 20022 message formats are being used for transmitting RTGS messages. The RTGS system

[2] Rating Level 1: Draft implementation measures not published; Rating Level 2: Draft implementation measures published; Rating Level 3: Final implementation measures published; Rating Level 4: Final implementation measures fully in force; and Rating Level NA: No implementation measures needed (that is, not applicable).

is highly scalable with new functionalities *viz*. advance liquidity features including a gridlock resolution mechanism and hybrid settlement facility, facility to accept future value dated transactions and options to process multi-currency transactions. The new RTGS system provides 3 access options to participants: thick-client, web-API (through INFINET or any other approved network) and the payment originator module. Participants have the choice to decide on the mode of participation in the system based on the volume of transactions and the cost of setting up the infrastructure. With implementation of the new RTGS system, the old RTGS system ceases to exist and the RTGS System Regulations 2013 have replaced the RTGS (Membership) Business Operating Guidelines, 2004 and RTGS (Membership) Regulations, 2004.

Report on 'Enabling Public Key Infrastructure (PKI) in Payment System Applications'

IX.29 The Reserve Bank constituted a group in September 2013 to prepare an approach paper for enabling PKI for payment system applications in India. The group comprised representatives from banks, the IDRBT-Certifying Authority, the Controller of Certifying Authority and departments of the Reserve Bank. The group also interacted with Indian Banking Association (IBA). The final report of the technical committee was released in April 2014.

IX.30 The report recommended the need for all banks' internet banking applications to create an authentication environment for a password-based 2-stage authentication as well as a PKI-based system for authentication and transaction verification for online banking transactions and its implementation in phases. It also suggested that banks provide the option to their customers for enabling PKI for their online banking transactions.

INFORMATION TECHNOLOGY WITHIN THE RESERVE BANK

IT Sub-Committee (ITSC) to the Central Board

IX.31 ITSC was constituted to advise the Reserve Bank on its overall IT strategy, infrastructure, applications and security and to oversee the implementation of the recommendations of the IT vision document 2011-17. ITSC met twice during the year focusing on issues relating to procedures to be followed for implementing IT projects, need for enterprise architecture, strengthening the role of the chief information security officer (CISO), an information security (IS) audit, an IT subsidiary of IDRBT, IS policy guidelines and disaster recovery (DR) drills conducted by the Reserve Bank.

Information security policy for the Reserve Bank

IX.32 The revised information security policy and related sub-policies have been approved by ITSC. The operational guidelines relevant to administer the policy were released in April 2014.

The electronic document management system (EDMS)

IX.33 A steering committee to implement EDMS with an objective of organising the documents in a systematic manner in electronic form has been formed. An approach paper for time bound implementation of EDMS has been prepared.

Enterprise knowledge portal (EKP)

IX.34 The revamped EKP with advanced features including interactive functionalities to enhance knowledge sharing initiatives in the Reserve Bank was inaugurated in November 2013. It provides a more focussed approach to knowledge sharing efforts in the Reserve Bank and has recorded increased level of visits by its staff.

Upgrading of the video conferencing (VC) system

IX.35 The work related to VC upgradation, which would *inter alia* provide for executive VC rooms at select locations, classroom VC facility in training colleges, high definition technology for better quality, video streaming facility and video-on-demand facility has been rolled out at almost all identified locations within the Reserve Bank.

Perimeter security solution (PSS)

IX.36 PSS aims to provide a mechanism to protect the information systems in the Reserve Bank from all threats/attacks from the external cyber world. The solution includes routers, switches, firewalls, intrusion detection and prevention systems. The project was implemented in two separate phases. In the first phase, procurement and replacement of networking components such as switches, routers and implementing auto fail over (AFO) of switches was completed and in the second phase operationalisation of firewalls and intrusion prevention system (IPS) was completed.

Information security operations centre (iSOC)

IX.37 An advanced iSOC system to proactively detect security related incidents which have an impact on the Reserve Bank, other banks and the financial sector and manage and coordinate responses to such incidents is being implemented in the Reserve Bank. An expression of interest (EoI) for supplying, installing, configuring, maintaining and operating iSOC has been issued. The project is expected to be completed by December 2015.

Mail messaging solution (MMS)

IX.38 The Reserve Bank's corporate MMS was reinforced with an advanced archival solution to provide better access, storage and retrieval of mails to the users. With archival facility, it will be possible to retrieve any mail from MMS. The solution will also eliminate the need for regular increase in mail box size for users at frequent intervals. Archival will also facilitate retention of mails to fulfil legal/statutory requirements. The process to upgrade MMS has also been initiated and is expected to be completed by March 2015.

Committee on data standardisation

IX.39 The Reserve Bank's IT vision 2011-17 document emphasised the importance of both quality and timeliness of data for its processing into useful information for MIS and decision making purposes. To achieve this, uniform data reporting standards are of vital importance. A committee has been constituted for data standardisation which *inter alia* will bring about synergy and uniformity in the areas of data reporting.