

IX

PAYMENT AND SETTLEMENT SYSTEMS AND INFORMATION TECHNOLOGY

A robust and well developed payment system infrastructure in the country facilitates safety, security and efficiency of payment transactions coupled with low transaction costs and better risk management for system participants. In 2011-12, the Reserve Bank persisted in its efforts at enhancing these features as also in improving the accessibility and affordability of the payment and settlement systems. Simultaneously, the ambit of technology is being widened within the Reserve Bank, particularly, in terms of data flow and knowledge dissemination.

IX.1 Through its multifaceted roles as a regulator, supervisor and harbinger of innovation, the Reserve Bank oversees the orderly development of a secure and efficient domestic payment and settlement system. As part of this function, the Reserve Bank has furthered its social responsibility by enabling payment system services at low costs by promoting

institutions such as IDRBT and systems such as INFINET and RTGS. The total turnover under various payment and settlement systems, in terms of both value as well as volume, exhibited a steady growth during the year 2011-12. In terms of volume, a growth of 9.1 per cent and in value terms 7.6 per cent was registered (Table IX.1).

Table IX.1: Payment System Indicators - Annual Turnover

Item	Volume (million)			Value (₹ trillion)		
	2009-10	2010-11	2011-12	2009-10	2010-11	2011-12
1	2	3	4	5	6	7
Systemically Important Payment Systems (SIPS)						
1. RTGS	33.2	49.3	55.0	322.8	394.5	484.9
Total SIPS (1)	33.2	49.3	55.0	322.8	394.5	484.9
Financial Markets Clearing						
2. CBLO	0.1	0.2	0.1	155.4	122.6	111.6
3. Government Securities Clearing	0.4	0.4	0.4	89.9	69.7	72.5
4. Forex Clearing	0.9	1.2	1.3	142.1	191.6	222.0
Total Financial Markets Clearing (2-4)	1.4	1.7	1.9	387.4	383.9	406.1
Others						
5. MICR Clearing	1,149.7	1,155.1	1,114.5	85.3	83.0	80.2
6. Non-MICR Clearing	230.6	232.3	227.0	18.8	18.3	18.8
Retail Electronic Clearing						
7. ECS DR	149.3	156.7	164.7	0.7	0.7	0.8
8. ECS CR	98.1	117.3	121.5	1.2	1.8	1.8
9. EFT/NEFT	66.3	132.3	226.1	4.1	9.4	17.9
Total Retail Electronic Clearing	313.7	406.3	512.3	6.0	11.9	20.6
Cards						
10. Credit Cards	234.2	265.1	320.0	0.6	0.8	1.0
11. Debit Cards	170.2	237.1	327.5	0.3	0.4	0.5
Total Cards	404.4	502.2	647.5	0.9	1.1	1.5
Total Others (5 to 11)	2,098.4	2,295.9	2,501.3	110.9	114.4	121.1
Grand Total (1-11)	2,133.0	2,346.9	2,558.2	821.1	892.9	1,012.0

Note: 1. Data for MICR clearing include data for high value clearing (HVC) for the year 2009-10. HVC was a special clearing of cheques for ₹ 0.1 million (later changed to ₹1 million) and was discontinued from April 1, 2010.
2. At the end of April 2012, MICR clearing was available at 64 centres (66 centres during the previous year) and the cheque truncation system (CTS) is available at two centres, namely New Delhi and Chennai. Full cheque clearing volume at New Delhi and Chennai has been migrated to CTS from July 2009 and March 2012 respectively. The CTS data is part of the MICR data clearing.
3. Settlement of government securities clearing and forex transactions is through the Clearing Corporation of India Ltd (CCIL).
4. The figures for cards are for transactions at POS terminals only.
5. Transactions pertaining to pre-paid instruments (PPI) and mobile banking for a value of ₹62 billion and ₹18.21 billion respectively have not been included in the retail electronic clearing.

VISION DOCUMENT 2009-12

IX.2 The Reserve Bank's Vision Document outlined a three-year road-map (2009-12) for the Indian payment and settlement system. The document sought progress in the following key areas:

Authorisation of Payment Systems

IX.3 The Payment and Settlement Systems Act 2007 (PSS Act) mandates that entities that want to start a payment system in India need to obtain authorisation from the Reserve Bank. As at end-May 2012, 41 authorised entities were operating various payment systems in the country. These include a financial market infrastructure organisation - Clearing Corporation of India Ltd. (CCIL), a systemically important retail payment operator - National Payments Corporation of India (NPCI), card payment networks (VISA, MasterCard, RuPay, etc.), automated teller machine (ATM) networks, cross-border in-bound money transfer services and pre-paid payment instrument (PPI) issuers.

Smooth Functioning of the Existing Payment Systems

IX.4 To ensure uninterrupted availability of the clearing and settlement infrastructure, first and second alternate bank arrangements have been put in place at all magnetic ink character recognition (MICR) processing centres and major clearing houses. The efficacy of such arrangements is tested through the conduct of return clearing at monthly intervals and a full-fledged business continuity plan (BCP) including the funds settlement in the books of the first and second alternate bank at least once a year. BCP exercises for CCIL, the real time gross settlement (RTGS) system, and national electronic fund transfer (NEFT) are carried out at more frequent intervals.

IX.5 The access criteria for payment systems were revised in October 2011 by putting in place two sets of access criteria, one for centralised payment systems (CPS), such as RTGS, NEFT and national electronic clearing service (NECS) and the other

different set for decentralised payment systems, such as clearing houses at MICR centres, electronic clearing services (ECS) and regional ECS (RECS).

IX.6 The revised access criteria for both systems are: (i) minimum CRAR of 9 per cent; (ii) net NPAs below 5 per cent; and (iii) the recommendation of the concerned regulatory department. In addition, a minimum net-worth of ₹0.25 billion is required for being a direct participant in the CPS. Since March 2012, all members of clearing houses are granted automatic membership to decentralised payment systems, if they are already direct participants of a CPS.

IX.7 Under the revised access criteria for CPS, 48 banks, which include 7 SCBs (all foreign banks) 11 regional rural banks, 1 local area bank, 3 state co-operative banks, 3 district central co-operative banks and 23 urban co-operative banks, were granted direct membership until May 2012.

IX.8 Sub-membership route has been introduced in the national payment systems to provide access to banks that do not qualify for direct participation in these systems

Promoting Electronic Modes of Payment

IX.9 The Reserve Bank vigorously promotes the use of electronic modes of payment over paper-based payments, as they are safe, secure, cost-effective and more efficient. The various security measures in card payment systems and the guidelines for intermediaries have also contributed to the safety of the system, resulting in the increased use of electronic payments (Table IX.1).

IX.10 The increase in the spread of NEFT to 86,449 branches and RTGS to 84,638 branches as at end-May 2012 underscores the success of various policy initiatives in this regard. Further, the rationalisation of the access criteria norms, including the option of sub-membership, is expected to increase the electronic payment products that banks offer to their customers.

IX.11 To provide a fillip to the growth of the electronic payment system, the Reserve Bank had

waived processing charges in March 2006. These have been re-introduced from July 1, 2011 by way of a service charge from originating banks to provide adequate compensation to banks that manage the operations and the destination bank. Along similar lines, service charges in the RTGS system were introduced from October 1, 2011 to recover operational costs and to bring further efficiency in the system. The RTGS service charges have been introduced with three sub-components: monthly membership fee, transaction fee, and time varying tariff. Member banks are permitted to pass on only the time varying tariff to their customers.

IX.12 Reflecting these measures, transactions under NEFT grew by 71 per cent (volume) and 91 per cent (value) during 2011-12. The volume and value of gross transactions in RTGS also registered a growth of 11.7 per cent and 11.2 per cent respectively, during 2011-12. The value of gross transactions in RTGS constituted 51 per cent of the total value of non-cash payments during 2011-12.

IX.13 The increasing usage of alternate modes of payments, such as credit cards, debit cards, PPIs and mobile payments, has accelerated the growth of non-cash and non-paper based mode of payments. The use of both debit and credit cards at POS were at par in 2011-12; however, usage in value terms is still tilted towards credit cards. (Table IX.1).

IX.14 PPIs registered a significant growth of over 67 per cent (in value terms) during 2011-12 and constituted 36.3 per cent of the total card segment in the country, with paper vouchers accounting for the bulk. As of end-March 2012, 39 banks (including the Department of Post) and 20 non-bank entities were authorised to issue PPIs in India. The launch of e-wallets by non-banks reflects the significant opportunity for mobile wallets and magstripe cards to increase their overall share in the PPI market.

IX.15 To encourage the use of mobile phones as a channel of payment, India has adopted a bank-led mobile payment model. As at end-March 2012, 49 banks with a customer base of 13 million provided mobile banking service in India. During

the year 2011-12, 25.6 million mobile banking transactions valued at ₹18.2 billion were transacted, thus registering a growth of 198 per cent and 174 per cent, respectively, over the previous year.

Promoting Safety and Efficiency in Payment Systems

Paper-based Payment Systems

IX.16 Paper-based payments account for 52.4 per cent of total non-cash transactions in terms of volume, although they account for only 8.4 per cent in value terms. Given the widespread use of paper, the Reserve Bank initiated the following measures to improve the existing systems: (i) an improved software application package - express cheque clearing systems (ECCS), with an in-built speed clearing facility was introduced in 2011 in non-MICR clearing houses to replace the clearing house application software package. It has been rolled out in 1,170 clearing houses (as at end-June 2012) and speed clearing is now available at over 1,200 clearing houses; (ii) instructions were issued regarding the maximum charges that could be recovered from savings bank customers for cheque collection; (iii) a grid-based CTS was initiated in March 2012 with the roll-out of grid-based CTS in Chennai by NPCI, which was then extended to cover Coimbatore and Bengaluru. The road-map for the roll-out of CTS in other regions has been prepared.

CTS 2010 - Standardisation of Cheques

IX.17 The implementation of grid-based CTS, increased issuance of multi-city cheques and speed clearing called for standardisation and enhanced security features of cheques. Accordingly, the CTS 2010 cheque standards were designed to help presenting banks identify the bonafides of cheques from drawee banks in an image-based processing scenario, limit fraud and enable straight-through processing. All banks have been advised to issue only CTS 2010 standard cheques to their customers on a priority basis in the northern and southern regions of the country and across the country through a time bound action plan.

Retail Electronic Payment System

IX.18 The RECS covering all CBS-enabled branches, which was launched in 2009, is now

available in 10 centres where local ECS processing has been subsumed into RECS. Banks have also been advised to expand the scope of NEFT by using it for payment of loans. As a customer service measure, payment of penal interest for delayed credit to the beneficiary's account / return has been mandated.

Alternate Payment Systems

Card Payments

IX.19 The Reserve Bank has mandated additional factor of authentication for the use of cards issued by banks in India. Accordingly, banks have implemented the same for all on-line card-not-present (CNP) transactions (e-commerce, m-commerce and interactive voice response). The mandate has been extended to include all mail order telephone order and standing instructions by May 1, 2012, with the additional caveat that in the case of customer grievance for transactions effected without the additional authentication after the stipulated date, the issuer bank shall reimburse the loss to the customer without demur.

IX.20 As part of the measures to contain the risk in card present (CP) transactions, the Reserve Bank in March 2011 constituted a working group on CP transactions to study and recommend an action plan to foolproof the system. The Reserve Bank has since advised banks and other stakeholders to implement the necessary measures¹ within the stipulated time-frame.

Pre-paid Payment Instruments

IX.21 Several rationalisation measures, such as relaxation in KYC for issuing PPIs for small-value instruments, redefined merchant categories to include utility bills/ essential services/ air and train travel tickets and recurring payment of college/ school fees and government taxes have been undertaken to promote the use of PPIs given their potential to minimise cash transactions. The issuance of co-branded PPIs and special categories of PPIs such as gift cards, loading of cross-border

inward remittance and government benefits into PPIs have been permitted. Non-bank payment system operators have been allowed to issue mobile phone-based semi-closed PPIs.

IX.22 To encourage the use of corporate cards, banks have been permitted to issue these to corporates for further issuance to employees, provided the corporate is listed in a stock exchange in India. This will enhance their use for the purchase of goods and services at all delivery channels and for cash withdrawal.

IX.23 The relaxation in the domestic money transfer guidelines in October 2011 enabled authorised entities (banks and non-banks) to increase domestic remittances through formal payment channels. The measures aim to help citizens, especially domestic migrants, fulfill their remittance needs through formal channels (Box IX.1).

Mobile Payments

IX.24 The growing popularity of mobile banking facility, particularly for small-value transactions, prompted the Reserve Bank to raise the limit for end-to-end encryption from ₹1,000 to ₹5,000 and remove the transaction limit of ₹50,000 per customer per day. Banks have been advised to prescribe transaction limits based on their own risk perception with the approval of their respective boards.

IX.25 For fund transfer through interbank mobile payment service (IMPS), an unstructured supplementary services data (USSD) that is being attempted across mobile network operators (MNOs) by NPCI will help in enabling mobile banking to the customers. IMPS is being extended to accept merchant payments, using the bank account and *Aadhaar* number.

IX.26 Relaxation of the BC guidelines to allow 'for profit' companies to act as BCs of banks has enabled MNOs to become BCs of banks. Given the wide reach of MNOs' in providing mobile phone

¹ Refer Report on Trend and Progress of Banking in India 2010-11 – Box III.3: Recommendations of the Working Group on Securing Card Present Transactions

Box IX.1 Domestic Money Transfer

Domestic money transfer (DMT) is the remittance of funds by one individual to another within the country. In India, the formal channels for such remittances are through banks in the form of cheques, demand drafts, RTGS, NEFT and IMPS and the Department of Post through money orders/instant money orders (IMOs). The informal channels are private operators.

However, formal channels remain inaccessible to the migrant population for economic, institutional and social reasons, making them dependent on the informal money transfer system. This exposes migrant labour segment to potential risk of theft at every stage of the transaction *viz.*, collection, deposit, withdrawal and disbursement. These informal money transfer systems and the volumes and value remain outside the scope of data capture, leaving no trace, which hinders oversight of such arrangements.

Given this scenario, the Reserve Bank adopted a gradualist approach by issuing DMT guidelines in October 2011. With this initiative, the formal banking channel has been opened to people who do not have a bank account but at the same time need to use the formal banking channel (*i.e.*, with the presence of a bank account either at the beneficiary end or the remitter end) to send/ receive remittances. Further, card-to-card transfers [person-to-person (P2P)] also enable the transfer of funds from the semi-closed PPI (with full KYC) issued by a non-bank to the customer of another semi-closed PPI issued by the same entity with similar characteristics or a bank account.

Three schemes have been introduced to enable P2P transfers under these guidelines:

- a) Liberalising the cash pay-out arrangements for amounts being transferred out of bank accounts to beneficiaries who do not have a bank account, and enhancing the transaction cap from the existing limit of ₹5,000 to ₹10,000, subject to an overall monthly cap of ₹25,000 per beneficiary. The remitting bank should obtain the name and address of the beneficiary.
- b) Enabling walk-in customers who do not have a bank account (for instance, migrant workers) to transfer funds to bank accounts (of, say, family members or others) subject to a transaction limit of ₹5,000 and a monthly cap of ₹25,000 per remitter. The customer needs to provide minimum details, such as his/her name and complete address, to the remitting bank.
- c) Enabling the transfer of funds among domestic debit/ credit/pre-paid cards and from a semi-closed PPI to a bank account, subject to the same transaction/monthly cap as at (b) above.

While enabling DMT, banks and non-banks have been advised to put in place: a robust system of safeguards including velocity checks and alerts to customers about credit into accounts using this facility; effect these fund transfers in a real or near real-time basis and settle inter-bank transactions only in Reserve Bank approved payment systems; provide this service at a reasonable charge to popularise the scheme; and have appropriate customer grievance redressal mechanism with customer grievances brought under the purview of the Reserve Bank's Banking Ombudsman Scheme. These efforts would facilitate remittances through the formal banking channels in a safe and efficient manner at reasonable costs.

services to customers across the country, this unique partnership model piloted in India is expected to boost mobile payments under the overall ambit of financial inclusion. Further, since March 2012 inter-operability at the retail outlets or sub-agents of BCs at the point of customer interface has been permitted if the transactions are carried out on-line and on the core banking solutions, which is expected to boost payment transactions.

Expanding Delivery Channels

IX.27 With the view of using ATMs as extended delivery channels for branchless banking in Tier III to Tier VI unbanked/ under-banked areas, the Reserve Bank has permitted non-banks to set up, own and operate ATMs that are styled White Label ATMs (WLAs), which would provide ATM services to customers of all banks. Non-bank entities that

have a minimum net-worth of ₹1 billion need to seek authorisation under the PSS Act, 2007 and opt for one of the three schemes. A certain percentage of the total WLA installed by the entities have to be installed in Tier V and Tier VI centres. The sponsor bank will be responsible for cash management and the customer grievance redressal.

Strengthening the Payment System Infrastructure

IX.28 Since RTGS is liquidity-intensive, the next generation RTGS (NG-RTGS) is structured to be equipped with liquidity saving features, an advanced gridlock resolution mechanism, increased security measures, operational reliability, business continuity and compliant with international standards. It would encourage inter-operability between alternative systems. The new system would endorse (a) the latest technology; (b) high scalability and flexibility

to adapt to changes in the financial environment and other requirements; and (c) enhance accessibility to cope with changes in the financial environment, such as globalisation of financial transactions and networking of settlement infrastructures.

IX.29 *RuPay cards*: With a view to introducing a domestic card scheme to ensure efficient price discovery and healthy competition with other international card payment networks, NPCI was granted approval under the PSS Act, 2007 to issue RuPay cards by banks in India under the RuPay domestic card payment scheme. NPCI launched India's first domestic card, the RuPay card (ATM and micro-ATM cards) through banks in India. Subsequently, in March 2012, NPCI was permitted to launch RuPay debit cards that are accepted at POS terminals in India.

IX.30 *Aadhaar Enabled Payment Systems (AEPS)* is an NPCI initiative to enable bank customers to perform balance enquiry, cash withdrawal, cash deposit, and remittances through the micro-ATMs at BCs using *Aadhaar*. In addition, the system can be used to route government benefits to beneficiaries using *Aadhaar* as an authentication mechanism. AEPS, thus, is a bank-led model that furthers the financial inclusion efforts.

IX.31 *Aadhaar Payment Bridge System* is a centralised electronic transfer system developed by the NPCI to enable benefit transfers such as MGNREGA, Social Security Pension, Handicapped Old Age Pension from government departments, through their respective sponsor or accredited bank, to the beneficiaries using *Aadhaar* numbers. It is currently being run on a pilot basis.

IX.32 *Automated Clearing House* for bulk transactions is likely to be operationalised in the near future by NPCI.

PAYMENT SYSTEM OVERSIGHT

IX.33 An oversight framework put in place, is consistent with the international standards prescribed by the committee on payment and settlement systems (CPSS), the global standards setting body in payment and settlement systems.

Oversight of authorised payment systems is carried out through a combination of off-site monitoring and need-based on-site inspection.

IX.34 For off-site monitoring process, data collection and consolidation has been streamlined through the online return filing system (ORFS), which uses structured templates. A database on the various payment instruments, their volume and value has been created and placed on the Reserve Bank's website. The data is analysed periodically to discern patterns and trends for further policy actions.

IX.35 Authorised entities carry out self-assessment based on a structured self-assessment template (comprising operations, risk management and business continuity arrangements among other parameters). The results of the self-assessment are analysed and corrective measures to address the short-comings are conveyed to the entities. This is complemented with periodic system audits by qualified professionals and market intelligence. The assessment process is complemented with need-based on-site inspection.

IX.36 CCIL, which is a critical financial market infrastructure, has been brought under the oversight mechanism, which includes off-site surveillance and monitoring as well as on-site inspection. The off-site monitoring and surveillance includes vetting the regulations for various segments operated by CCIL, a review of its risk management framework (its stress and back-test methodologies, margining, and the creation of a default fund), and monitoring and review of defaults and settlement shortfalls across segments. The process is rounded off with a review of its business continuity plan and disaster recovery plans; operational and information security audits.

IX.37 As regards, failed transactions at ATMs, the time limit for the issuing bank to resolve customer complaints has been reduced from 12 to 7 working days from the date of receipt of the customer complaint. If the issuing bank fails to re-credit the customer's account within this period, it would have to compensate the customer at ₹100 per day. The customer is entitled to receive this compensation,

only if a claim is lodged with the issuing bank within 30 days of the date of transaction. The number of free transactions permitted per month (five transactions as on date) at other bank's ATMs to savings bank account holders has been modified to include all types of transactions, *i.e.*, both financial and non-financial.

OTHER DEVELOPMENTS

IX.38 Vision Document 2012-15: The draft of the Payments System Vision Document for the period 2012-15 has been placed in the public domain for comments. The vision is to ensure that all "payment and settlement systems in the country are safe, efficient, interoperable, authorised, accessible, inclusive and compliant with international standards". To this end, the Reserve Bank would pro-actively encourage electronic payment systems to promote and usher in a less-cash society in the country.

IX.39 The Financial Sector Assessment Programme (FSAP) of the payment systems in India was carried out by an IMF-World Bank team in September 2011. The FSAP team assessed the government securities settlement system which is operated by the Public Debt Office of the Reserve Bank against the CPSS-IOSCO - 'Recommendations for securities settlement systems (RSSS)' and concluded that the systems observe or broadly observe the standards, with two standards not being applicable. The FSAP team also assessed the CCIL, the central counterparty (CCP), authorised under the PSS Act, 2007 against the CPSS-IOSCO 'Recommendations for central counterparties (RCCP)' and concluded that the CCIL observes or broadly observes the standards, with two standards not being applicable.

IX.40 *Financial Market Infrastructure*: CCIL has been operating a reporting platform for interest rate

swaps and has since been accorded approval to act as a trade repository for credit default swaps and forex over-the-counter (OTC) products.

IX.41 *SWIFT Oversight Group*: SWIFT is subjected to co-operative oversight by the G-10 central banks with the National Bank of Belgium as the lead overseer. The SWIFT Co-operative Oversight Group (OG) has been expanded to include other CPSS member countries, including the Reserve Bank of India.

IX.42 *Domestic use of SWIFT*: The structured financial messaging solution (SFMS) operated by the Institute for Development and Research in Banking Technology (IDRBT) is the only messaging infrastructure that banks are permitted to use for exchange of financial messages. Recently, permission has been accorded for the domestic use of SWIFT as an alternate messaging solution. This permission is subject to SWIFT: (i) having a joint venture in India; (ii) locating a server in India for domestic messages; and (iii) ensuring fair pricing to users. SWIFT has since agreed to the conditions and the modalities for the use of SWIFT for domestic funds transfer are being worked out.

International Developments

IX.43 India (Reserve Bank) was included as a member of the CPSS, the international standards setting body for payment and settlement systems, in 2009 and is committed towards implementing these standards.

Publication of 'Report on OTC Derivatives Data Reporting and Aggregation Requirements'

IX.44 CPSS-IOSCO have constituted a technical committee to address the mandate in Recommendation 19² of the Financial Stability

² Authorities with the legal mandate to set requirements for the reporting of transactions to trade repositories should consider the recommendations set out in the forthcoming report of the FSB Data Gaps and Systemic Linkages Group, and consult with the Committee on the Global Financial System (CGFS), the Bank for International Settlements (BIS), the ODSG and ODRF, to identify the data that should be reported to trade repositories to enable authorities to carry out their respective tasks and monitor, among other things, implementation of the G-20 commitments to central clearing and exchange or electronic platform trading. Further, as the data must be able to be readily aggregated on a global basis, by end- 2012 CPSS and IOSCO, in consultation with authorities, and with the ODRF, should develop both for market participants reporting to trade repositories and for trade repositories reporting to the public and to regulators: (i) minimum data reporting requirements and standardised formats, and (ii) the methodology and mechanism for the aggregation of data on a global basis.

Board (FSB) Report on ‘Implementing OTC Derivatives Market Reforms’ prepared by the FSB OTC Derivatives Working Group. The recommendation 19 asks CPSS and IOSCO to develop both for market participants reporting to trade repositories (TRs) and for TRs reporting to the public and to regulators: (i) minimum data reporting requirements and standardised formats; and (ii) the methodology and mechanism for the aggregation of data on a global basis.

IX.45 Accordingly CPSS-IOSCO technical committee has come out with the ‘Report on OTC Derivatives Data Reporting and Aggregation Requirements (Data Report)’ which was published in January 2012. The report supports the view that TRs, by collecting data pertaining to OTC trades centrally, would provide authorities and the public with better and timely information on OTC derivatives. This would make markets more transparent, help to prevent market abuse, and promote financial stability. The report also supports the international developments of a global legal entity identifier for data reporting and aggregation.

Publication of Red Book on Payment System

IX.46 The CPSS, BIS publishes reference work on the payment systems and other financial market infrastructure of various countries as Red Books. While the previous edition of the Red Book covered the payment systems in G-10 countries, the current volume, which was brought out after CPSS membership was increased in 2009, covers 10 countries including India. In addition, on an annual basis, the CPSS publishes statistics on payments, clearing and settlement systems in CPSS countries including data from India. The latest statistical update contains data for 2010.

INFORMATION TECHNOLOGY

IX.47 During 2011-12, the Reserve Bank continued its endeavour to facilitate the Indian banking sector’s alignment with the latest innovations in technology by improving its IT infrastructure, implementing new applications and initiating steps for further adoption of technology in the banking sector.

IT Sub-Committee of the Board

IX.48 In line with the enhanced emphasis on IT governance, an IT sub-committee of the central board has been constituted in the Reserve Bank with an independent board member as the Chairman. The Sub-committee will guide the Reserve Bank on the overall IT strategy, infrastructure and applications besides reviewing and monitoring the implementation of IT initiatives.

Information Security (IS) Policy

IX.49 A review of the IS policy and guidelines (issued in 2005, 2007) against the backdrop of the changed IT environment in the Reserve Bank coupled with changes in applicable security aspects across business process components, *i.e.*, people, infrastructure, systems, applications and processes, was carried out in consultation with an advisory group comprising an external expert and members from different departments of the Reserve Bank. The policy and sub-policy documents have been revised to provide mandate, enablers and policy direction in the main policy document, while the sub-policies cover the component and domain-specific aspects.

Business Continuity Planning

IX.50 Given the importance of planning to face disasters and manage business continuity, a thematic video conference on the subject was held at the Reserve Bank, followed by an internal approach paper and the initiation of BCP documentation in the Reserve Bank. Considering the need to have different stakeholder departments on board as also the business centricity of the business continuity management (BCM) process, an advisory group, comprising external experts and internal heads of select departments, was constituted. The documentation requirements and organisational arrangements will be taken forward by the newly constituted Risk Management Department (RMD) as approved by the Audit and Risk Management sub-committee of the board.

Automated Data Flow

IX.51 The Reserve Bank has advised all commercial banks to put in place an automated data flow (ADF) system from which the banks can cull data from source systems without manual intervention for their reports to the Reserve Bank. A core group prepared an approach paper recommending implementation in phases, keeping in view the technology and process maturity of banks. A reporting mechanism has been put in place to monitor progress and a co-ordination group comprising representatives from select banks has been constituted to review progress on a quarterly basis. All banks are expected to put ADF in place by end-March 2013.

RTGS and NG-RTGS System

IX.52 RTGS volume crossed 0.3 million transactions twice during March 2012 and the

necessary resource augmentation was undertaken to handle the high transaction volumes. In view of the increasing volumes, as also other business requirements, the Reserve Bank is in the process of replacing the existing RTGS with NG-RTGS, which provides more functions and facilities. The NG-RTGS is expected to adopt the emerging messaging standards (Box IX.2).

Upgrading the Enterprise Knowledge Portal

IX.53 The enterprise knowledge portal (EKP), which has emerged as the major mode of disseminating information and sharing knowledge in the Reserve Bank, is being upgraded with the latest features for effective search and advanced content management and collaboration tools.

Desktop Virtualisation

IX.54 A central data system, where users are able to work on diskless nodes (*i.e.*, the desktop has no

Box IX.2

Payment Systems: Emerging Messaging Standards

The existing RTGS system uses a proprietary message format whereas NEFT uses the SFMS format, which is a secure messaging standard developed to serve as a platform for intra-bank and inter-bank applications. SFMS is an Indian standard similar to that used by SWIFT, which is used globally for financial messaging. Launched in December 2001 at the IDRBT, SFMS has the potential to be used for all secure communication within the bank and between banks.

Most central banks currently use SWIFT-MT standards for payment transactions. The International Standards Organisation (ISO) has devised new standards (ISO 20022) for the financial sector based on Extensible Mark-up Language (XML) that are easy to maintain and use Java technology. These messages (MX messages) permit better flexibility in monitoring the message content and details, and thus, help reduce costs and simplify information gathering, monitoring and surveillance activities for various purposes such as anti-money laundering.

From a system point of view, XML messages are easier to work with. It is the default format for exporting data in most contemporary systems, and is hence, optimal for a new system. Also, XML offers the lowest implementation cost. However, it involves the cost of migration for the banking sector as a whole due to the higher network bandwidth and disk space required at the central site. There would be an incremental cost for participant banks, especially medium and small banks, because the bandwidth requirements for MX are relatively higher. In addition, there will be a nominal increase in cost due to an increase in memory and CPU

utilisation for the central banks and the community. Although there is some impact on disk space and network bandwidth, so far this has not constrained the market infrastructure in countries that are migrating to ISO 20022 standards. However, migration to new standards involves smooth communication among all existing applications systems, *i.e.*, core banking systems at banks and various applications running at corporates that interact with the payments systems being run by the Reserve Bank.

The Reserve Bank has initiated steps to develop NG-RTGS. Among other things, the system will use an XML based messaging system that conforms to ISO 20022 standards. The ISO 20022 message standards (<http://www.iso20022.org>) for the financial sector are being examined by the ISO as well as the BIS. These standards aim at a “common language” for all financial communications, which would promote standardisation and save costs through improved transaction processing and better communication among various business domains, communication networks, and different stakeholders, such as financial institutions, clients and suppliers. Such initiatives are usually driven by communities of users looking for cost-effective measures to support specific financial business processes and interoperability with existing protocols.

To adopt and promote messaging standards appropriate for India, a working group has been set up, comprising representatives from select public and private sector commercial banks, the IDRBT, the CCIL, the NPCI and the Reserve Bank.

Box IX.3 Desktop Virtualisation

Virtualisation is a methodology for dividing the resources of a computer, using a variety of hardware and software abstraction techniques, into multiple execution environments by creating multiple isolated partitions – Virtual Machines (VM) or Virtual Environments (VEs) – on a single physical server. This separates the logical interface from the physical machine. Virtualisation originated in the 1960s as a technique to optimise the use of very expensive and relatively scarce computing resources. However with the advent of less-expensive computing technologies, such as Intel-based servers and PCs, the cost consideration was mitigated. As a result, servers and PCs proliferated, requiring new ways to better manage and use these resources.

Desktop virtualisation, often called client virtualisation, separates a computer desktop environment from the physical computer. The “virtualised” desktop is stored on a centralised, or remote, server and not on the physical machine. It allows users to interact with a virtual desktop (in the same way they would use a physical desktop) by letting the user log into their remote desktop from any location.

The key benefit of virtualisation is that total cost of ownership (TCO) is reduced. Organisations can bring down overall TCO by reducing individual desktop management and extending the lifecycle of hardware. Other benefits are the efficient use of CPU and memory resources, reduced energy costs, reduced desktop downtime, increased availability, centralised desktop security and data protection, support of ‘Bring Your own Device’, flexibility to add new users and a uniform computing environment across the organisation. Its drawbacks are non-availability if the network is not well managed, challenges in setting up and maintaining drivers for printers and other peripherals, difficulty in running certain complex applications, reliance on connectivity to the corporate or public network, and the complexity and high costs of deploying and managing the virtual desktop infrastructure (VDI).

The factors that need to be considered for VDI deployment are investment in technology, storage and network upgrades, training and software costs. Over time, the implementation of VDI saves costs. Overall, VDI can provide a better data sharing environment and access to data from anywhere, at any time. These features are expected to increase the overall efficiency and productivity of an organisation.

internal hard disk to store data) and also from anywhere (remote location) at any time through internet access is proposed to be implemented in phases over two years. Besides optimising resources for software and hardware management, this project will support green IT through reduced power consumption (Box IX.3). Preliminary work in this regard has commenced.

Upgrading of the Video Conferencing System

IX.55 In view of the benefits of video conferencing (VC) in terms of time and cost, and its increasing use, particularly for thematic VCs, a project on upgrading VC facilities in the Reserve Bank has been taken up. Adoption of HD technology, increased reach across the Reserve Bank and

desktop VC facilities for senior management are planned.

Perimeter Security

IX.56 While enhancing operational efficiency by reducing the time, space and volume constraints for access and availability of information, the information and communication technologies have also brought new challenges to the integrity, availability and confidentiality of systems and data. New and increasing threats of disruptive intervention from users outside the system, through modes such as remote access, and the ever increasing intensity and nature of probable attacks call for a revamped perimeter security system in the Reserve Bank. Steps in this regard have been initiated.