

Reflecting the need for technologically advanced, secure, efficient, accessible payment and settlement systems, the Reserve Bank persisted in its endeavour to incentivise electronic modes of payment. Enhanced use of prepaid payment instruments and mobile phone based payment services have been promoted with adequate security measures in place. Driven by the objective of reinforcing RBI as a knowledge hub, the Bank has striven towards strategic use of IT and its applications.

IX.1 In a system of inter-woven financial and international economic linkages, an efficient payment and settlement system is paramount. In the Indian set up with an enormous spread of banking and non-bank financial institutions and other financial organisations, ensuring adequate payment and settlement structures with strong security measures to harness efficacy assumes critical significance and hence is yet another unique responsibility of the Reserve Bank.

IX.2 During the year, various payment and settlement systems in the country continued to function efficiently, thereby facilitating smooth functioning of the financial markets in particular and the economy in general. The total turnover under the various payment and settlement systems both in value as well as volume terms, exhibited a steady growth of 10 per cent in 2010-11 (Table IX.1).

OVERSIGHT OF PAYMENT SYSTEMS IN INDIA

IX.3 The Payment and Settlement Systems Act, 2007 (PSS Act) empowers the Reserve Bank of India to regulate and supervise payment systems within the country.¹ The scope of the oversight function of the Bank is guided by the policy objectives spelt out in the Mission Statement “Payment Systems in India Vision 2009-12 (July-June)”, in terms of which the Bank would strive “to ensure that all payment and

settlement systems operating in the country are safe, secure, sound, efficient, accessible and authorised”. Oversight necessitates that “the objectives of safety and efficiency are promoted by monitoring existing and planned systems, assessing them against these objectives and, where necessary, inducing change”².

IX.4 In terms of the PSS Act, the Reserve Bank monitors all planned payment systems and ensures that only those payment systems with strong system design, adequate risk management solutions and sound financial parameters are authorized to operate in the country.

IX.5 All authorised entities are assessed against their individual authorisation conditionalities and relevant policy guidelines issued by the Bank. The assessment process comprises of off-site surveillance as well as on-site inspections.

IX.6 Off-site surveillance involves data collection and analysis, self-assessment by the authorised entities, periodical system audits by qualified professionals and market intelligence. Periodical analysis of the data is carried out to discern patterns and/or trends for further policy actions, if any. System audit has been prescribed to ensure that the authorised payment systems perform to the best standards of data security and integrity and that the processes and procedures are in sync with the authorisation conditions.

¹ The powers to regulate and supervise comprise: Power to determine standards (Section 10); Notice of change in the payment system (Section 11); Power to call for returns, documents or other information (Section 12); Access to information (Section 13); Power to enter and inspect (Section 14); Power to carry out audit and inspection (Section 16); Power to issue direction (Section 17); Power of Reserve Bank to give directions generally (Section 18); Directions of RBI to be generally complied with (Section 19).

² Central Bank Oversight of Payment and Settlement Systems, May 2005, CPSS, BIS.

Table IX.1: Payment System Indicators - Annual Turnover

Item	Volume (in million)			Value (₹ crore)		
	2008-09	2009-10	2010-11	2008-09	2009-10	2010-11
1	2	3	4	5	6	7
Systemically Important Payment Systems (SIPS)						
1. High Value Clearing	21.8	5.5	0.0	45,50,667	18,61,560	0
2. RTGS	13.4	33.2	49.3	3,22,79,881	3,94,53,359	4,84,87,234
Total SIPS (1+2)	35.2	38.8	49.3	3,68,30,548	4,13,14,919	4,84,87,234
				(6.6)	(6.3)	(6.2)
Financial Markets Clearing						
3. CBLO	0.1	0.1	0.1	88,24,784	1,55,41,378	1,22,59,744
4. Government Securities Clearing	0.3	0.3	0.4	62,54,519	89,86,718	69,70,236
5. Forex Clearing	0.8	0.9	1.2	1,69,37,489	1,42,11,486	1,91,60,153
Total Financial Markets Clearing (3-5)	1.2	1.4	1.7	3,20,16,792	3,87,39,582	3,83,90,133
				(5.7)	(5.9)	(4.9)
Others						
6. MICR Clearing	1,142.0	1,144.2	1,155.1	58,57,575	66,69,957	83,01,218
7. Non-MICR Clearing	233.6	230.6	232.3	20,60,893	18,78,425	18,32,909
Retail Electronic Clearing						
8. ECS DR	160.1	149.3	156.7	66,976	69,524	73,646
9. ECS CR	88.4	98.1	117.3	97,487	1,17,613	1,81,686
10. EFT/NEFT	32.2	66.3	132.3	2,51,956	4,09,507	9,39,149
Total Retail Electronic Clearing	280.6	313.8	406.4	4,16,419	5,96,644	11,94,481
Cards						
11. Credit Cards	259.6	234.2	265.1	65,356	61,824	75,516
12. Debit Cards	127.7	170.2	237.1	18,547	26,418	35,705
Total Cards	387.2	404.4	502.2	83,903	88,242	1,14,207
Total Others (6 to 12)	2,043.4	2,092.9	2,296.0	84,18,790	92,33,268	1,14,35,745
				(1.5)	(1.4)	(1.5)
Grand Total (1 to 12)	2,079.8	2,133.0	2,346.9	7,72,66,130	8,92,87,769	9,83,13,112
				(13.9)	(13.6)	(12.5)

Note: 1. High value clearing has been discontinued w.e.f. April 1, 2010.

2. Settlement of Government securities clearing and forex transactions is through Clearing Corporation of India Ltd.

3. At the end of April 2011, the MICR clearing was available at 66 centres (65 centres during previous year).

4. The figures of cards are for transactions at POS terminals only.

5. Figures in parentheses are ratios to GDP at current market prices.

IX.7 Additionally, each authorised entity is required to carry out a self-assessment of its operations, risk management and business continuity arrangements amongst other parameters based on international standards prescribed by the Committee on Payment and Settlement Systems (CPSS), the global standards setting body for payment and settlement systems. The results of the self-assessment shared with the Reserve Bank, are used to create a risk profile of the entity. The inputs gathered through market intelligence are also used as a pointer. A need based on-site inspection complements the assessment process.

IX.8 Based on the assessment carried out and market intelligence including consultation with stakeholders, the Reserve Bank induces changes in the payment system/s for improving their safety and efficiency as well as customer convenience and service. Rules, regulations, procedural guidelines, access criteria and minimum standards for operational efficiency for various products including the large-value and retail payments are used for this purpose. Statutory powers conferred by the PSS Act are also used for giving necessary directions.

IX.9 To aid the process of oversight, Regional Offices have been set up at four metros.

POLICY INITIATIVES

IX.10 Under the guidance of the Board for Regulation and Supervision of Payment and Settlement Systems (BPSS) several important policy initiatives were taken.

Paper-based Payment Systems

IX.11 The magnitude of the paper transactions despite recording a fall of 5 per cent over the previous year, continued to dominate the payment system accounting for 59 per cent of the total volume of transactions. The Reserve Bank took several steps to both reduce the settlement time of paper clearing and also encourage the shift towards electronic mode of payments.

- i) To further refine the acceptance of multi-user inputs in a networked environment, core-banking integration and graphic interface compatibility, a new automation software package called 'Express Cheque Clearing System' (ECCS) has been developed. It incorporates all the latest features and is expected to be rolled out across all the non-Magnetic Ink Character Recognition (MICR) locations in the country by September 2011 along with the speed clearing facility at all the centres.
- ii) Speed clearing has since been extended to 216 centres including all 66 MICR centres.
- iii) The service charge for cheque processing through MICR CPC and collection charge for outstation/speed clearing have been rationalized.
- iv) The second phase of the grid-based Cheque Truncation System (CTS) is nearing implementation at Chennai incorporating the CTS Standards-2010.

Electronic Payment Systems

IX.12 The electronic payment products provide speedier, cost effective and secure payment mechanism to customers in comparison to traditional

paper based payment instruments. The evolution of electronic payment products in the country has progressed through two phases: (i) introductory phase and (ii) rationalisation phase.

IX.13 During the introductory phase, electronic products like Electronic Clearing Service (ECS) and Electronic Funds Transfer (EFT) were introduced by the Reserve Bank. These systems were decentralised, serving the population of specific areas. The focus during the rationalisation phase has been to introduce centralised pan-India payment solutions like the Real Time Gross Settlement (RTGS), National Electronic Funds Transfer (NEFT) and National Electronic Clearing Service (NECS) that enable servicing customers spread throughout the country with settlement at a central location. This phase also coincided with the implementation of Core Banking Solutions (CBS)/centralised liquidity management solutions in banks.

IX.14 The RTGS system, in operation since March 2004, has witnessed a steady growth in both value and volume terms (Table IX.1).

IX.15 Various initiatives taken to further refine the centralised systems during the year are as follows:

- i) To streamline the process flow in credit-push systems like NEFT, RTGS, ECS (Credit) and NECS systems, banks can credit beneficiaries' accounts based solely on account number details subject to safeguards.
- ii) RBI has been waiving processing charges for retail electronic payment systems since the year 2006. It has now been decided to allow the clearing houses/processing centres to levy processing charges on the originating banks. Further, the destination banks will also levy some nominal charges on the originating banks as a compensation for usage of their infrastructure.
- iii) Regional Electronic Clearing Service (RECS) introduced in 2009 for facilitating state-wide payment and receipts, has been successfully

operating at Bengaluru, Chennai, Thiruvananthapuram, Ahmedabad, Hyderabad, Guwahati, Kolkata, Bhubaneswar and Jaipur. While all these centres operate the credit scheme, Bengaluru and Chennai also operate the debit scheme.

- iv) A new value band in the ₹1-2 lakh segment under NEFT was created, with customers having to pay lower charges. The threshold value for RTGS transactions has since been raised to ₹2 lakh.

IX.16 The efforts of RBI aimed at promoting electronic payment systems *vis-à-vis* paper based payments are evident, with both the value and volumes of these systems registering impressive growth rates (Chart IX.1).

IX.17 To ensure timely resolution of disputes between system providers and system participants, a Dispute Resolution Mechanism (DRM) under the PSS Act, 2007 has been framed. A time frame of a maximum 15 working days has been laid down for resolution of disputes.

IX.18 The PSS Act, 2007 and regulations framed thereafter have provided a firm legal basis for the process of netting and settlement finality. To amplify these aspects, a directive on Settlement and Default Handling Procedures has been issued which covers all multilateral and deferred net settlement systems authorised by the Reserve Bank of India.

New Payment Channels

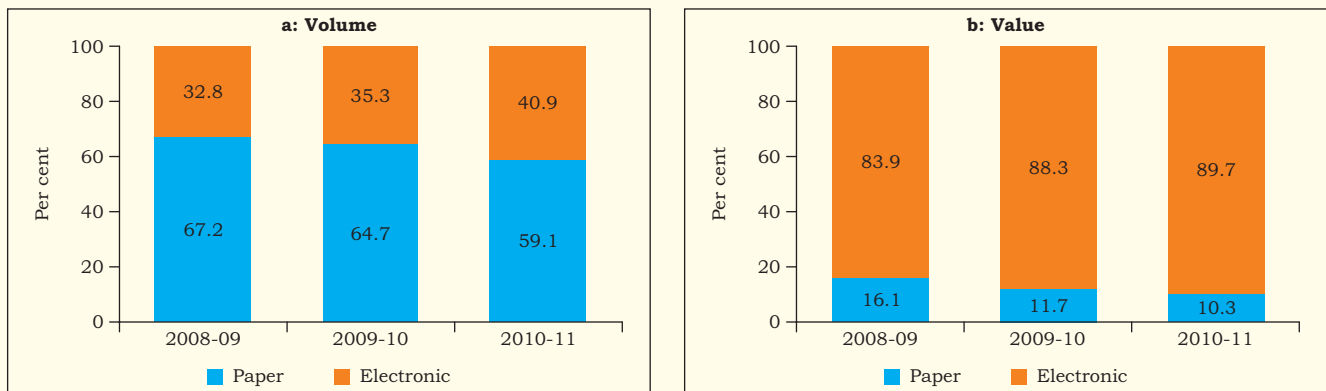
IX.19 The card based payment systems cover credit/debit and prepaid cards. With more than 250 million cards (debit, credit) issued in the country, a spurt in the usage of these cards across various delivery channels like Automated Teller Machines (ATMs), Points of Sale (POS), e-commerce, m-commerce, Interactive Voice Response (IVR), *etc.* has been observed. On an average, 400 million transactions valuing over a ₹1,000 billion are being processed during a month using these cards.

IX.20 To ensure the security in the usage of these products, the Reserve Bank has mandated

- i) An additional factor of authentication for all card-not-present transactions except the Mail Order Telephone Order (MOTO) transactions. The Bank is in the process of addressing the security of card present transactions (transactions effected with cards at ATM and POS channels). A working group constituted by the Reserve Bank for securing card present transactions has submitted its recommendations which are being evaluated for implementation.
- ii) Online alerts effective from July 01, 2011 for all types of card transactions irrespective of the amount and channel used.

IX.21 Subsequent to issuance of the guidelines on prepaid payment instruments, this segment has also

Chart IX.1: Share of Paper Based Vs Electronic Transaction



seen a spurt in activity. Banks as well as non-banks currently operate in the prepaid payments system segment. This product is being leveraged by non-bank system providers for entry into payments arena. Fifteen non-bank entities have been authorised to issue these products, and this has ushered in innovative payment products leveraging payment channels like e-commerce and m-commerce. The semi closed m-wallets can be issued for value up to ₹50,000 bringing them on par with other semi closed prepaid instruments.

IX.22 The guidelines on prepaid instruments have been amended to (i) extend the use of semi closed prepaid instruments intended for payment of utility bills/essential services, for purchase of air/train travel tickets (ii) permit banks to issue semi closed prepaid instruments through the agents in addition to the business correspondents and (iii) permit the issue of co-branded and gift prepaid payment instruments (iv) permit banks to issue prepaid instruments to government organisations and other financial institutions for onward issuance to the beneficiaries/customers and to beneficiaries under Money Transfer Service Scheme (MTSS) for loading cross border inward remittances received by them.

IX.23 Mobile phone based banking, one of the important evolutions in payment systems, is currently being provided by 38 banks. Banks have also been permitted to facilitate mobile banking transactions without end-to-end encryption up to ₹5000.

IX.24 As a further step to ensure timely and speedy reconciliation of failed ATM transaction, effective from July 2011, the time limit for resolution of complaints has been reduced from 12 to 7 working days from the date of complaint, failing which ₹100 per day is payable as penalty by the bank (provided the complaint is lodged by the customer within 30 days of the transaction).

IX.25 To ensure a level playing field among the stakeholders, banks have been advised that the five free transactions in a month permitted to savings bank account holders at other bank ATMs would include all types of transactions - financial and non-financial.

Interdependencies in Payment Systems

IX.26 The payment and settlement infrastructure of the country is becoming increasingly interdependent due to the direct/indirect relationships between systems and the use of common third party service providers. As a consequence, the settlement flows, operational processes and risk management procedures of many systems have become increasingly interdependent. Thus, the smooth functioning of an individual system often depends on the smooth functioning of other related systems (Box IX.1).

CPSS INITIATIVES

IX.27 A joint Working Group (WG) of the CPSS and the Technical Committee of the International Organisation of Securities Commissions (IOSCO) was formed in June 2009 to provide guidance on the application of the recommendations for central counterparties (CCPs) to OTC derivatives and for trade repositories in OTC derivatives markets³. The CPSS formed two other Working Groups in June 2009 to study the repo clearing and settlement arrangements and post trade services.

IX.28 The first Working Group in its September 2010 report⁴ studied the extent to which the clearing and settlement infrastructure for repos contributed to the instability evident in some repo markets during the crisis, and suggested that a review of the existing clearing and settlement arrangements for repos could

³ The two reports of this working group, Guidance on the application of 2004 CPSS-IOSCO recommendations for central counterparties to OTC derivatives CCPs and Considerations for trade repositories in OTC derivatives markets, were issued as consultative reports in May 2010. The feedback received during the consultative process for both the reports has been incorporated in the FMI report.

⁴ 'Strengthening repo clearing and settlement arrangements'.

Box IX.1 Interdependencies in Payment Systems

Highlighting the increasing interdependencies in payment system infrastructure and knock-on effects which could affect multiple systems due to their inter-linkages and interdependencies, the Committee on Payment and Settlement Systems (CPSS), BIS, published a report on 'The interdependencies of payment and settlement systems' in June 2008 which identifies various interdependencies that exist among the systems of CPSS countries; analyses the risk implications of these interdependencies; and assesses any associated risk management challenges.

The report states that the development of tight interdependencies has on the one hand helped in strengthening the global payment and settlement systems infrastructure by reducing various costs and risks, but on the other hand also increased the potential for disruptions to spread quickly and widely across multiple systems and markets. It has highlighted the need for system operators, participants and service providers to recognise, understand and manage these risks effectively arising out of the interdependencies for the safe and efficient functioning of the payments and settlement infrastructure.

A study on the interdependencies in the Indian payment and settlement system infrastructure was carried out, keeping in view the international efforts in this regard and the development of different market segments within the country and the inter-linkages between them.

Some of the key takeaways from the study are as follows:

- The Indian payments system infrastructure is characterised by a large number of payment systems such as the large value payment system (RTGS), CCIL operated systems (Government securities, Forex, CBLO), centralised retail payment systems with a pan-Indian presence such as NEFT, NECS, NFS-ATM, and other retail systems such as MICR cheque clearing in Mumbai, settling in central bank money. In addition, clearing corporations such as India Clearing Corporation Limited (ICCL) and National Securities Clearing Corporation Limited (NSCCL) settle the funds leg of the corporate bond transactions in central bank money in the RTGS system on a Delivery *versus* Payment (DvP) basis. Thus, the use of central bank money as a

settlement asset for these key payment systems in the country has contributed to the reduction of both credit and liquidity risk.

- The settlement in central bank money is a key characteristic which has led to the Indian payments system becoming a highly integrated and interdependent web of interrelationships with the central bank (RBI) at its centre. This in turn has had an impact on the settlement flows between various systems and determines the smooth settlement of all payment obligations in central bank money. Owing to the interconnectedness of systems the credit and liquidity risks can spread very fast throughout the system. The potential for disruption has, however, been minimised through the use of the Central Counterparty (CCP) infrastructure for various markets such as USD-INR Forex segment, CBLO and G-Sec markets.
- The study has also highlighted the presence of cross-system liquidity and operational risks in the Indian payments and settlement system infrastructure. This is especially evident in the case of CCIL which while minimising liquidity needs and providing a guaranteed settlement in various market segments, is by itself the biggest source of concentration of counterparty risk and operational risk to the Indian payments and settlement system infrastructure.
- Using the evidence presented in the Financial Stability Report (FSR), the study also recognises that concentration risk is evident with few participants accounting for the bulk of transactions pointing to the potential disruption of operations in various payment systems on account of failure or disruption in the operations of one or more than one amongst the largest five participants.
- On account of the high level of integration and inter-linkages of the Indian payments and settlement system, it is essential that the individual risk management rules and regulations of each payment system are understood for overall containment of systemic risk. The study in its conclusion accordingly advocates for the adoption of international best practises in the conduct of oversight by the Reserve Bank.

be undertaken with a view to making necessary improvements.

IX.29 The other Working Group on post-trade services in its November 2010 report⁵ detailed the

developments in the clearing industry and market structures between the years 2000 and 2010 in the CPSS countries and the impact of these developments on new risks which could have a bearing on the robustness of CCPs.

⁵ 'Market structure developments in the clearing industry: implications for financial stability'.

Principles for Financial Market Infrastructure

IX.30 In response to the Asian crisis in the late 90s, the CPSS and the Technical Committee of the IOSCO came out with three sets of standards for strengthening payments and settlement system infrastructure (including both payment and securities settlement systems). These are: (i) the CPSS produced “Core principles for systemically important payment systems (CP) (2001); (ii) the joint CPSS-IOSCO “Recommendations for Securities settlement systems (RSSS) (2001); and (iii) the joint CPSS-IOSCO “Recommendations for central counterparties” (RCCP) (2004).

IX.31 The recent global financial crisis necessitated a relook at these standards. Accordingly, a joint CPSS-IOSCO Steering Group was formed to chalk out a comprehensive list of standards incorporating not only the lessons from the crisis but also the experience of using these standards over the past decade in assessing and strengthening the payment and settlement system infrastructure in many countries.

IX.32 This initiative also supports the Financial Stability Board’s (FSB) efforts in strengthening financial systems through identification of gaps, if any, in international standards and addressing them. Towards this end, the consultative report “Principles for Financial Market Infrastructures” (FMI) has been released for public comments in March 2011.

IX.33 An FMI is defined as ‘a multilateral system among participating financial institutions, including the operator of the system, used for the purposes of recording, clearing or settling payments, securities, derivatives or other financial transactions’. FMIs typically possess a set of common rules and procedures for all participants, a technical infrastructure, and a risk management framework.

IX.34 The principles in the consultative report when finalised would replace the above three sets of standards, with a single set of standards. The Principles (24 in total) cover the entire gamut of the payment and settlement system landscape and encompass payment systems, central securities

depositories, securities settlement systems, CCPs and a new category of FMI viz., trade repositories.

INFORMATION TECHNOLOGY

IX.35 During 2010-11 the Reserve Bank continued in its endeavour to facilitate the alignment of banking sector with innovations in technology by improving its own IT infrastructure, implementing new applications and initiating steps for further adoption of technology in the banking sector.

IX.36 The IT Vision document 2011-17 prepared by a High Level Committee (Chairman Dr. K.C. Chakrabarty) with members from Indian Institute of Technology (IIT), Indian Institute of Management (IIM), Institute for Development and Research in Banking Technology (IDRBT), banks and the Reserve Bank, was released. *Inter alia*, the vision document discusses the road map for enabling IT as a strategic resource for positioning RBI as a knowledge organisation, and the steps to be taken for harnessing its human resource potential. For commercial banks, it envisages leveraging technology for enhanced efficiency, reduction in small transactions cost, improved customer service and better information flow to regulators (Box IX.2).

IX.37 In order to improve the quality of data/information received from commercial banks, a project for automating the flow of data from the core banking solution or other IT systems of banks to the Reserve Bank by a straight through process has been taken up. A core group consisting of experts from banks, the Reserve Bank, IDRBT and the Indian Banks Association (IBA) was constituted for preparing an approach paper on the same. The project will be implemented in a phased manner taking into account the technology and process maturity of individual banks.

**INFORMATION TECHNOLOGY
INFRASTRUCTURE**

IX.38 The vision to reinforce RBI as a knowledge organisation has invigorated an internal technological

Box IX.2 IT Vision Document: 2011-17

The IT Vision of the Reserve Bank of India 2011-17 was prepared by a High Level Committee, chaired by Dr. K.C. Chakarbarty, Deputy Governor with experts from varied backgrounds within and outside Reserve Bank as members.

The objective of the IT Vision for 2011-17 is to enable IT as a strategic resource for (i) enhancing enterprise knowledge, (ii) improving customer service, (iii) strengthening governance, (iv) increasing overall efficiency, and (v) ensuring environment friendly systems.

The steps to attain the envisioned state have been identified as:

- Adopting appropriate business process re-engineering and allocating resources before taking up the development of any new project;
- Conforming to internationally accepted data standards;
- Using business intelligence tools for analysing information;
- Ensuring automated flow of data from the source systems of banks to their Management Information Systems (MIS) and then to the Reserve Bank without any manual intervention;

- Improving IT governance;
- Effective project management;
- Evolving well defined information policies as well as information security framework; and
- Better vendor management and outsourcing practices.

For commercial banks, enhanced use of IT in areas like MIS, regulatory reporting, adoption of technology based strategies for financial inclusion, need for risk mitigation, use of analytics for improved customer relationship management (CRM) have been set as priorities.

The vision document discusses the need to move towards an integrated IT environment. Desirability of evolving a Centre of Excellence (CoE) for serving the technical and technological needs of the banking sector, which may also serve as a laboratory for research and development activity has also been mentioned in the document.

Department of Information Technology (DIT) in RBI would be the nodal department for coordinating and monitoring the progress of implementation of the recommendations of vision document.

revamp augmented by the significant updation to the existing infrastructure support.

IX.39 *Enterprise Knowledge Portal (EKP)*: An interdepartmental Technical Advisory Group with an external expert has been constituted to work towards the enhancement of the EKP, the intranet site of the Bank for effective internal communication.

IX.40 The *Data Centres* continued to provide necessary infrastructure support for running the critical payment and non-payment systems of the Bank. Adequate redundancy has been built to ensure uninterrupted availability of applications and data. To test the preparedness for business continuity, three disaster recovery (DR) drills were conducted during the year for payment system applications. For non-payment applications, DR drills have been conducted on a quarterly basis.

IX.41 *Network*: The INdian FINancial NETwork (INFINET), the communication backbone for the Indian Banking and financial sector managed by IDRBT provides a secured platform for access to all

payment and settlement applications. During the year, all offices of the Reserve Bank have migrated to the more reliable and cost effective Multi Protocol Label Switching (MPLS) technology. The network availability has considerably improved. The banks are gradually migrating to MPLS.

IX.42 *LAN revamping at all RBI locations*: The Local Area Network (LAN) was installed in phased manner during 1999 to 2002, at various offices of the Bank to provide connectivity to the users. During the year, the LAN has been upgraded in each RBI office to take care of present and near future requirements. Simultaneously, the process of providing a single domain across all the RBI offices has been initiated.

INFORMATION TECHNOLOGY APPLICATIONS

IX.43 The RBI manages multiple IT applications which are utilised by external and internal users for the purposes of payment and settlement, currency management, debt management, bank and government account management, regulatory

surveillance, internal accounts management, database management and communication.

IX.44 *Real Time Gross Settlement System (RTGS):* Patches for removal of positive Inter-Bank Funds Transfer Processor (IFTP) acknowledgement and multithreading for handling increased volume of incoming messages in Participant Interface (PI) software were successfully deployed. During the year, participant banks have migrated their PI to Windows 2008 environment. Steps have been initiated to replace the existing RTGS system with the Next Generation Real Time Gross Settlement (NG-RTGS) system for adopting the latest technology and emerging business processes. Some of the new features proposed to be implemented in the NG-RTGS system are advanced liquidity management facility; extensible mark-up language (XML) based messaging system conforming to ISO 20022 standards; and real time information and transaction monitoring and control system.

IX.45 *Public Debt Office: Negotiated Dealing System (PDO-NDS):* The application was suitably modified to support the system with respect to introduction of call and put options for Government securities, extinguishing bought back securities, buyback auctions for Market Stabilisation Scheme (MSS) and normal securities and development of Marginal Standing Facility (MSF) for SCBs (other than RRBs).

IX.46 *Centralised Public Accounts Department Systems (CPADS):* A centralised web based

application with Public Key Infrastructure (PKI) based security for handling government transactions is working successfully from the data centres. During the year, a significant development in this application was related to the software developed for collection of e-payment of commercial taxes for the state of Karnataka by Public Accounts Department (PAD), Bangalore. This module is functioning from the secured web site and all the participating banks along with PAD Bangalore have been provided access to carry out e-payment of commercial taxes. This has facilitated the State Government of Karnataka to collect the commercial taxes through banks on T+0 basis.

IX.47 *Integrated Accounting System (IAS):* BASIS has been replaced by IAS and has been rolled out in all centres.

IX.48 *Core Banking Solution (CBS):* A project for developing and implementing an RBI specific CBS has been taken up and is expected to integrate activities of the banking departments *i.e.*, Public Debt Office (PDO), Public Accounts Department (PAD) and Deposit Accounts Department (DAD).

IX.49 *Database Management:* A significant amount of statistical data is collected, compiled and disseminated by the Reserve Bank. This data generating system augments the policy making processes, which is the core function of the Bank. Advanced IT applications have been used by the Bank to enhance the efficacy of the data management and dissemination process (Box IX.3).

Box IX.3

Information Technology as a Vehicle for Data Dissemination

The Reserve Bank of India compiles monetary, banking, and financial statistics for India while Central Statistics Office produces most of the economic statistics. Recognizing the potential use of information technology solutions in the data management processes, the Bank has been using IT solutions consistently to enhance both coverage and quality of data to contribute to the policy making processes.

Presently, multiple domain specific Statistical Information Systems, ranging from stand-alone spreadsheet based systems to sophisticated systems based on Business

Intelligence (BI) tools are being used in the Bank. In order to further improve efficiency, a centralised approach is being envisaged for better manageability and control.

The approach may include centralisation of computing infrastructure, generalisation of data handling processes and integration of data elements. The technologies adopted will span across the entire spectrum of the Generic Statistical Business Processes (GSBPM 4.0, 2009) like data design, collection, processing, analysis, dissemination, *etc.*

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(...Concl.)

Improvement in the data collection and data exchange processes, particularly from the banks, has been facilitated by use of Online Return Filing System (ORFS) for submission of returns as against the earlier paper format or unstructured excel format. Under ORFS, a single window returns submission system, commercial banks enter data or upload returns online through the web based front-end. Returns submitted by banks first reaches a central data pool, which is then pushed to the user departments in the Reserve Bank.

While ORFS takes care of data capturing and transmission of returns from banks to the Reserve Bank, it doesn't incorporate any standard for exchange of data. Aligning with international standards on financial reporting, Reserve Bank has adopted eXtensible Business Reporting Language (XBRL) format for reporting data by banks and financial institutions. Technically, XBRL is an extension of XML in finance and accounting, and XBRL is leveraging XML to the maximum extent.

Recently, the Bank prepared an Approach Paper on Automated Data Flow (a straight through process) from the CBS or other IT systems of commercial banks to the Reserve Bank, according to which banks would be required, in the first phase, to ensure seamless flow of data from their transaction server to their MIS server and automatically generate all returns from the MIS server, without any manual intervention. In the second phase, the Reserve Bank would introduce a system for the flow of data from the MIS server of banks in a straight through process.

With time, the scope of data released by the Reserve Bank has enlarged and the manner in which the data were released

has changed from print to electronic version. The Bank is using various IT solutions to improve the dissemination of statistical data and chief among them is the Bank's data warehouse platform.

Data are now made available in downloadable and reusable formats through the Bank's data warehouse, which the RBI had set up for its internal use in December 2002. For the benefit of researchers, analysts and others users of such data outside the RBI, internet access to the publishable part of the data warehouse has been provided by the Bank to the public through a link called 'Database on Indian Economy: RBI's Data Warehouse' on its website (www.rbi.org.in). This effort has been generally welcomed by the academicians, researchers and general public.

The data capturing process itself has been automated using ETL (Extract, Transform and Load) tools, which update the data warehouse on incremental basis as per the pre-defined data load strategy which includes push/pull technology based on data changes in the source system. ETL tool carries out data cleansing and data transformation to integrate related data from various sources, as a result data in data warehouse stands up-to-date.

For the first time "Hand Book of Statistics on the Indian Economy" was generated and printed directly from RBI data warehouse and has been made available online also making it nearly real time. Apart from this "Statistical Tables related to Banks in India" is also being brought out directly from data warehouse and more publications are envisaged to be added on this platform.

POLICY INITIATIVES

IX.50 The review process of the Information Security Policy, which was issued in 2005, has been initiated in the backdrop of a changed environment for centralisation of all IT systems and also changes in the IT industry. To take this forward an interdepartmental committee has been formed with an external expert as the Chairman.

IX.51 The continuity of critical services in case of a disaster has always been a priority. But with the

adoption of technology based systems and applications to provide such services, business continuity preparedness has assumed greater significance. To address this issue, a comprehensive Business Continuity Planning (BCP) document covering business continuity as well as disaster recovery aspects for all the functions of the Bank is being prepared. DIT has been entrusted with this responsibility, with suitable inputs from business owner departments.