

Draft

**INSTITUTE FOR DEVELOPMENT AND RESEARCH IN BANKING TECHNOLOGY
(I D R B T)**

**Fifth International Conference on
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Technology Adoption by Indian Banking Sector : Role of RBI

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Dr. Ramasastry, distinguished participants and friends,

Let me at the outset welcome all the visitors to Hyderabad. I hope you will have an enjoyable and productive time here.

I am thankful to IDRBT for inviting me to inaugurate the Fifth International Conference on Fuzzy and Neural Computing. I am aware that you have a heavy agenda before you and complex issues to deliberate upon. So, my inaugural address will be brief, to enable you to move on, with your main business.

I compliment IDRBT for taking initiatives in hosting international conferences on areas of importance to banking technology in general, and as relevant to India, in particular. The theme of last year's conference, the first in the series, was information security. As we all know, information security is a global concern, common to all countries and multiple sectors. Efforts are on by various stakeholders across the countries to find ways to defend critical technology infrastructure from cyber attacks.

This conference, the second in the series, on fuzzy and neural computing, is equally important. This subject is also of great relevance to various sectors

globally. No doubt, banking sector has started using fuzzy and neural computing systems in a small way in various areas like fraud monitoring, credit appraisal, customer relationship and overall risk management.

I notice impressive research activity in reputed academic institutions across the globe in fuzzy and neural computing. This conference provides an excellent forum to exchange views on latest developments and help further work. The presence of keynote speakers and paper presenters lined up over the next three days not only indicates the advancements in research in this area, but also identifies areas for work in future. It gives me a great pleasure to be amidst this galaxy of academicians and practitioners gathered here on the occasion of the Fifth International Conference on Fuzzy and Neural Computing hosted by IDRBT.

At the outset, I would like to give you the background to RBI's role in Technology, and in particular, in IDRBT. At the time the rest of the world, especially advanced economies, were using computers, the political atmosphere was averse to the idea of computerization. Government was not encouraging adoption of information technology. Import of computers was restricted severely. There was no indigenous production of computers. RBI, because of some sense of independence from the Government, took the initiative and was, in a sense, leader among public institutions in use of modern technology. The trade unions in RBI did not cooperate. But, the vision, sagacity and courage of Dr. Rangarajan, then Governor of RBI, helped launch a programme of use of technology in banking, in particular, in RBI.

IDRBT is, thus, a unique institution established by Reserve Bank of India, exclusively for research and development in the area of banking technology. There

is no parallel in the world to IDRBT in the sense that no other central bank had set up such an institute. The credit of establishing such an institute two decades ago should go to the visionaries at Reserve Bank of India, when technology adoption by banks in India was in its initial stages.

Reserve Bank of India played multiple roles in the technology adoption of banking sector in India: First, as an early adopter; second, as a guiding force and the third, as institution builder. Let me initially dwell upon its role as an early adopter, especially in the area of payment and settlement systems in India.

RBI: As an Early Adopter

Reserve Bank initiated in mid-1960s the process of computerization for large scale data processing. One of the first mainframe computers in India was put in place by the Reserve Bank of India. The thrust initially was on data compilation and analysis, including country-wide surveys. But what started for statistical processing slowly covered internal work areas like pay roll.

In the 1980s, the RBI took the first step to use technology for cheque clearing. The turning point in the technology adoption story in Indian banking sector was the use of MICR (Magnetic Ink Character Recognition) technology based cheque clearing as it brought visible change in the form of reduced manual processing and clearing cycle time.

In the mid nineties, RBI introduced the electronic funds transfer system which was again the first initiative to enable banks to transfer funds between two different banks. This system progressively matured into a major funds transfer system today.

A large-value real time funds transfer system, namely, Real Time Gross Settlement System (RTGS) was introduced in 2004, to be helpful in their real time funds management. RBI re-engineered the RTGS to adopt the latest messaging standard, that is, the ISO 20022 form October 2013. In fact, the Indian RTGS was the first to adopt the ISO 20022 standards across the globe.

The RBI played a major role in the setting up of the Clearing Corporation of India Ltd., to settle on net basis trades in Government Securities, foreign exchange trades, borrowings from market, collateral borrowing, etc. RBI was fortunate in having the guidance of Dr. R.H. Patil, and support from Governor Jalan.

Setting up of the National Financial Switch (NFS) connecting the ATMs of all banks enabled customers to withdraw money from any bank's ATM. Today there are more than 1,60,000 ATMs in the country which are expected to grow even more with payment banks and private ATMs being introduced.

Cheque Truncation System (CTS) was introduced by the RBI where the images of cheques are transmitted online, thus obviating the need for physical movement of cheques. Around 5 million cheques are cleared daily on an average through the CTS.

RBI started its own core banking solution called e-Kuber in 2012. This not only enabled the RBI to centralize its accounts but also gave facilities to the banks to log in and check their funds as well as do transactions.

Implementing robust and secured payment and settlement systems for the benefit of banks and their customers has certainly brought speed, transparency and efficiency to the country's economy, as a whole.

IDRBT has played a major role in establishing and running a secured closed user group financial network called INFINET and structured messaging system called SFMS, over which today's RTGS and NEFT function.

Let me now present its role as the guiding force for the technology adoption by banks in India.

RBI: As the Guiding Force

The Reserve Bank took the role of a guide to the banks. It appointed several committees to give reports for the benefit of the banks, especially public sector banks, in their technology adoption plans. The first such committee was set up in 1984 under the chairmanship of Dr Rangarajan. The Committee drew a path for banks to reach the goal of branch computerization. As banks were slowly moving towards the goal, the Reserve Bank got another report prepared by another committee, again chaired by Dr Rangarajan for adoption of high end systems.

Dr Rangarajan Committees were followed by Saraf Committee and Vasudevan Committee in mid and late nineties. In late nineties, the Reserve Bank of India has guided banks for crossing the Y2K hurdle smoothly.

As a central bank, the Reserve Bank took the role of the developer on one side to ensure banks adopt technology. On the other hand, Reserve Bank of India played the role of guiding banks to mitigate risks of all kinds, including business disruptions that would have been caused by Y2K issue.

As banks started adopting technology in phases, the Reserve Bank of India guided them towards core banking solution implementation during early nineties and early 2000s. After all banks completed CBS implementation, Reserve Bank of

India encouraged banks to implement automated data flow for reporting information to the central bank. The ADF is to ensure banks put in place appropriate data capturing, cleaning and reporting systems.

Realizing the need for analytical processing, the Reserve Bank of India implemented a data warehouse project for its internal use in the early 2000s itself. The credit for this initiative and its successful implementation should go to Dr. Barman, a respected expert in statistics in India. It is one of the first data warehousing projects undertaken by any central bank. The RBI project served as a model for implementation of data warehousing by other central banks and the commercial banks in India. Recently, big data and analytics have assumed significance and Reserve Bank of India laid the foundation for such systems by building strong data warehouse almost a decade and half back. The data warehouse is useful for internal use of the Reserve Bank. It also provides to the public access to for time series dissemination of various economic and banking indicators in the form of database on Indian economy (DBIE)

The IT Vision Document of RBI for the period 2011-17 and Gopalakrishna Committee for information security are currently serving as guiding documents for the technology adoption in Indian banks.

RBI: As an Institution Builder

Realizing the need for institutions for smooth and fast adoption of technology by the Indian banking system in India, the RBI has set up some institutions either directly or indirectly. While IDRBT was the earliest, CCIL and NPCI owe their existence and growth to RBI.

A Core Committee was appointed at the behest of Reserve Bank of India for setting up CCIL as a safe institutional structure for clearing and settlement of trades. CCIL was established in 2001 to meet the objectives of central counterparty, guaranteed settlement, efficient settlement system and lower operational cost. The institute was to insulate financial system from shocks arising out of operations.

Payment Systems Vision Document of Reserve Bank of India released in 2005 paved the way for establishment of National Payments Corporation of India. NPCI is to take care of retail payment segment in India. NPCI has taken over National Financial Switch operations from IDRBT. Some of the important initiatives of NPCI include Immediate Payment System (IMPS), Cheque Truncation System (CTS) and RuPay Card.

Chronologically, IDRBT was the first institute to be established by Reserve Bank of India. Since inception IDRBT has been working at the intersection of banking and technology. It has been building and managing the necessary technology infrastructure for banking sector. It is also carrying on the research activities, and thus international Conference is in many parts of the effort.

IDRBT has set up centres of research in the areas of analytics, cyber security, mobile systems, cloud computing and open source systems. IDRBT is not a mere Research Institution. The Institute has been working closely with industry, banks and academicians to ensure right products and services are designed and used. Towards this, IDRBT has a vertical exclusively for bank EDP and consultancy. As part of interaction with banks, IDRBT coordinates two important forums –

Forum for Chief Information Officers (CIOs) of banks and Forum for Chief Information Security Officers (CISOs)

IDRBT is also working in developing standards, guidelines and frameworks for Banking Sector. Some of the key contributions have been Micro ATM standards for FI, IT Governance, Cloud Security Framework, Social Media Framework, on CRM and Data Quality, most recently on Vendor Management. The framework provides banks a guideline and a reference for implementing best practices.

IDRBT's deep understanding of technology and affiliation with academic and industry bodies is helping to provide consultancy and advisory role to banks in the areas of IT Governance, Information Security, Network Management, Financial Inclusion, Social Media, Mobile Banking, CRM, Cloud Computing, etc

Big Data and Analytics

Now let me touch upon the importance of the theme of the present conference and its relevance to banking. From the traditional role of accepting deposits and lending money, banks have grown into a critical service industry. With technology, the elements in providing service are captured and stored. This creates a large database. Recent advances in **Big data analytics** has thrown up immense possibilities in identifying areas of business propositions for banks and at the same time meeting the very choosy demands of their customers. Research in this area has enabled banks to develop their own data warehouses for customer relationship management (CRM) initiatives. This massive creation of data is a wealth house of information which can be tapped by entities which deal with data analysis for the benefit of practically any field ranging from finance, commerce, socio-economic development, science, demography, etc. To achieve this end, we need to ensure

data quality and consistency. Our challenge lies in describing standards and ensuring adoption and implementation of those standards.

Big Data, data with large volume, variety, velocity and veracity has become the mantra for understanding new leads for the banks, likes/dislikes of customer, behavioural analysis of customers, information security threats, etc. Machine Learning and Pattern recognition have become the virtual assistants for humans. Computers have emerged from automating mundane tasks to performing self healing, recommending from past patterns/data and predicting newer behaviour of customers. The recent Nobel Prize on discovering cells that constitute inner GPS would be interesting to watch on how computer scientists take this forward in dissecting human brain and integrating some of this into Computer brain (CPU). The analytics have emerged from Machine Learning and Pattern recognition to Neural Networks to Deep Learning techniques getting closer to human brain actions and interpretations.

The research and the suggestions from IBM Watson in the field of medicine are worth understanding. Its implications in banking and finance would be fascinating to watch for all bankers. It is exciting to hear some of the valuations going for the start-ups in the recent times. For most of these start-ups, the business value proposition has been data and the analytics.

I understand some of the tech-savvy banks in India have already forayed into big data and are implementing some of the fuzzy and neural computing techniques for understanding customer behaviour, improving risk management and cross/up-sell.

This International Conference on Fuzzy and Neural Computing at IDRBT is expected to provide impetus to research in Fuzzy Computing, Neuro Computing and hybrid Neuro-Fuzzy Computing.

The collaboration between academics and industry is critical for bringing in useful and usable research to the field. I am confident that this Conference will deal with ideas which have concrete relevance and can be directly applied to industry.

I am sure that the Conference will help IDRBT. Let us work towards developing newer techniques, algorithms and use cases that are acceptable and implementable in the area of needless to say, Fuzzy and Neuro computing.

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