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Resource Material

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E-GOVERNANCE FOR BETTER SERVICE DELIVERY AND PROGRAMME DESIGN, IMPLEMENTATION AND MONITORING

(Extract from the XI plan document)

Since good governance is about all aspects of governments' interface with (i) Citizens (G2C) and (ii) Businesses (G2B), e-Governance aims at the use of technology and process re-engineering for more efficient service delivery to both citizens and business, and also for more effective delivery of various programmes, projects and schemes. In an increasingly connected virtual world of knowledge in cyberspace and with increasing spread of Internet and web-based information systems, time and distances have shrunk, and service delivery is now possible on 'anytime, anywhere' basis. Sequential steps in service delivery can in some cases be processed in parallel, making simultaneous delivery possible. Government interface with people can be re-engineered in a manner that human discretion is minimized. In programmes like e-seva, government functionaries do not interface with the public and private providers man the front-end service-delivery kiosks. The service provider does not have authorization to alter government records and those who manage the records do not interface with the people. In the process, corruption gets minimized and the entire service delivery process becomes more transparent. If attributers of good governance are transparency, efficiency, responsiveness cost effectiveness and accountability, e-Governance is the means to attain these attributers through application of technology. The National Knowledge Commission had, in the context of e-Governance, suggested that to make an immediate impact on citizens, it is critical to identify and simplify important processes and services, say 15 to 20 to begin with, which are currently cumbersome, bureaucratic and prone to unnecessary delays and corruption. Initially these services could include providing online record of land rights, computerized land registration, computerized transfers, computerization of social security schemes, birth and death certificates, proof of residence, issue of ration and ID cards, and so on.

PROCESS RE-ENGINEERING

The first and most crucial element of this agenda has to be a change in the procedures of various government departments. Over a period of years, very few of these procedures has been reviewed. Recently, when the review of procedures applicable for passports was undertaken, it was observed that for ordinary citizens, availing passport facilities is well nigh impossible unless they take the help of intermediaries. The form for getting a passport was quite complicated. Further, the procedures which were prescribed envisaged verification by police at various places where the persons were staying in the past few years. This led to enormous delays and harassment. Similar, complicated procedures for issue of ration cards,
caste certificates, driving licences or depositing taxes are also in vogue. There is a strong need to revise them and make these more citizen-centric. While the above processes could be prioritized, it will be necessary to have a comprehensive review of all those deliverables which impact on the availability of services to the common citizen.

E-GOVERNANCE INFRASTRUCTURE

The following have been proposed under e-governance infrastructure:

(i) Unique Identifiers

• UID (unique ID) FOR INDIAN RESIDENTS
• UID FOR INDIAN CORPORATES/BUSINESS ENTITIES— MCA 21:
• SMART CARDS

(ii) Service Delivery Infrastructure

• STATE-WIDE AREA NETWORKS (SWANS)
• COMMON SERVICE CENTRES (CSCs)
• STATE DATA CENTRES (SDCS)
• CONNECTIVITY FOR THE LAST MILE
    - Leveraging BSNL rural exchanges
    - Wireless Connectivity from BSNL
    - Last mile connectivity through USOF(Universal Service Obligation Fund)

ICT APPLICATIONS FOR BETTER PROGRAMME IMPLEMENTATION AND MONITORING

ICT interventions are a pre-requisite for effective implementation and delivery of flagship programmes. The proposed NREGS stipulates the provision of employment for a minimum of 100 days a year for at least one adult per rural household. For this scheme to be properly implemented, it will be necessary for every village Panchayat to maintain a register enumerating eligible adult individuals in every family. This would need to be converted into a workers' register. All government departments with works programmes in rural areas would have to create village-wise works registers, which would then have to be centrally aggregated and catalogued villagewise at the district/block headquarters. Each potential worker would have to be given a UID and would have to be assigned to the aggregated village-wise works register so that an account can be kept for 100 days of employment for one member from each family. In a nutshell, this would require works and workers inventories to be created and stored in a central data depository at the district headquarters.

ICT solutions are all the more needed to plug the following loopholes:

• Inflated Schemes
– Inflated quantity of work, depressed productivity, inflated person day estimates
– Bogus registrations
– Registration of dead persons, minors and medically unfit persons, duplicate and/or proxy registration, fictitious registrations

• Fraudulent Requisition of Funds
– False measurement, inflated progress of works, omitting an operation or work item

• Inflated Muster
– Ghost workmen, bogus attendance

• Fraudulent Wage Payment
– Under payments, dependant fraudulent payments

• Use of ICT in Major Flagship Programmes
While approving the NeGP, the government directed that for major projects like Bharat Nirman and Rural Employment Guarantee Schemes, the concerned line Ministry concerned should make use of e-Governance and automation techniques in implementation from the inception stage. Significant steps have been taken by the Ministry of Rural Development to use ICT in the implementation and monitoring of the NREGA and PMGSY, through its NREGASoft and Online Management Monitoring and Accounting System (OMMAS) applications developed by the NIC.

LOCATION-SPECIFIC PLANNING USING GEOGRAPHICAL INFORMATION SYSTEM

Planning for sustainable development has been a challenge, as it requires substantial amount of data on all aspects of development. In emerging technology paradigm, GIS has emerged as a powerful tool which has the potential to organize complex spatial data into layered information with tabular relationships. The Planning Commission has put in place a Web-enabled 23-layered GIS database to facilitate location specific planning by creating hierarchical spatial database and application services. The multi-layered GIS database provides comprehensive data village wise—geographical data, river basin/watersheds/micro watersheds data, physical infrastructure (roads/electricity/rail roads), social infrastructure (education and health facilities), urban and rural settlements, demographic data, amenities data, soil/ forest cover data, and so on. The Planning Commission has also taken up a project, being implemented by the NIC, for creating computer aided digital utility mapping for six mega cities—Ahmedabad, Bangalore, Chennai, Hyderabad, Kolkata, and Mumbai. The project envisions collating information from all concerned organizations and analysing the same for each utility, for example, water, sewerage, electricity, roads, communication, gas pipeline, and so on, by creating large-scale digital maps for the concerned cities, with an aim to help in urban planning, disaster preparedness and infrastructure management. The database is expected to be a major aid to planning, development and management of urban utilities. It will also provide the GIS information base for a vehicle navigation/tracking system based on GPS. The Ministry of Urban Development has a project for carrying GIS to other cities of India. Both these projects will help decision makers in effective planning by making a paradigm shift in resource allocation from the broadcast mode to a location specific, need based mode

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Source: 11th Five Year Plan (2007-12)

Recommendations of the National Knowledge Commission on e-governance:

1. Government Process Re-engineering Before Any Computerisation

At present the E-governance efforts are primarily based on computerising age-old processes left behind by British Raj and compounded by a plethora of new layers and silos by Indian bureaucracy, each working within departmental boundaries and pet-priorities. As a result we are computerising cumbersome processes and hence not commensurately benefiting from it. Simply digitising the existing government processes merely adds an additional layer of expense, complexity, delay and confusion. NKC feels that there is now a unique opportunity in the history of India to leave behind the British Raj and re-engineer and modernise government processes to build a new India of the 21st century. Hence it is essential to first redesign the government processes keeping the citizen at the centre, providing for the enablement of citizens, businesses, producers and consumers, replacing the old mistrust and control regime of the colonial past. This redesigning of government processes will drastically reduce the numbers and duration of successive steps required to obtain services. It will also provide traceable records, enable enforcement of individual performance, accountability, efficiency and productivity, as well as transparency of policies and processes.

2. Ten to Twenty Important Processes and Services

To make an immediate impact on citizens it is critical to identify and simplify important processes and services, say 10 to 20 to begin with, which are currently cumbersome, bureaucratic and prone to unnecessary delays and even corruption. These processes can be simplified and made available as web-based services. Initially, these services could include birth certificate, death certificate, proof of residence, and ration/ID cards. Other processes can be added over a period of time. This approach will require each state to implement these processes in concert and learn from each other.

3. Common Standards

At present, various State Governments are choosing their own ways of selectively computerising their processes and provide E-governance. Many of these programs are vendor-driven and not scalable. It is critical to develop and enforce citizen/business entitlement standards uniformly over all states and central ministries and functions, spanning from voting, taxes, certificates, financial products, law-enforcement and welfare for individuals, properties of land, institutions, businesses etc. These standards should not be hardware-centric and vendor dependent but should enable easy participation by any State, Panchayat Institution, business, NGO or citizen, whenever they decide. These standards, templates and data formats must be designed carefully by teams of experts drawn from government, IT companies, academia, R&D institutions and users or stakeholders who understand latest trends, technology, software, user interfaces and interoperability requirements. NKC recommends that all State Governments follow these standards. At the same time, it is also conscious of the need to incorporate some of the standards followed by State Governments.

4. Best Practices and Lessons from the Past

A great deal of work has already been done in various central ministries and in State Governments. The key is to learn from these and design best practices that are affordable and applicable nationwide to ensure ease of use and interoperability. NKC notes that the Government's own offices, laboratories, and directorates have an immense amount of useful and relevant data [e.g. the seven centres of the National Bureau of Soil Science and Land Use Planning (NBSSLUP)], which needs to be digitised and made publicly accessible for use and analysis. Data collected by one agency should
be made available across all agencies as well as to the public, subject to national security considerations.

5. National Infrastructure

It is important to provide secure broadband infrastructure and associated hardware, software and hosting facilities nationwide with easy access at all levels. This infrastructure should be based on a 'user pays' principle and public-private partnership in investments and mutual accountability and efficiency. This infrastructure creation should be led by the Central Government to enforce a high level of security, uniformity and standards at every interface, regardless of state language, culture, legacy and financial health.

6. Web-based Services

To enforce standards and to keep the governance uniformly responsive and transparent, it is recommended that State Governments use templates created by the Central Government to offer localised data and services in Indian languages. In this model, the private sector can invest in creation of access-infrastructure and building relevant business models for user-fee collection and its sharing across all stakeholders, to ensure sustainability and adaptation for future needs. This also implies that all public institutions will make sure that all public data is available on the web.

7. Open Source Software

Because of the enormous size and scope of the Egovernance effort in India and because of the availability of globally recognised software talent of Indians, we must actively encourage open source software implementations and open standards wherever possible. This will allow us to have cost-effective solutions and help develop open software products and standards. It will also help improve scaling up and minimise delays caused by repeat tendering.

8. Specialist CITO (Chief Information Technology Officer)

Each State and major Central Government departments must create an empowered chief information technology officer, with relevant expertise and skills in the domain subject and IT usage. These posts must be filled on open recruitment and draw the best and the brightest from India's technologically qualified talent. These officers should be paid market salaries and have a three-year contract with the Government, which can be renewed depending on performance.

9. New National Programs

As government plans to spend hundreds of thousands of crores on Bharat Nirman, Rural Employment Guarantee Scheme, and urban development initiatives, it is recommended that we mandate that each of these programs begin with well engineered E-governance implementation and web-interface that ensures speedy delivery, productivity and efficiency. It is recommended to invest one to two per cent of the national program budget in establishing new processes and associated E-governance infrastructure to improve delivery and reduce leakages.

10. Focused Organisation

For national E-governance to succeed, it is critical to create an appropriate central organisation with structures that can operate in a mission mode, with full autonomy and accountability. NKC recommends creation of an organisation with a Chief Executive Officer (CEO), with board members drawn from the IT industry and government to redesign processes and procedures, to represent a multiplicity of stakeholders and diversity in domain expertise, and to drive the national E-governance plan with facilitation from the CIT Ministry.

The task of this organisation shall include but not be limited to:
a) administrative reforms related to process re-engineering
b) providing and maintaining common national ICT infrastructure for E-governance
c) providing leadership and framework for implementation, with immediate focus on selected mission mode projects ; and
d) providing a neutral consulting framework and standards for E-governance with the help of CITOs.

There is a need to re-engineer our processes first to change our basic governance pattern for simplicity, transparency, productivity and efficiency, to select 10 to 20 important services that make a critical difference, to offer web-based services, develop common standards and deploy a common platform or infrastructure for E-governance to make it citizen-centric. As a next step, NKC recommends focusing on the organisational issues related to re-engineering government processes with strong committed leadership, autonomy, flexibility, clarity of purpose, predefined deliverables, measurable milestones and periodic monitoring in order to implement the national E-governance program within three to five years.

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Source: NKC, Report to the Nation, 2006-09

Business Process Re-engineering (BPR)

(Extract from the Report on the second Administrative Reforms Commission)

In India, the way government institutions conduct their business has evolved over time and is codified in different Statutes, Rules, Regulations and procedural manuals enacted or formulated over a wide span of time (with many processes even continuing from the colonial period). On the other hand, the scope and complexities of governance along with the government machinery have expanded over time. The advent of ICT has led to the recognition that these technologies provide a unique opportunity to redesign government processes not only to provide better services and reliable information to citizens but also to improve efficiency and effectiveness within government institutions.

The basic idea behind such re-engineering is to avail of the opportunity provided by ICT in transforming governmental processes and not just in modifying them. Michael Hammer and James Champy, who in their landmark book 'Reengineering the Corporation – A Manifesto for Business Revolution' (1993) introduced the concept of business process re-engineering, have the following to say in this regard:

> *"Re-engineering is the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance, such as cost, quality, service, and speed."*

The business process re-engineering model has been further developed by James Champy, one of the co-authors of the book 'Re-engineering the Corporation – A Manifesto for Business Revolution'. He has now put forward the idea of 'X-engineering' which, briefly, involves the following steps:

i. Step one: To get others within the organization to understand how technology– and particularly the Internet – can really drive the organization to a whole new level of efficiency. In other words, to get others within the organization to understand the potential of technology.

ii. Step two: To actually start to redesign all the processes that govern the way the organization does business. In doing so, these processes are to be examined from beginning to end - and from both inside and outside the organization - and decide what can be simplified or eliminated. 'At the core of X-engineering, then, is the need to understand the rationale for every step in a process.'

iii. Step three: To redesign the processes jointly with the entities with which the organization deals with.

iv. Step four: Internal re-engineering should allow the organization to do things which are really important to it. To achieve this, there is need for creating standards. This would include standardization of technology being used.

Thus, first, there has to be conviction within the organization that process re-engineering will lead to greater efficiency and efficacy. However, this conviction should lead to the realization that ICT offers the opportunity to accomplish it now and not later.

Second, the rationale for each step involved in a process - both for activities which lie totally within the organization and those which involve outside entities – needs to be examined with the express aim of identifying the steps which can be simplified or eliminated altogether. Once this has been accomplished, the need for redesigning the

processes ab initio immediately arises. In the case of government organizations, the needs of the citizens assume centre-stage.

Presently, in India, different government organizations, both at the Union and State Government levels, are engaged in carrying out a study of their business processes with the objective of re-designing them using ICT. These efforts are at various stages of planning/completion. One of the earliest organizations to undertake such a study is the Income Tax Department which created a separate Directorate of Business Process Re-engineering (BPR) for the purpose in May 2006. An external consultant was appointed through a global tendering process for carrying out the BPR Project. The project commenced in May 2007 and was completed with the finalization of 18 reports within a time frame of eight months. To begin with, awareness was created about the need for such an exercise through meetings with employees as well as their associations/unions. This was aimed at developing a sense of ownership within the workforce. In the end, more than 800 departmental personnel from Chief Commissioners to Group 'C' employees participated in the exercise. Further, customer views were ascertained through specifically designed questionnaires administered to different categories of taxpayers and consultants. The study included an 'As-is' study phase aimed at mapping of existing processes followed by a 'gap analysis' to identify problem areas and bottlenecks. These, along with best global practices in the field of tax administration, were incorporated in re-designing the processes and suggesting 'To-be' models. Such 'To-be' models and recommendations have been prepared in respect of the following:

- Bulk Operations Division including Regional Processing Centre
- Facilitation Centres and Receipt and Despatch Units
- Changes to PAN/TAN Issuance and Management
- Assessee Tax Credit Accounting System
- Core Processes Redesign – Assessment
- Core Processes Redesign – Post Assessment
- Core Processes Redesign – Appellate
- Risk Assessment System
- Knowledge Management System
- Record Management System
- Human Resources and Infrastructure
- Grievance Redressal Management
- Change Management

The lessons which emerge from this project are three-fold:

i. the workforce has to believe in the benefits of business process re-engineering through ICT;

ii. there is no shortcut to step-by-step examination of all business processes resulting in re-designing of these processes; and

iii. each government organisation will have its own specific set of design outcomes which would require close interaction between technological solution providers and the domain experts.

As mentioned earlier, identifying changes in the legal and regulatory framework lies at the heart of business process re-engineering in government organizations, as many of the governmental processes, including the steps involved in them, arise out of the provisions

contained in different legislations, rules, regulations and procedural manuals/codes. Process re-engineering in the sense mentioned above would require reformulation of such provisions. This was visualized by the Standing Committee on Information Technology (2005-06, Fourteenth Lok Sabha) in its 22nd Report entitled 'Implementation of e-Governance Projects' (December 2005). The Committee took note of the evidence given by a representative of the National Institute of Smart Governance (NISG):
"As regards 'process', in most of the departments, we are governed by more than hundred years' old acts and rules. These are driving inefficiency. If you put the same thing in the computers, a hundred-year-old process, it will get inefficiency in a very efficient way. We will be enlarging that inefficiency. We have to change the process behind this. A lot of legislative effort at the highest level is also needed in this process area…"

The Committee engaged in further discussions with various IT Service and Solution providers and recommended the following:

"The Committee observed that the age-old statutes and regulations governing the manual process will not be suitable for governing the electronic processes which require altogether a different set of legal framework and guidelines to make the e-Governance successful. They are of the strong opinion that the legal and regulatory changes in the processes would be able to deliver the services more efficiently and effectively and remove a lot of other hurdles of manual regulatory mechanism. The Committee, therefore, recommended that a comprehensive review of all relevant statutes and regulations should urgently be done to bring about suitable changes therein so as to make them compatible with the cyber age technology enabling the citizens to obtain maximum advantage of e-Governance projects. They further recommend that possibility of bringing a new legislative mechanism may also be explored, if need be, to ensure that the implementation of e-Governance projects delivers the citizen-centric services in an effective and successful manner."

In response, the Union Department of Information Technology stated in their Action Taken Notes that they along with DAR&PG will jointly examine and review relevant statutes and regulations and the possibility of a new legislation in order that the citizens obtain maximum advantage from NeGP. However, the Committee felt that no concrete steps have been taken regarding a comprehensive review of all relevant statutes and regulations governing manual processes specifically when a different set of legal framework and guidelines may be required for the purpose of e-Governance. In their Thirty Seventh Report (December 2006), the Committee stated the following while expressing their concern:

"In the changing scenario, it calls for immediate attention of the Government. Keeping in view the urgency involved in reviewing the relevant statutes and regulations, the Committee desire that the matter be accorded top priority and pursued to its logical conclusion…"

The Commission agrees with the views of the Standing Committee. The task involving complete re-engineering of business processes in government is in itself stupendous. Without providing the legal structure and mandate, it would be difficult to achieve it within any realistic time-frame. In fact, in a later chapter, the Commission has recommended that the whole framework of e-Governance should be given a statutory backing. Even the US legislation has provided this framework to government entities.

Thus, Section 202 of Title II of the E-Government Act of 2002 prescribes 'Federal Agency Responsibilities' in the following manner:

"*a) The head of each agency shall be responsible for:*

1) Complying with the requirements of this Act (including the amendments made by this Act), the related information resource management policies and guidance established by the Director of the Office of Management and Budget, and the related information technology standards promulgated *by the Secretary of Commerce;*

2) Ensuring that the information resource management policies and guidance established under this Act by the Director, and the related information *technology standards promulgated by the Secretary of Commerce are communicated promptly and effectively to all relevant officials within their agency; and*

3) Supporting the efforts of the Director and the Administration of the *General Services Administration to develop, maintain, and promote an integrated Internet-based system of delivering Federal Government Information and services to the public under Section 204.*

b) Performance Integration

1) Agencies shall develop performance measures that demonstrate how electronic government enables progress toward agency objectives, strategic goals, and statutory mandates.

2) In measuring performance under this section, agencies shall rely on existing data collections to the extent practicable.

3) Areas of performance measurement that agencies should consider include-

a. Customer service;

b. Agency productivity; and

c. Adoption of innovative information technology, including the appropriate use of commercial best practices.

4) Agencies shall link their performance goals, as appropriate to key groups, including citizens, businesses, and other governments, and to internal Federal Government operations.

5) As appropriate, agencies shall work collectively in linking their performance goals to groups identified under paragraph (4) and shall *use information technology in delivering Government information and services to those groups.*

c) Avoiding Diminished Access: When promulgating policies and implementing *programs regarding the provision of Government information and services over the Internet, agency heads shall consider the impact on persons without access to the Internet, and shall, to the extent practicable-*

1) Ensure that the availability of Government information and services *has not been diminished for individuals who lack access to the Internet; and*

2) Pursue alternate modes of delivery that make Government information and services more accessible to individuals who do not own computers or lack access to the Internet.

d) Accessibility to People with Disabilities: All actions taken by Federal departments *and agencies under this Act shall be in compliance with section 508 of the Rehabilitation Act of 1973 (29 U.S.C. 794d).*

e) Sponsored Activities: Agencies shall sponsor activities that use information technology to engage the public in the development and implementation of policies and programs.

…"

In effect, by providing a clear-cut mandate and prescribing the deliverables, the US law has ensured that business process re-engineering in government entities gets the attention it deserves.

Several experts have underlined the importance of government processes re-engineering:

"re-engineering administrative processes and re-organization of information ownership is the most important step for implementing an e-government application. Government entities would be required to implement substantive reforms in organizational structures, initiate a change in culture and mindsets, train and improve skills of its people and put in place appropriate supporting ICT infrastructure to enable online processes that are timely and efficient for both the government entity and the entities it interacts with. Thus, the business processes would in effect be changed fundamentally to allow the efficiency and transparency gains associated with e-government."

The Commission has considered the issues involved in re-engineering of business processes in government entities. It is of the view that for every function a government entity performs and every service or information it is required to provide, there should be a step-by-step analysis of each process involved on the anvil of rationality and simplicity. Such analysis should incorporate the viewpoints of all stakeholders. After identifying steps which are redundant or which require simplification, the provisions of the law, rule, regulation, instruction, code, manual etc. which form the basis of such steps should also be identified. This should be followed by prioritizing the functions of the government entity. Following this exercise, processes should be re-designed using the tools provided by Information and Communications Technology keeping in mind the objectives of speeding up decision making, maximizing outputs, minimizing costs, improving service delivery and quality of information to be provided etc. This should be accompanied by re-formulation of the legal/regulatory framework which underly governmental processes.

The wholehearted participation of government officials within an organization cannot be overemphasized while re-engineering business processes as in the end, the technological solutions would have to be put to effective use only by them. In fact, each government organization would be required to constitute a separate team drawing from expertise available within the organization at various levels of functioning.

Once the business processes have been re-engineered and the technological solutions developed, these should be tested in real life situations to assess their functioning. e-Governance projects should not be implemented on a large scale in the very first instance. The pilot project should be designed to work in the most difficult circumstances so that the bottlenecks and shortcomings are identified during the pilot stage itself which could be redressed before any effort to upscale the project is taken. However, there should be flexibility within the whole initiative to adjust to problems thrown up at the pilot stage and a two-way feedback process should be ensured between the BPR exercise and the pilot stage with the BPR leading to the pilot stage and pilot stage leading to further changes in the BPR. The whole exercise should focus on forms, processes, structures and laws regulations.

To sum up, the Commission feels that the entire gamut of activities under Business Process Re-engineering could be classified into the following four heads:

a. Clear assessment of citizens needs.

b. Analysis of the existing processes and identification of the weaknesses and redundancies.

c. Redesigning of processes and the required changes to be made in the statues and regulations.

d. Bringing about changes – in forms, processes, structures and statutes.

Recommendations:

a) For every function a government organisation performs and every service or information it is required to provide, there should be a step-by-step analysis of each process to ensure its rationality and simplicity.

b) **Such analysis should incorporate the viewpoints of all stakeholders, while maintaining the citizen-centricity of the exercise.**

c) **After identifying steps which are redundant or which require simplification, and which are adaptable to e-Governance, the provisions of the law, rules, regulations, instructions, codes, manuals etc. which form their basis should also be identified.**

d) **Following this exercise, governmental forms, processes and structures should be re-designed to make them adaptable to e-Governance, backed by procedural, institutional and legal changes.**

Business Process Re-engineering Project of Income Tax Department

The Union Finance Minister announced in his Budget Speech of 2006 about business process reengineering (BPR) in the Income Tax Department. A Directorate of BPR was created within the Department in May 2006 which launched this exercise with the following objectives:

- Re-evaluation of all current processes to remove redundant and obsolete processes and redesign/create new processes
- Identification of stakeholder's for information, convenience of filing tax returns & documents, payment of taxes and speedier issue of refunds and the ways in which the organization can meet them
- Increase alignment between people, processes and technology
- Enhance employee involvement, skills and organizational creativity

The study has been completed with finalization of 18 reports which focused on the key strategic areas of tax administration i.e. pre-assessment, assessment, post assessment and appellate/dispute avoidance as well as key enabling processes such as information technology, human resources, infrastructure etc. This project was undertaken in two phases: an 'As-is' study phase and a 'To-be' Model stage. It was conducted at 15 locations which included metros (Delhi, Mumbai, Kolkata), mid-size cities (Hyderabad, Nagpur, Patna, Bhopal, Mysore, Lucknow, Guwahati, Ludhiana and Shillong) and moffusil areas (Hajipur, Mandya, Itarsi).

The BPR exercise has come up with, inter alia, a major recommendation of functionally segregating the working of the Department across two broad lines – a Bulk Operations Division (BOD), handling routine and repetitive activities not requiring the use of discretion and amenable to large scale automation and a Compliance Operations Division (COD) to carry out specialized activities. Currently, the same set of people is doing both these jobs. CBDT has accepted a majority of the recommendations.

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Source: 11th ARC Report

Information Technology Audit

(Extract from IT Audit Manual Volume I)

During the last decade, most of the Government Departments, Public Sector Enterprises and Autonomous Bodies have embarked on computerising their operations in a big way. Initially, computers were available only to large organizations due to high purchase and operational costs. Later the advent of personal computers and the rapid decrease in the costs enabled medium-sized organizations also to take advantage of Information Technology for their data processing. Nowadays, the widespread availability of powerful microcomputers and their associated packaged software has resulted in the extensive deployment of computers by even small organizations. Correspondingly the possibilities of data loss and associated organizational costs have increased tremendously along with new risk factors. Due to vulnerabilities of network, the danger of tampering with data by insiders and outsiders is much higher in IS systems.

In fact, with the advent and growth of computer network systems, computer systems are now Information Systems (IS). Therefore, "Information Technology Audit" and "Information Systems Audit" have an important role to play in the present day context in ensuring accountability.

IT Audit is a broad term that includes Financial Audits (to assess the correctness of an organization's financial statements), Operational Audits (evaluation of internal control structure), Information Systems Audit(including performance Audit), Specialized Audits (evaluation of services provided by a third party such as outsourcing etc.) and Forensic Audits. However, a common factor is the formation of an opinion regarding the degree of reliance that can be placed on the IT systems in the audited organization.

Objectives of IT Audit:

The objectives of IT audit include assessment and evaluation of processes that:

(a) Ensures asset safeguarding –'assets' which include the following five types of assets:

• Data
Data objects in their widest sense, i.e., external and internal, structured and nonstructured, graphics, sound, system documentation etc.

• Application Systems
Application system is understood to be the sum of manual and programmed procedures.

• Technology
Technology covers hardware, operating systems, database management systems, networking, multimedia, etc.

• Facilities
Resources to house and support information systems, supplies etc.

• People
Staff skills, awareness and productivity to plan, organize, acquire, deliver, support and monitor information systems and services.

(b) Ensures that the following seven attributes of data or information are maintained:

• **Effectiveness** - deals with information being relevant and pertinent to the business process as well as being delivered in a timely, correct, consistent and usable manner. Deals with System effectiveness – evaluating whether the IT system meets the overall objectives of top management and users.

• **Efficiency** - concerns the provision of information through the optimal (most productive and economical) usage of resources. Deals with System efficiency –efficient systems use optimum resources to achieve the required objectives

• **Confidentiality** - concerns protection of sensitive information from unauthorized disclosure.

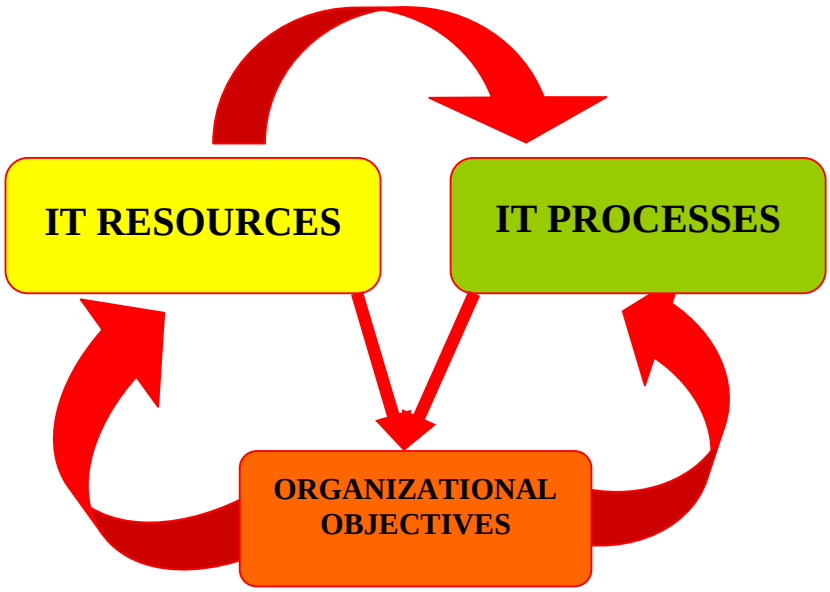
• **Integrity** - relates to the accuracy and completeness of information as well as to its validity in accordance with the business' set of values and expectations.

• **Availability** - relates to information being available when required by the business process, and hence also concerns the safeguarding of resources.

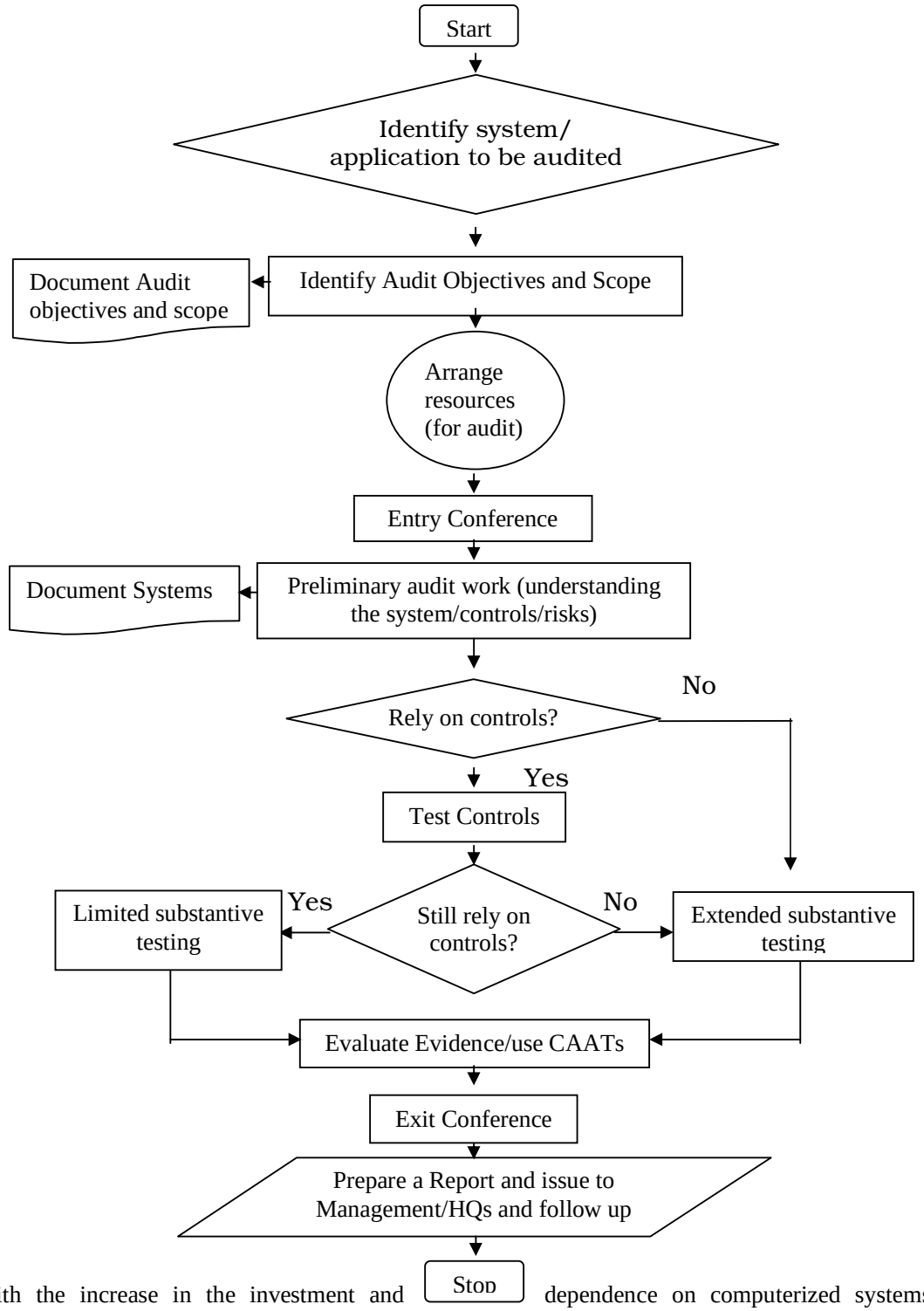
• **Compliance** - deals with complying with those laws, regulations and contractual arrangements to which the business process is subject; i.e., externally imposed business criteria. This essentially means that systems need to operate within the ambit of rules, regulations and/or conditions of the organisation. For example, an FIR to be filed normally requires signature of the complainant as per rules, and needs to be reengineered by changing the rules to permit web based complaints. Similarly, banking operations will have to conform to the banking regulations and legislation. It is also the duty of the IT Auditor to see that the work practices are in tune with the laws of the land such as the IT Act promulgated by the Government of India.

• **Reliability of information** - relates to systems providing management with appropriate information for it to use in operating the entity, in providing financial reporting to users of the financial information, and in providing information for reporting to the regulatory bodies regarding compliance with laws and regulations.

Thus, IT Audit is all about examining whether the IT processes and IT Resources combine together to fulfill the intended objectives of the organization toensure Effectiveness, Efficiency and Economy in its operations while complying with the extant rules. This can be depicted diagrammatically as follows:



IT Audit Process Flow Chart



With the increase in the investment and dependence on computerized systems by the auditee, it has become imperative for audit to change the methodology and approach to audit because of the risks to data integrity, abuse, privacy, etc. In an IT system, especially implemented in an environment of deficient controls as compared to a manual system, an independent audit is required to provide assurance that adequate measures have been designed and are operated to minimize the exposure to various risks.

Overview of Clinger-Cohen Act

(From Wikipedia, the free encyclopedia)

The **Clinger-Cohen Act** (CCA), formerly the **Information Technology Management Reform Act of 1996** (ITMRA), is a 1996 United States federal law, designed to improve the way the federal government acquires, uses and disposes information technology (IT).

The Clinger-Cohen Act supplements the information resources management policies by establishing a comprehensive approach for executive agencies to improve the acquisition and management of their information resources, by:

- focusing information resource planning to support their strategic missions;
- implementing a capital planning and investment control process that links to budget formulation and execution; and
- rethinking and restructuring the way they do their work before investing in information systems.

The Clinger-Cohen Act of 1996 directed the development and maintenance of a Federal Enterprise Architecture to maximize the benefits of information technology (IT) within the Government.

Overview

In February 1996, Congress enacted the Clinger-Cohen Act to reform and improve the way Federal agencies acquire and manage IT resources. Central to implementing these reforms is the need to establish effective IT leadership within each agency. The law requires each agency head to establish clear accountability for IT management activities by appointing an agency CIO with the visibility and management responsibilities necessary to carry out the specific provisions of the Act. The CIO plays a critical leadership role in driving reforms to:

- help control system development risks;
- better manage technology spending; and
- succeed in achieving real, measurable improvements in agency performance.

The Clinger-Cohen Act provides that the government information technology shop be operated exactly as an efficient and profitable business would be operated. Acquisition, planning and management of technology must be treated as a "capital investment." While the law is complex, all consumers of hardware and software in the Department should be aware of the Chief Information Officer's leadership in implementing this statute.

The Clinger-Cohen Act emphasizes an integrated framework of technology aimed at efficiently performing the business of the Department. Just as few businesses can turn a profit by allowing their employees to purchase anything they want to do any project they want, the Department also cannot operate efficiently with hardware and software systems purchased on an "impulse purchase" basis and installed without an overall plan. All facets of capital planning are taken into consideration just as they would be in private industry.

The Clinger-Cohen Act assigns the Director of the Office of Management and Budget (OMB) responsibility for improving the acquisition, use, and disposal of information technology by the Federal Government. The Director should aim to improve the productivity, efficiency, and effectiveness of Federal programs, including through dissemination of public information and the reduction of information collection burdens on the public. The Act supplements the information resources management (IRM) policies contained in the Paperwork Reduction Act (PRA) by establishing a comprehensive approach to improving the acquisition and management of agency information systems through work process redesign, and by linking planning and investment strategies to the budget process.

History

The "Information Technology Management Reform Act' of 1996 is later renamed "Clinger-Cohen Act" for its co-sponsors, Rep. William Clinger, R-Pa., and Senator William Cohen, R-Maine.

Definitions

In the Clinger-Cohen Act itself some terms have explicitly defined:

Information technology
: The term *Information Technology*, with respect to an executive agency means any equipment or interconnected system or subsystem of equipment, that is used in the automatic acquisition, storage, manipulation, management, movement, control, display, switching, interchange, transmission, or reception of data or information by the executive agency. For purposes of the preceding sentence, equipment is used by an executive agency if the equipment is used by the executive agency directly or is used by a contractor under a contract with the executive agency which (i) requires the use of such equipment, or (ii) requires the use, to a significant extent, of such equipment in the performance of a service or the furnishing of a product. Information technology includes computers, ancillary equipment, software, firmware and similar procedures, services (including support services), and related resources. It does not include any equipment that is acquired by a Federal contractor incidental to a Federal contract.

Information resources
: The term *Information Resources* means information and related resources, such as personnel, equipment, funds, and information technology.

Information resources management
: The term *Information Resources Management* means the process of managing information resources to accomplish agency missions and to improve agency performance, including through the reduction of information collection burdens on the public.

Information system
: The term *information system* means a discrete set of information resources organized for the collection, processing, maintenance, use, sharing, dissemination, or disposition of information.

Information technology architecture
: The term *Information Technology Architecture*, with respect to an executive agency, means an integrated framework for evolving or maintaining existing

information technology and acquiring new information technology to achieve the agency's strategic goals and information resources management goals.

Director of the Office of Management and Budget

Clinger-Cohen Act assigns the Director of the Office of Management and Budget (OMB) some ten tasks. The following list represents a selection:

Use of Information Technology in Federal programs
: The OMB Director is held responsibility for improving the acquisition, use, and disposal of information technology by the Federal Government. The Directory should aim to improve the productivity, efficiency, and effectiveness of Federal programs, including through dissemination of public information and the reduction of information collection burdens on the public.

Use of budget process
: The OMB Director shall develop, as part of the budget process, a process for analyzing, tracking, and evaluating the risks and results of all major capital investments made by an executive agency for information systems. The process shall cover the life of each system and shall include explicit criteria for analyzing the projected and actual costs, benefits, and risks associated with the investments.

Information Technology Standards
: The OMB Director shall oversee the development and implementation of standards and guidelines pertaining to Federal computer systems by the Secretary of Commerce through the National Institute of Standards and Technology.

Use of Best Practices in Acquisition
: The OMB Director shall encourage the heads of the executive agencies to develop and use the best practices in the acquisition of information technology.

Assessment of other models for managing Information Technology
: The OMB Director shall assess, on a continuing basis, the experiences of executive agencies, State and local governments, international organizations, and the private sector in managing information technology.

Other tasks are about the comparisment of agency uses of IT, training, Informing Congress, and procurement policies.

Performance-based and results-based management

Director of the Office of Management and Budget (OMB) shall encourage the use of performance-based and results-based management in fulfilling the responsibilities assigned. OMB's Director is tasked with the following responsibilities:

- to evaluate the information resources management practices of the executive agencies with respect to the performance and results of the investments made by the executive agencies in information technology.
- to issue the head of each executive agency to:
    - establish effective and efficient capital planning processes for selecting, managing, and evaluating the results of all of its major investments in information systems;
    - determine, before making an investment in a new information system:
        - whether the function to be supported by the system should be performed by the private sector and, if so, whether any component

of the executive agency performing that function should be converted from a governmental organization to a private sector organization;
        - whether the function should be performed by the executive agency and, if so, whether the function should be performed by a private sector source under contract or by executive agency personnel;
    - analyze the missions of the executive agency and, based on the analysis, revise the executive agency's mission-related processes and administrative processes, as appropriate, before making significant investments in information technology to be used in support of those missions;
    - ensure that the information security policies, procedures, and practices are adequate.
- guidance for undertaking efficiently and effectively interagency and Government-wide investments in information technology
- periodic reviews of selected information resources management activities of the executive agencies
- to enforce accountability of the head of an executive agency for information resources management

Executive Agencies

The head of each US Federal executive agency shall comply with several specific matters. A selection.

Design of Process

Each executive agency shall design and implement in the executive agency a process for maximizing the value and assessing and managing the risks of the information technology acquisitions of the executive agency.

Content of Process

The process of an executive agency shall

1. provide for the selection of information technology investments to be made by the executive agency, the management of such investments, and the evaluation of the results of such investments;
2. be integrated with the processes for making budget, financial, and program management decisions within the executive agency;
3. include minimum criteria to be applied in considering whether to undertake a particular investment in information systems, including criteria related to the quantitatively expressed projected net, risk-adjusted return on investment and specific quantitative and qualitative criteria for comparing and prioritizing alternative information systems investment projects;
4. provide for identifying information systems investments that would result in shared benefits or costs for other Federal agencies or State or local governments;
5. provide for identifying for a proposed investment quantifiable measurements for determining the net benefits and risks of the investment; and
6. provide the means for senior management personnel of the executive agency to obtain timely information regarding the progress of an investment in an information system, including a system of milestones for measuring

progress, on an independently verifiable basis, in terms of cost, capability of the system to meet specified requirements, timeliness, and quality.

Performance and Result-based Management

The head of an executive agency shall (1) establish goals for improving the efficiency and effectiveness of agency operations. (2) prepare an annual report, (3) ensure that performance measurements (4) comparable with processes and organizations in the public or private sectors (5) analyze the missions, and (6) ensure that the information security policies, procedures, and practices of the executive agency are adequate.

Acquisition of Information Technology

The authority of the head of an executive agency to conduct an acquisition of information technology includes several general and specific authorities.

E-Government Act of 2002

(From Wikipedia, the free encyclopedia)

The **E-Government Act of 2002** (Pub.L. 107-347, 116 Stat. 2899, 44 U.S.C. § 101, H.R. 2458/S. 803), is a United States statute enacted on December 17, 2002, with an effective date for most provisions of April 17, 2003. Its stated purpose is to improve the management and promotion of electronic government services and processes by establishing a Federal Chief Information Officer within the Office of Management and Budget, and by establishing a framework of measures that require using Internet-based information technology to improve citizen access to government information and services, and for other purposes.

COBIT FRAMEWORK – Executive Summary

COBIT (Control Objectives for Information and Related Technology) is an international open standard that defines requirements for the control and security of sensitive data and provides a reference framework. It is an IT governance structure and supporting toolset that allows managers to bridge the gap between control requirements, technical issues and business risks. COBIT enables clear policy development and good practice for IT control throughout organizations. COBIT emphasizes regulatory compliance, helps organizations to increase the value attained from IT, enables alignment and simplifies implementation of the COBIT framework.

COBIT Mission:
To research, develop, publicise and promote an authoritative, up-to-date, internationally accepted IT governance control framework for adoption by enterprises and day-to-day use by business managers, IT professionals and assurance professionals.

THE NEED FOR A CONTROL FRAMEWORK FOR IT GOVERNANCE
A control framework for IT governance defines the reasons IT governance is needed, the stakeholders and what it needs to accomplish.

Why
Increasingly, top management is realising the significant impact that information can have on the success of the enterprise. Management expects heightened understanding of the way IT is operated and the likelihood of its being leveraged successfully for competitive advantage. In particular, top management needs to know if information is being managed by the enterprise so that it is:
• Likely to achieve its objectives
• Resilient enough to learn and adapt
• Judiciously managing the risks it faces
• Appropriately recognising opportunities and acting upon them.

Successful enterprises understand the risks and exploit the benefits of IT and find ways to deal with:
• Aligning IT strategy with the business strategy
• Assuring investors and shareholders that a 'standard of due care' around mitigating IT risks is being met by the organisation
• Cascading IT strategy and goals down into the enterprise
• Obtaining value from IT investments
• Providing organisational structures that facilitate the implementation of strategy and goals
• Creating constructive relationships and effective communication between the business and IT, and with external partners
• Measuring IT's performance.

Enterprises cannot deliver effectively against these business and governance requirements without adopting and implementing a governance and control framework for IT to:
• Make a link to the business requirements
• Make performance against these requirements transparent
• Organise its activities into a generally accepted process model
• Identify the major resources to be leveraged

• Define the management control objectives to be considered.
Furthermore, governance and control frameworks are becoming a part of IT management good practice and are enablers for establishing IT governance and complying with continually increasing regulatory requirements.

IT good practices have become significant due to a number of factors:
• Business managers and boards demanding a better return from IT investments, i.e., that IT delivers what the business needs to enhance stakeholder value
• Concern over the generally increasing level of IT expenditure
• The need to meet regulatory requirements for IT controls in areas such as privacy and financial reporting (e.g., the US Sarbanes-Oxley Act, Basel II) and in specific sectors such as finance, pharmaceutical and healthcare
• The selection of service providers and the management of service outsourcing and acquisition
• Increasingly complex IT-related risks, such as network security
• IT governance initiatives that include adoption of control frameworks and good practices to help monitor and improve critical
IT activities to increase business value and reduce business risk
• The need to optimise costs by following, where possible, standardised, rather than specially developed, approaches
• The growing maturity and consequent acceptance of well-regarded frameworks, such as COBIT, IT Infrastructure Library (ITIL), ISO 27000 series on information security-related standards, ISO 9001:2000 Quality Management Systems—Requirements, Capability Maturity Model® Integration (CMMI), Projects in Controlled Environments 2 (PRINCE2) and A Guide to the Project Management Body of Knowledge (PMBOK)
• The need for enterprises to assess how they are performing against generally accepted standards and their peers (benchmarking).

Who
A governance and control framework needs to serve a variety of internal and external stakeholders, each of whom has specific needs:
• Stakeholders within the enterprise who have an interest in generating value from IT investments:
– Those who make investment decisions
– Those who decide about requirements
– Those who use IT services
• Internal and external stakeholders who provide IT services:
– Those who manage the IT organisation and processes
– Those who develop capabilities
– Those who operate the services
• Internal and external stakeholders who have a control/risk responsibility:
– Those with security, privacy and/or risk responsibilities
– Those performing compliance functions
– Those requiring or providing assurance services.

What
To meet the requirements listed in the previous section, a framework for IT governance and control should:
• Provide a business focus to enable alignment between business and IT objectives
• Establish a process orientation to define the scope and extent of coverage, with a defined structure enabling easy navigation of content

• Be generally acceptable by being consistent with accepted IT good practices and standards and independent of specific technologies
• Supply a common language with a set of terms and definitions that are generally understandable by all stakeholders
• Help meet regulatory requirements by being consistent with generally accepted corporate governance standards (e.g., COSO- Committee of Sponsoring Organisations) and IT controls expected by regulators and external auditors.

HOW COBIT MEETS THE NEED

In response to the needs described in the previous section, the COBIT framework was created with the main characteristics of being business-focused, process-oriented, controls-based and measurement-driven.

Business-focused

Business orientation is the main theme of COBIT. It is designed not only to be employed by IT service providers, users and auditors, but also, and more important, to provide comprehensive guidance for management and business process owners.

The COBIT framework is based on the following principle:
To provide the information that the enterprise requires to achieve its objectives, the enterprise needs to invest in and manage and control IT resources using a structured set of processes to provide the services that deliver the required enterprise information. Managing and controlling information are at the heart of the COBIT framework and help ensure alignment to business requirements.

COBIT'S INFORMATION CRITERIA

To satisfy business objectives, information needs to conform to certain control criteria, which COBIT refers to as business requirements for information. Based on the broader quality, fiduciary and security requirements, seven distinct, certainly overlapping, information criteria are defined as follows:
• Effectiveness deals with information being relevant and pertinent to the business process as well as being delivered in a timely, correct, consistent and usable manner.
• Efficiency concerns the provision of information through the optimal (most productive and economical) use of resources.
• Confidentiality concerns the protection of sensitive information from unauthorised disclosure.
• Integrity relates to the accuracy and completeness of information as well as to its validity in accordance with business values and expectations.
• Availability relates to information being available when required by the business process now and in the future. It also concerns the safeguarding of necessary resources and associated capabilities.
• Compliance deals with complying with the laws, regulations and contractual arrangements to which the business process is subject, i.e., externally imposed business criteria as well as internal policies.
• Reliability relates to the provision of appropriate information for management to operate the entity and exercise its fiduciary and governance responsibilities.

BUSINESS GOALS AND IT GOALS

Whilst information criteria provide a generic method for defining the business requirements, defining a set of generic business and IT goals provides a business-related and more refined basis for establishing business requirements and developing the metrics that allow measurement against these goals. Every enterprise uses IT to enable business initiatives, and these can be represented as business goals for IT.

If IT is to successfully deliver services to support the enterprise's strategy, there should be a clear ownership and direction of the requirements by the business (the customer) and a clear understanding of what needs to be delivered, and how, by IT (the provider). The enterprise strategy should be translated by the business into objectives related to IT-enabled initiatives (the business goals for IT). These objectives should lead to a clear definition of IT's own objectives (the IT goals), which in turn define the IT resources and capabilities (the enterprise architecture for IT) required to successfully execute IT's part of the enterprise's strategy. Once the aligned goals have been defined, they need to be monitored to ensure that actual delivery matches expectations. This is achieved by metrics that are derived from the goals and captured in an IT scorecard. For the customer to understand the IT goals and IT scorecard, all of these objectives and associated metrics should be expressed in business terms meaningful to the customer. This, combined with an effective alignment of the hierarchy of objectives, will ensure that the business can confirm that IT is likely to support the enterprise's goals.

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Source: www.isaca.org

Audit of Public Private Partnership projects

[Extracts from Draft Public Auditing Guidelines]

by
B B Pandit, Director General (Audit), O/o C&AG of India

- **Capacity building for public auditors:**
  - Identification of audit teams with multi-disciplinary skills and expertise
  - Assessment of training requirements
  - Training by internal as well as external faculty
  - Training of selected may be deputed for training to selected SAIs

- **Scope of audit** – to provide a reasonable assurance to all stakeholders including the government, parliament/legislatures, and the public that the PPP arrangement subject to audit has yielded value for money and that public interests have been adequately protected.

- **Objectives of audit**
  - To provide unbiased, objective assessment of whether public resources are responsibly and effectively managed to achieve intended results.
  - Audit should focus sufficiently well on the achievement of the contracted end products, it should not stand in the way of innovations injected into the partnerships which is one of the keys to the success of the enterprise.
  - The main objective of the audit of PPP projects is to provide a reasonable assurance to all stakeholders about the wisdom, faithfulness, integrity, economy, efficiency and effectiveness of the PPP arrangement and to ensure that the infusion of the private sector agency into the project has resulted in improving the value for money for the government.
  - The aim is to cover all aspects of the project contracting and execution, but without impacting the freedom and innovations built into the arrangement.

- **Types of documents to be audited**
  - Documents regarding the project formulation, appraisal and approval, available with the nodal ministry, promoting agency
  - Data and documents relating to the contract documents and concession award originated by and available with the public sector partner
  - Data and documents furnished to the public sector partner by the private contractor and available with the former for verification
  - Reports submitted by the Independent Engineers and Independent Auditors

- **Access to documents and records of private partner**

  - To include a clause (pending an amendment to DPC Act) in the contracts / concession agreements to provide for the audit oversight of the CAG for easy accessibility to the records and data available with the private partner.

  - In the normal course, all documents and data required by the public auditors are likely to be available with the government department and the public sector agency which promoted the PPP project.

  - In case any additional information is essential for the purpose of verifying facts and for audit evidence, the public auditors may take recourse to Paragraph 169 of the CAG's Regulations on Audit and Accounts

  - If the audit is being undertaken under Section 20 (1) or (2) of the DPC Act, and the body to be audited is either a joint venture with minority participation by the public sector agency, the sanction issued by the President or the Governor, as may be, shall include a clause requiring the body to make available all data and documents requisitioned by the public auditors.

- **Audit planning**

  - Collection of data and information on PPP projects
  - Selection of PPP projects for audit
  - Preparation of the audit plan
  - Seeking the cooperation of the private partner as well as public agencies to the PPP arrangements
  - Engaging external experts

- **Audit methodology**

  - Has to be innovative
  - Approach to audit should be dovetailed keeping in view the different types and categories of PPPs
  - To be devised to suit the requirements of the individual projects under scrutiny

- **Coverage of audit (sequential approach)**

  - Audit of bidding and evaluation
  - Audit of project formulation and approval
  - Audit of concessions and concession period
  - Audit of risk allocation
  - Audit of financial risk
  - Audit of viability gap funding (VGF)
  - Audit of tariff/toll/user charges
  - Audit of total project cost
  - Audit of construction of the project
  - Audit of monitoring of the project construction activities
  - Audit of commercial development

- Audit of operation, maintenance and development and collection of revenue
- Auditing PPPs for value of money (VFM) evaluation
- Audit of valuation of assets

[Illustrative checklists/criteria on each of the above are provided in the guidelines]

- **Audit findings, reporting and recommendations**

  - In respect of PPP projects, the important principle is to bring out in their reports, *what have been achieved* rather than *how it was achieved* by the private partner responsible to construct and manage the project.

  - The focus of the audit reports will be the review of end results rather than the *how* of achieving them.

  - Audit examination should not focus on narrow considerations on what went wrong; but must disseminate the good practices noted during the audit scrutiny for the information of all concerned.

  - Major audit findings should be presented in the Exit Conference.

  - Auditors do not focus only on technical issues at the risk of neglecting the social and economical effects of PPPs; they should also verify whether the project has met with those objectives in letter and spirit.

  - Public auditors should not give the impression that they are against reasonable and calculated risk taking by the public sector partner.

  - Though there may be no occasion to comment on the PPP policy as such, the impact of the policy on the project development and management and on the user community may be highlighted in appropriate cases, with supporting evidence.

  - Recommendations should not be routine and must help the public partner concerned to implement the project in the best public interest.

Business Models in e-Governance initiatives and Audit Issues

by

Neelesh Kumar Sah, Director (IT Audit), O/o C&AG of India

IT implementation in various organisations is almost common place today. Every part of the government is out to make use of the benefits of IT. But most of the times the government departments agencies etc are not as equipped in terms of expertise, know-how and means to plan, organize, implement and sustain an IT effort. This has prompted the governments and the departments to adopt novel means for the IT implementation and support. Various possibilities available to the Government have been from Outright Government owned and controlled to PPP, Outsourcing and finally complete privatisation.

More often than not, such means have hovered around the PPP model, i.e., the Public Private Partnership and outsourcing. We all would have heard of the term PPP since long…when the attempts at roping in large investments in various functions were made. In 1990, investments in Power sector were sought through this route. Similarly, in large infrastructure projects like the rail, road, bridge and construction, PPP have been resorted to. In most of these, it has been done primarily to bring in Private investments and their project management which is presumably efficient. The PPP in IT implementations comes in with a twist. Here the focus is not as much on investments as on gathering the expertise on IT and associated 'complexities' which is more often not available in the Government sector.

The key characteristics of PPP are:

- Private Execution & Financing of Public Investment
- Private Provisions of Services
- Private Risk
- Whole-of-Life Perspective
- Typically, PPPs have a design-build-finance-operate scheme, as opposed to design-build only which is common for traditional public investment, but there are many other variants

The various forms of PPP typically are:

- Joint Ventures
- BOO model
- BOT model
- BOOT model
- Private Initiatives model and
- Partial Privatisation model through partnering with strategic investors

Outsourcing may be considered as one of the kinds of PPP where most of the risks are transferred to the outsourced party, however, the government retains its rights of ownership of data and application systems.

To make such PPPs work, across the country, various governments have been evolving different mechanisms.

One of the most common structures in the State Governments is to create an autonomous body within the state apparatus that is referred to for any IT implementation by the state departments. In a few states, state level societies have been created which get into outsourcing contracts for the delivery of various services to the citizen. However, the common thread in all the above is that

these bodies are utilized to rope in the partners under the umbrella of PPP initiative or they go in for outright outsourcing. This diffused manner of service delivery has its own risks. They can be:

- The PPP does not necessarily improve efficiency or provide value for money
- Fails to adequately transfer risks to the private sector
- Avoids disciplines of the budget process- off budget treatment
- Very complex contracts-can be difficult to get the right balance on contract specificity
- Procurement can be lengthy and costly
- In long–term can be relatively inflexible structure
- Service delivery to the citizen at 'real' low cost but actually realising arbitrary revenue.

Audit has accordingly relevance and role in looking at the PPP models in the IT sector critically to ensure that the intended benefits to the citizen are actually delivered.

Among the above risks, the risk of non transfer or inadequate transfer of the risks to the private sector is often the case. It may happen that in states delivering the citizen services through the PPP mode, the service delivery remains confined to the urban major cities and does not get distributed across the state even though this was built into the business model. Thus the government continues with the risk of being burdened with providing services to the remote or 'not so viable' areas. This may involve creation of an IT infrastructure and a new application altogether by the states leading to problems of integration.

The discipline of budget is definitely at risk as is seen in the mode of creation itself when most of the autonomous bodies created are put out of the ambit of audit and thus avoid the accountability to the government. The autonomous bodies are even created as societies with subordinate level societies at the basic levels of the governance. The societies may carry out the functions of the government but do not have any accountability to the government being put beyond the audit ambit through the statutes creating them.

Sustenance of any IT initiative will depend on the distinct roles and responsibilities on both the partners. However, the IT contracts and the deliverables are not adequately measured up with adequate safeguards for the government. It will be common to find failures in IT projects when one of the partner pulls out, which is normally the private partner citing reasons of non performance by the government partner. In fact in many situations the service delivery is itself not so easily measurable. This may compromise on the adequate levels of service to the citizen. It is important to see here as to what the private partner has promised and what happens when the partner fails to deliver on that? The issue is not just to blacklist or levy penalties on the private partners but to see how the service delivery to the citizen is ensured in a timely manner and it is not so bound to the failure of one partner. Absence of a mechanism to monitor the SLA (Service Level Agreement) performance does inhibit any concerted effort to enforce due performance.

The issue of the ownership is still to be adequately addressed. Most of the government organisations are content with the provision of services but do not ensure adequate business continuity in the event of the failure of the service provider by not insisting on the ownership rights on the data, the application and the source codes.

The procurement in the PPP could be lengthy if the procurement process of the government and the private partner is mixed up. It is important that the efficiency in the process is ensured. But if the ownership is that to be of the government under a specific arrangement, then it is imperative for the government also to be a party to this process. In such a scenario, does the government become dependent on only the advice of the partner or is capable of assessing the requirements and the RFP (Request for Proposal) appropriately will be an issue.

As is the example in many implementations in the government, the actual users are not adequately trained in IT implementation in PPP models that envisage the operation of the system

for some time. The absence of the experience does make it difficult for the government to take over the projects. Further, continued dependence coupled with the ownership or possession of source codes, application and data makes it difficult for the government to manoeuvre.

A few of the revenue models are the fixed cost model, user charges model, revenue sharing model and the entrepreneur model. In most of the cases the private sector partner are offering the services to the citizen at certain cost which the citizen considers to be cheap in real terms. However, this compromises on the right of the citizen to be able to get such services on demand and free of charge or least/ minimal charges. Such situation may exist in contravention of Act/ rules/ regulations of the government without any modifications to them being even proposed. This further makes the IT service delivery mechanism in such cases unresponsive and compromise on the accountability to the citizen. Further, the various revenue models, especially the user charges model or revenue sharing models have the risk of indirectly increasing the burden on the government when the users of say an e-procurement system build in the costs that they incur in their bids, thus increasing the project costs they are bidding for.

The issue of the security of the data and applications in the hands of the private partner is another issue meriting attention. In many cases, it may be found that the organisations have not enforced a non disclosure agreement and have not carried out a screening of the outsourced staff. This not only compromises on the security and safety of data and applications but also on transparency and poses risks of corruption. Data and applications for the service to the citizen are owned by the government and the rights of the government on the same need to be exercised.

Ultimately, it is very difficult to assess the value delivered through such partnerships in absence of pre-determined criteria which could have made it possible to compare the pre and post implementations. Also the implementation through a particular route can not be evaluated as easily either. Efficiency in an IT implementation is in any case difficult. And then to assess or compare it with a particular model vis a vis any other, including the own effort of the government, is very difficult.

Some of the issues of the outsourcing in an IT implementation have been addressed in the Audit and Accounts Regulations 2007 of the Comptroller and Auditor General of India in its chapters on Audit in IT environment and the Audit Evidence. However, in light of the discussion above, it will call for application and involvement of rigorous and innovative methods of audit to address the need of the hour.

(The views expressed in this article are personal to the author)

Overview of selected IT Audit Reports

Information Technology review of SETU (Integrated Citizen's Service Centres)

The audit of SETU IT system conducted between February 2006 and June 2006

Introduction about SETU

With a view to harness the benefits of Information Technology (IT) for Effective and transparent functioning of the administration, Government Decided (August 2002) to provide different services to citizens through an IT based project SETU (Project) connoting a 'Bridge' for connecting Government with people. District Level SETU Societies (DLSS) registered under the Societies Registration Act, 1860 were to engage software development agencies(Agencies) on the principle of Build-Operate-Transfer (BOT) for front-end manual activities such as issue of blank application forms, stamp papers, scrutiny of documents attached with the applications, ensuring availability of required information and generating receipt of applications through software.

Non-implementation of all the phases of SETU

SETU was to be implemented in four phases. In the absence of phase-wise benchmarks/time limits as of June 2006, the SETU centres were providing the services envisaged in the first phase only.

Absence of uniformity in software

Instead of developing common software, different back-end soft wares for databases were in use in various SETU centres. Non-development of uniform software by State Level SETU Society resulted in failure to provide envisaged information at apex level**.**

Processing controls

Due to absence of provision for generating Token numbers for execution of affidavits (Nanded and Kolhapur), non availability of audit trails to trace the transactions, Generation of Affidavits without photographs the correctness in issue of affidavits and charges collected therefore could not be ensured.

Non-availability of source code

As per agreement the source code of the application software would be the intellectual property of the societies. However, none of the DLSS had obtained the source code for the SETU system in operation from the BOT agency. This will hamper the business continuity of the system.

Excess Collection of fees

SETU Centres collected fees for the services in excess of the notified amounts by the Government. The increase of the fees in some of the districts was adhoc. Citizens were charged more for issue of various certificates than the rates prescribed by Government, which led to excess collection of Rs 22.09 lakh from citizens by Collector, Thane**.**

Unspent balance of fees with SLSS

SETU system was operated on the principle of BOT by private agencies. Government, thus, failed to ensure service to citizen at a low cost. The role of DLSS in maintaining the SETU system was, thus, reduced merely to collecting service charges from citizens. Government had also directed (August 2002) that 10*per cent* of the collections made by the DLSS were to be transferred to SLSS. It was observed that the SLSS had Rs 12.96 lakh as of May 2006 towards the transfer of service charges by six40 Collectors to SLSS through DIT.

Information Technology Audit of eSeva –an e-Governance initiative by Government of Andhra Pradesh

Audit was conducted in 2002-03

Main thrust of audit report

Though Government launched a unique and conceptually a good project to put e-governance into action to provide a large number of services to citizens on one-stop-shop basis, the project suffered from lack of transparency, inefficient and ineffective implementation largely due to unpreparedness of the participating departments and inadequate coordination.

About the system

"Twin Cities Network System" (TWINS) renamed as e Seva .in 2000,developed as part of e-governance to provide speedy services across the counter by integrating several departments was implemented on Build Own Operate and Transfer (BOOT) basis under Public-Private Partnership model where Government would provide civil infrastructure and private operator would provide IT infrastructure.

System Development issues

- Feasibility study was not conducted before implementing the eSeva project and as a result, the suitability of the solution **could not be assessed by the Government**.
- Though bids were invited (June 2000) for selecting two operators for the purpose, all the centers were entrusted to only one operator without assigning any reasons thereby probing for better services to citizens through competition could not be achieved.
- Access to the systems was ad hoc on day to day basis exposing itself to high risk of lack of accountability.
- System was implemented with out System requirement study and everything was left to the discretion of operator exposing the project to serious risks of scope creep

Lack of system documentation policy

- Adequate documentation did not exist for any of the aspects relating to software, hardware, network, error handling, etc. with the e Seva.

Security of data and business continuity of the system

- There was no documented well-defined procedure for creating user accounts.
- Adequate user account management system was not in place.

- The data not being transmitted in an encrypted form between e-Seva centres and data centre.
- No alternative site had been identified for data centre activities in case of any disaster

Inadequacies in e-payments module

No evidence of periodical penetration tests to ensure security of the system conducted was available with e Seva.

Non-provision of audit trail.
Audit trail was not provided in e Seva thereby exposing the project to risks.

Information Technology Audit of e-Procurement in Andhra Pradesh

The Review of the performance of the Tender Management System1 -Component of e Procurement application was conducted (January – July 2006)

Introduction:
The State Government, as part of its e-Governance initiatives, implemented e-Procurement, for procurement of works and products, using Information Technology.

Audit findings

Fund Management
As per the Government guidelines 50 per cent of the e Procurement Fund charges collected by APTS, a state PSU, would be spent on the respective Department's IT initiatives and the remaining 50 per cent retained to sustain e Procurement project. However, there was no information available with the IT&C department on the actual expenditure incurred from this Fund.

Programme implementation

As of July 2006, two years after the orders passed by the Government to all deparments PSUs etc for using the e-procurement platform, only 10 out of 30 Government Departments, 15 out of 36 PSUs, 58 out of 134 Urban Local Bodies and five out of eight Universities were using e- Procurement.

Contractor's database was not updated rendering the auto bid module ineffective.

Conflict of Interest
Despite PWC being a partner to the technical bid, even after the selection of the vendor, Government continued to involve PWC in all critical areas like reviewing price structure and the future business model.

Intellectual Property Rights
Government was not having its proportionate share over the Intellectual Property Rights (IPR) of the TMS application despite sufficient contribution towards domain expertise for developing the tender management software.

Escrow agreement
The source code of Tender Management Software was kept under Escrow agreement so as to safeguard the interests of the Government. However, the full functionality of the TMS software had not been ensured before creating an Escrow account.

Business Continuity Plan/Disaster Recovery Plan
As of July 2006, BCP/DRP document was not approved by the Government. It was also observed that the backups were taken on disks instead of on tapes. Thus absence of a BCP/DRP system was at risk of losing important information.

Departmental Admin User ID operated by Vendor
It was noticed that all the departmental admin user IDs Departmental activities like creation of users, updating departmental masters etc. are were done by the vendor.

Security Audit
The security audit of e Procurement platform was yet to be conducted as of July 2006. Consequently, the e Procurement platform was not being used for the projects taken up under World Bank and other multilateral bank loan assistance.

Public key infrastructure (PKI) implementation
Audit trail was lost as the decrypted signature was stored replacing the encrypted one. In 2/3rd cases digital signature was blank where price bid data was stated to be digitally signed.

Audit Module
The Department was not having control over the system as

- The logs maintained were inadequate and incomplete in respect of the activities of the administrator.
- The 'Access Control' software was not activated so as to contain possible misuse of system by the Administrator.
- the Audit logs were being reviewed by the vendor itself and were retained for a period of six
  months only.

Possible Cartel formation not ruled out
In the absence of electronic payment gateway services, the payments were made manually to the departments. It was seen that though the electronic bids submitted by the suppliers ranged from 20 to 60 per NIT, hard copies of the bid documentation were actually submitted in most of the cases by one to three bidders for opening of the price bid indicating even the cartel formation is not ruled out.

Information technology review of e-readiness of Government of Jammu and Kashmir

Government of Jammu and Kashmir took various e-Governance initiatives in the State during the last decade with the objective of using Information Technology (IT) in the process of Government functioning and to bring about simple, moral, accountable, responsive and transparent governance to its citizens. The IT audit conducted between February and June 2007 covered the IT environment in the Department of Information Technology.

Audit Findings

Absence of planning

The DIT had not formulated any short or long term structured IT plan fulfilling the Government's mission. The Information Technology Unit, created after four years of conception of the e-governance initiative, remained without identification of any roles and responsibilities for about two years (1998-2000)

Due to lackadaisical approach, the pace of implementation of IT initiatives has been tardy with no visible change in the IT scenario of the State, despite the DIT having been in existence for almost a decade

Unplanned implementation of IT within Secretariat

- The software package (SKIMS Triple Plus) developed by the TCS for the State of Andhra Pradesh was accepted by J&K Government on "as is" basis without ensuring its customization as per the requirements of the State.
- Out of 430 applications in the package only 274 were applicable to J&K
- Of the 274 applications, only 18 were identified to be implemented 'as it is' and the balance required customization which was pending (June 2007).
- Out of 18applications, attendance module was the only application put live.
- The agreement with TCS provided for only the Gap analysis of the software and other applications required to be developed as part of customization vide GAP analysis report were not developed (June 2007)

Citizen Centric Services
As per Content Development Plan about 20 citizen centric services were identified to cater to the information to local populace at block level through the Community Information Centres.
However, except for information on *Haj* pilgrims and data on Below Poverty Line population, no other services were made available through them.

Establishment of Jammu & Kashmir Wide Area Network (JKSWAN)
The efforts to establish (March 2000) a State wide network (JKSWAN) that would serve for egovernance did not materialise since the government had not taken any follow up action.

Non-utilisation of funds received from GOI
The GOI provided assistance under National e-Governance Plan (NeGAP) for (2004) ten Projects within the domain of State Government explicitly meant for capacity building through which business process re-engineering financial viability and change management aspects of e-governance project were to be provided thrust during conceptualization and development phase. Only miniscule fund could be utilized. Further, the Central Assistance received during 2005-07 was surrendered by the Government in 2006-2007
Efforts for realising policy mission on e-Governance laid down in the IT policy of the State for encouraging e-tourism, e-health and e-commerce in the state were yet to be initiated.

COMPUTERISATION OF EMPLOYMENT EXCHANGES

During the Eighth Five Year Plan period, GOI introduced a centrally sponsored scheme for computerisation of employment exchanges in phased manner Computerisation of 40 employment exchanges in the state was taken up along with network connectivity and the work was entrusted to the Electronic Trade & Technologies Development Corporation Limited on turn-key basis.

The IT audits were conducted during June--July 2002 (Kerala) ; June 2004 and March 2005 (West Bengal) ;and December 2005 to April 2006 (Maharashtra) .
The main audit objectives were to evaluate:

- the efficiency and effectiveness of the system
- the completeness and correctness of data
- the generation of employment statistics
- the adequacy of security controls to ensure the integrity of data.

Issues highlighted in the reports

In West Bengal, as on the date of audit

- the computerised system installed in the employment exchanges were found lying inoperative for more than 3 years (as on March 2005) owing to abandonment of work by the vendor and a default timer based lock implanted by the vendor.

In Maharashtra, as on the date of audit

Earlier package with Oracle implemented during 1997-99 (expenditure of Rs 2.06 crore) was left incomplete and the later package 'Rojgar Mitra' developed (2001-02) in DB2 continued to have the same deficiencies of the old package also.

In Kerala, as on the date of audit

Timely delivery of the software by NIC was not ensured due to the absence of any agreement with specific time frame and that led to delays in implementation.

Lack of documentation on system development

In all the states

1. No documents relating to the system were available.
2. User requirement specifications (URS) and system requirement specification (SRS) were not available
3. No user manual had been prepared

In the absence of proper system documentation when the on-line operation stopped functioning in eighteen employment exchanges in West Bengal, the system could not be made functional.

Design and functional deficiencies in the system

In Kerala,

- The modules relating to registration, renewal and lapse of registration were bot being used properly thereby leading to risk of payment unemployment assistance and sponsoring the same candidate repeatedly.

In West Bengal,

- No unique code had been designed for the employment exchanges.
- No provision for data entry in respect of vocational training facilities.
- No provision for identifying the employment status of the registered candidates

In Maharashtra,

- The details regarding candidates getting placement or employment were not entered in the system.
- surveys to identify the employers had not been conducted since the last five years for better coverage of the employers

Input controls and validation checks

The systems in all the states had deficient Input controls and validation checks which made the data incomplete and unreliable.

These discrepancies were likely to result in granting undue seniority benefits.

Following were additionally observed in Maharashtra

Access controls

A generalized user ID and password was known to all the system users to access the data, thus, the accountability was blurred /could not be ensured.

Audit trail

Audit trails available in the system were not invoked.

LOCAL BODIES

Information Technology (IT) Audit of Property Tax application in Navi Mumbai Municipal Corporation(NMMC)

(Audit Report (Local Bodies) for the year ended March 2006)

The general objective of the computerization of property tax functions was to reap the benefits of information technology to improve operational performance besides providing error free and better services to the tax payers. However, even after nine years of computerization, NMMC could not evolve an error free application. NMMC did not maintain proper input records to support data entries relating to assessments. It was seen that standard input documents/ forms or a standard process were not being used to enter information into the system. It was also found that classification of properties, essential for calculation of tax with respect to the usage and property structure was not correctly captured in the system. Lack of sufficient input controls along with inadequate monitoring resulted in incomplete and incorrect database. This led to irregular fixation of rateable value and non-adherence to the conditions of minimum rateable value, there by impacting the collection of revenue. MIS reports in respect of demand and recovery were not designed in the application. Receipts entered in the system were not reconciled with manually reported totals received from banks/ward offices indicating poor management controls. Poor security controls and lack of audit trails made the system vulnerable to unauthorized manipulation.

Computerised Billing and Collection in the Chennai Metropolitan Water Supply and Sewerage Board

(Audit Report (Civil) for the year ended 31 March 2005)

- Incorrect adoption of 'Usage of a Property' (domestic, commercial, etc.) having a bearing on the calculation of Water/Sewerage Charges resulted in short raising of demand.
- Failure to adopt the latest Annual Value of property, which is the basis for demanding Water/Sewerage Tax resulted in short assessment of Tax.
- Assigning of more than one Identification Code to the same assessee resulted in raising of demands against both codes and artificially boosting the accrued income of theBoard.
- Incorrect posting of collections, non-withdrawal of credits posted for cheques that were subsequently dishonoured, etc., resulted in overstatement of the demands raised.
- Lack of controls to ensure complete transfer of updated data from the Corporation relating to Annual Value of assessed properties resulted in under assessment.
- Due to non-matching of assessee codes between the Corporation and the Board, upward revision of annual value of properties could not be entered into the Board's computer system.
- The Board raised demands on eligible assesses not in the assessee list

EDUCATION

INFORMATION TECHNOLOGY AUDIT OF THE DIRECTORATE OF EDUCATION

(*Report on Government of NCT of Delhi of 2008*)

The MIS system which was one of the biggest initiatives of the IT processes of the Directorate of Education, Delhi, had been found to have weak input controls and validation checks which had considerably limited the utility of the system. The planning for the system requirement was deficient and feasibility studies were not done before undertaking the project. This also resulted in absence of audit trail as it would have required more resource. Deficient planning had meant that there were integration issues among various modules. There was an unacceptable level of manual overrides which affected the integrity of the data. Due to deficiencies in modules the Directorate had to resort to manual interventions leading to risks to the data integrity apart from duplication of work. Thus the basic purpose of modules was not being served.

IT SYSTEMS OF ORISSA PRIMARY EDUCATION PROGRAMME AUTHORITY

(*Audit Report (Civil) for the year ended 31 March 2007*)

Review of different IT systems developed by the OPEPA disclosed deficiencies in the System Development planning when adhoc and arbitrary approaches were adopted. There were

various rounds for the collection and feeding of data in a computerised system but each was marred by the improper planning like incorrect sequencing of the acquisition of hardware and software, deficient system and database designs etc. These resulted in the incomplete capture of information. The systems developed also had deficient application controls leading to incorrect data in the database. Thus the reliability of information in the databases was questionable. The system was developed with the view to capture information using the ICR technology. However, the controls on the input through the ICR could not be exercised leading to incorrect inputs into the database. Moreover, the use of the ICR technology itself was questionable as it was a costly alternative and was adopted through a justification which was on patently incorrect basis. Further, more than 24 lakh records pertaining to childless households were collected and input into the system leading to excess expenditure. Thus adoption of ICR technology led to development of an unreliable, inconsistent and erroneous database of children at a cost of Rs 5.05 crore during OCC-2005. The CTSVU-2006 system developed at a cost of Rs 2.76 crore to rebuild the database of OCC-2005 also failed due to defective software, absence of supervision and monitoring. Due to faulty planning, implementation of EPIS and the GIS remained incomplete, as well, overshooting the scheduled dates of completion after incurring expenditure of Rs 2.64 crore.

RAILWAYS

Computerised Passenger Reservation System of the Indian Railways

Audit was conducted in 2007

Audit findings

Deficient acquisition and maintenance of hardware

The terms of AMC regarding maintenance of minimum of 25 per cent of spare modems and multiplexers (MUX).were not followed and resulted in inconvenience to the public.

Deficient system design

- The PRS had a number of deficiencies, which posed not only operational difficulties but also a higher risk of security due to the manual interventions required.
- Manual intervention and issue of blank paper ticket was resorted to in case of a link failure before printing the ticket,
- The facility of current day reservation was not available on some locations were done manually.
- Though the problems in the system existed for more than three years, they were not rectified.
- Coaching Refund System developed for granting refunds in cases where passengers failed to turn up or discontinued journey which was not possible through the PRS was not fully integrated with PRS and as a result, the operator had to toggle between PRS and CRS to process refunds.
- Concession codes for all the categories of passengers were not provided in the system

- no provision was built into the system to book such concessional tickets like concessions were admissible for the escorts of blind and mentally retarded children below the age of five.
- the slip coaches/trains resorted to ,where there are no direct trains from originating station to destination stations were not defined in the system

Booking quota

Various quotas for accommodation in trains were not properly managed resulting in decrease in availability of seats, which resulted not only in loss of revenue to the Railways but also provided scope for malpractices.

Booking of accommodation on fictitious names

many passengers were found to be booked with single letter names and with such passenger names as 'TBA', 'ANKL', 'PTY', 'Cricket player', 'Railway courier', 'PayBill Clerk' etc., without indicating ages.

Deficient controls for generation of pre-bought tickets

For journeys involving more than one lap, the PRS did not check whether the scheduled arrival time of the first train was prior to the departure time of the second train before issuing the pre-bought ticket for the second lap of journey.

Non-allotment of vacant berths earmarked for tatkal quota

vacant berths earmarked for Tatkal Quota were not released to the waitlisted passengers, resulting in under-utilisation of accommodation and depriving the needy passengers

Distance between stations

The distance for the up direction was different from the distance for the down direction

Allotment of same berths to different passengers

- same berths were allotted to different passengers by the system
- berths were allotted through current booking against berths already booked

Incorrect setting of train status

As refund amount was calculated on train status', setting the status at the appropriate time was very important. There were discrepancies noticed in setting the status of some trains

Compact accommodation

System at the time of final charting, in a single PNR ticket containing 5 passengers, four confirmed passengers were given berths in one coach and the RAC passenger was accommodated in another coach without giving compact accommodation, despite availability of vacant berths in the same coach.

Unreserved Ticketing System in Indian Railways

The existing railway ticketing system software namely Scalable Modular Advanced Rail Ticketing System (SMARTS) which was implemented (1998) over IR for issuing unreserved tickets was replaced with (2001-02) a new System -Unreserved Ticketing System (UTS). UTS has since been replicated in all the zones of Indian Railways. UTS provides the facility to purchase unreserved tickets three days in advance of the date of journey

Audit/Review of the UTS system conducted during 2008

Audit findings

Implementation

- The implementation of UTS in 12 out of the 16 zones was running behind Schedule on account of inordinate delays in acquisition of hardware
- Despite the known vulnerability of manipulation with dot matrix printers by the booking clerks and inherent advantages of having thermal printers, IR proceeded with bulk purchases of dot matrix printers across all zones. Instances of manipulation of tickets generated through UTS were already noticed in ECR, NR and WCR.

Deficient communication network

- Though communication link failures in the channels provided by BSNL/MTNL were extensive, IR did not have any mechanism to ensure minimum guaranteed efficiency of leased lines.
- IR's plan of providing thin clients in smaller stations experiencing frequent link failures has remained unachieved even after a lapse of about five years.

Deficiencies in system design

- Provision to issue concessional tickets like /students/industrial workers traveling in group, Teachers honored with National Awards were not made in the system.
- no provision to issue circular journey tickets to passengers.
- no provision for cancellation of un-travelled portion of a ticket
- The system does not provide for issuing a receipt for clerkage charge when unreserved tickets are cancelled
- No provision for realisation of the cancellation charges of UTS tickets subsequently reserved through Passenger Reservation System (PRS). These jobs were done manually
- No provision to account for the cancellation of 100 per cent concession vouchers such as military warrants etc
- UTS was generating incorrect accounting reports
- UTS also restricted the maximum number of passengers per ticket to four which was of inconvenience the passengers.
- UTS has not yet been integrated with other accounting systems like AFRES. Therefore online information of UTS earnings or apportionment of UTS earnings over different zones could not be provided through UTS

Inadequate disaster recovery and business continuity arrangement

- A disaster recovery and business continuity plan was not formulated
- Although back up servers were available, the mechanism of accessing the back up servers and the data stored in them were not tested leading to operational problems
- Off site storage of data were also not provided in some zones

Inadequate physical access and environmental controls

- no effective mechanism to restrict unauthorised entry
- At many locations, the booking offices were prone to water seepage.

Inadequate logical access controls

The IT security practices were deficient with inadequate physical and logical access controls as a result of which the system was exposed to unauthorised access and the IT assets were not adequately protected

- IT supervisory privileges were carried out by the booking clerks
- User IDs of clerks, who went on long leave or were transferred to another booking location or retired from service were not blocked/deleted and the system was therefore prone to unauthorised access.
- As against the requirement of the length of passwords (10 digit alphanumeric characters). The system accepted only the 6 digits at the maximum
- no restriction on minimum length of passwords password
- passwords were not changed since installation of UTS

Deficient change management

Changes to be made in the software were not analysed properly and often implemented in correctly.

- When the second class fare was reduced by one rupee (1 April 2007) the changes were incorrectly made to reduce the fare of superfast trains also.
- The changes in tariffs were not carried out in the system in a timely manner resulting in improper levy of fares from passengers.

Inadequate training

- Most of the users in SWR were not trained and in NEFR, training was organised for a very limited period

Inadequate validation control for tickets

System allowed

- issue of advance journey tickets for non-suburban stations for distances less than 200 Kilometers which was not permissible
- cancellation of non-suburban tickets even after three hours of departure of last train

The rule itself was prone to misuse and frauds in case of un reserved tickets issued for short destinations where a passenger could perform his journey in the morning and return to the ticket issuing station the same day and cancel the ticket

Inadequate validation of fares and distances

- Differences in the distances recorded between stations in the route database as compared to the actual distances which led to undercharge / overcharge of fares.

- Discrepancies were noticed in the distances between the same pair of stations resulting in irregular computation of fare.

Inadequate validation of routes and blank paper tickets

- Several routes were not defined in the database and therefore the journey tickets could not be issued for many stations through the system
- Blank paper tickets were also issued for stations whose routes were not specified in the system.

Inaccuracies in database

Station names were duplicated with different station codes, stations were wrongly specified and the database contained various inconsistencies casting doubts on its reliability

- the minimum age for availing senior citizen concession was recorded as 12 years
- Daily statement of cancelled tickets generated at Railway stations and zonal levels indicated variations.

Summary of audit findings relating to IT Audit of Computerization of Land Records

IT Audit	Major Audit Findings			
Computerisation of Land Records in Tamil Nadu (Audit Report (Civil) for the year ended 31 March 2003)	Against a period of three years fixed initially for the completion of the scheme, it was extended repeatedly without adhering to the target. The scheme is still in the initial stage even after 13 years.	The data computed by the external agencies were with lot of errors. To ensure correctness of the data a fresh check-list was prepared and the process of correcting the errors were commenced in 1998 and still going on and only 65 out of 206 taluks the process of correction is complete.	The system was not provided with adequate controls to ensure completeness and correctness of data rendering the data unreliable. Land Taxes were incorrectly projected. Categories and types of land were not correct. Government lands were declared as private lands and vice versa. Names of property owners were left blank.	71 *per cent* of the records required correction, as the relationship (like son of, daughter of, wife of, etc.) was captured incorrectly. In many cases relationship field was blank.
"Bhu Abhilekh" system in Madhya Pradesh (Audit conducted from March 2006 to August 2006)	Computerisation of land records was not yet complete as RORs were still being issued to landowners in manuscript.	Updation work of database was not carried out in 18440 villages due to diversion of services of EDP staff and because of lack of monitoring.	Discrepancies were noticed in the database due to absence of input controls and lack of proper validations at tehsil levels.	There was lack of general IT controls in the absence of any IT policy/ strategy in the department.
'BHUIYAN' in Chattisgarh (Audit conducted during April 2006 to July 2006)	The department failed to utilize Central assistance of Rs.6.24 crore, Rs.1.57 crore received during 2001-02 was diverted for purposes other than specified in allotment, Rs.4.40 crore	Avoidable expenditure of Rs.24 lakh on software, unfruitful expenditure of Rs.22.57 lakh on hardware, diversion of hardware to ineligible persons was noticed. Undue benefit of Rs.2.47	The system was not provided with adequate controls to ensure completeness and correctness of data rendering the data unreliable. The department did not	The data computed by private firms were with blank fields and full of errors due to this system was fraught with risks of generating incorrect ROR. Further, invalid coding, variation

	was irregularly drawn and kept in cash/ savings banks account to avoid lapse and utilization certificates were furnished even after having unspent balances.	crore to private firms for data entry operations, unfruitful expenditure of Rs.1.29 crore on final printouts of khasra and khatauni, and infructuous expenditure of Rs.45.68 lakh on digitization of cadastral maps was noticed.	prescribe adequate controls in the system design. Trial run and testing of the software was neither conducted nor documented. There was no built in control for validation of data for linking it with the provisions of land records.	in ported data, double account and inconsistencies in subsidiary files was noticed.
Computerisation of Land records in Maharashtra (Audit conducted from May to July 2004)	**Lack of definite time frame**. The GOI which financed the project or the Government of Maharashtra (GOM) which implemented it, did not set any specific target date for implementation of the project..	**Lack of documentation-** Neither user requirement specifications were framed nor had NIC done proper system study/analysis and prepared System Requirement Specification (SRS) report for software for acceptance of the department	**Delay in capture and lack of validation of data-** The software developed by the NIC did not cater to the Land Information System (LIS) required by the department as it was not user friendly and the system did not provide for constant updating and manipulation of data.	**Deficiencies in database design and application software-** Non-capturing of the earlier entries pertaining to 7/12 extract in the computer resulted in denial of an essential facility available in the manual system. There was no control to ensure that the areas of all the subdivisions were captured correctly in the application

Computerisation of Land Records in Tripura (Audit Report for the year ended 31 March 2007)	Lack of definite time frame and effective monitoring led to indefinite delay in the implementation of the scheme. Tardy implementation was evident from the fact that the scheme, which commenced in 1991, was not yet complete even in the pilot district.	Due to lack of validation controls, program error, lack of interrelation among various tables and faulty data type description, the consistency, integrity and reliability of the data had been compromised.	Mouja-wise total area of land available in manual records did not tally with Khatian-wise total area of land and plot-wise total area of land available in the database. Due to non-utilisaiton of computers, generators and other peripherals expenditure of Rs. 1.14 crore remained idle.	Due to non-adoption of any business continuity policy, no back-up was being taken for mutation orders and the offsite storing of monthly database back-up was not regular. No testing procedure to check the back -up data had been adopted.
Computerisation of Land Records in Uttar Pradesh (Audit conducted from May to August 2007)	Access controls were weak and Business Continuity Plan and Disaster Recovery management On- site training to officials was incomplete.	The information stored in the database was full of errors and important details were missing in the computerized database, thereby, compromising reliability of 'Record of Rights' to land holders.	Mutation orders were being updated with delays and not within prescribed time limit.	Due to inconsistencies in database design and structure of table in different tehsils, it is difficult to integrate data for generation of Management Information System (MIS) reports for planning and development purposes.
Land Record Computerisation in Goa (Audit conducted from June – July 2007)	In the absence of individual maps of sub-divisions/surveys and interface between Dharani and Cadastral Maps, copies of maps could not be issued to public instantaneously	Partitioning of a sub-division into two sub-divisions with larger area than the original area was possible due to faulty system design.	Lack of input controls and validation checks resulted in incomplete and incorrect data base leading to pendency of mutation requests and mutation of properties having other rights like	

	and public had to approach Director of Settlement and Land Records (DSLR) for maps and Mahiti Ghars or Mamlatdar offices for Records of Rights (RoR) copy separately.		mortgage, general power of attorney etc.	
Land records Computerisation in Gujarat (Audit conducted from February 2007 to June 2007)	There were major deficiencies in input, access, operation and security controls. Duties as defined to various functionaries were exercised by others. Absence of proper access controls exposed the system to the risk of unauthorized use.	Digitization of cadastral map in 131 villages at an expenditure of Rs 98.56 lakh could not yield any fruitful result.	Computers procured were utilised for other purposes.	Scanners purchased for e-Dhara kendras at an expenditure of Rs 17.01 lakh remained unutilised. In addition to the provision as per guidelines, 26 servers at a cost of Rs 34.91 lakh were purchased for taluka offices.
Land Records Computerisation in Karnataka (Audit conducted from February 2007 and November 2007)	There was no mechanism for off-site back up of data and to record that the back up was actually taken and periodically tested independently that they were retrievable.	The system lacked various controls to ensure complete data accuracy and reliability.	Names of the land owners in 99,186 cases and khata numbers in 53,055 cases were recorded as junk characters in 3 taluks test-checked. Extent of land was recorded as zero in 53,069 cases in 3 test-checked taluks. Also data in several fields were found incorrectly captured.	The incomplete data in original records carried to the database needed to be cleaned up to facilitate achievement of objectives like planning at grass-root level, *etc.* There were delays in updation of crop data; updation was also incomplete.

Summary of audit findings relating to IT Audit of Computerization of Treasury Computerisation

IT Audit	Major Audit Findings			
KOSHWAHINI - Computerisation of Treasuries in Maharashtra (Audit conducted from April to August 2005)	The system development methodology adopted was purely ad-hoc and in the absence of proper documentation the Department could not manage and monitor the development and implementation of the system and was completely dependent on the National Informatics Centre, the developer of the system.	No Master Plan was prepared for each approved project for maintaining control over the project and for monitoring the time and cost incurred throughout the life of the project. There was no proper disaster recovery plan; validation checks and security controls were also not properly laid down and followed resulting in high risks in the System.	The accounting requirements, records and functions at the treasury level still remained to be computerised. Due to non-completion of Bank Reconciliation module reconciliation was done manually & as such, the correctness of receipts and payments was not verifiable.	As the Drawing and Disbursing Officer register was incomplete and not authenticated, 12,554 Drawing and Disbursing Officers appearing in the Drawing and Disbursing Officer master table were not verifiable. Drawing and Disbursing Officers were allotted two codes. Of these some had operated both the codes and drawn bills. There was no one-to-one link between the cancellation of original and issue of fresh cheque in the system. As such, the correctness of 232 cheques amounting to Rs 1.89 crore drawn by the Pay and Account Office could not be verified
Online Treasury Information System in Haryana **(**Audit Report	Test checked treasuries were using different versions of the Online Treasury Information (OTIS) software. In the absence of a proper input control, the OTIS	Due to improper data entry at the bill passing clerk and Treasury Officer levels, the OTIS database depicted an inflated	The procedure for data entry was not followed in the treasuries. In 23,653 cases, the transaction dates (the date on which the bill was received) were	Though required under Treasury Rules, no provision for revalidation of bills was made in the software. As a result, the database showed in

(Civil) for the year ended 31 March 2006**)**	application software was accepting all form codes of bills instead of the form codes which the major head of account was required to process.	picture of expenditure. In the absence of a validation check between the drawing and disbursing officers (DDOs) and head of accounts, a DDO was able to draw and encash bills from a head of account for which he/she was not authorised to operate.	the dates later than the voucher dates (the date on which the payment was made).	18,043 cases, involving an amount of Rs 103.63 crore, that the banks had made payments after the currency period of ten days of their passing.
e-Kosh in Chattisgarh (Audit conducted from February 2007 to May 2007)	There was no documented IT Policy. Documentation of various stages of system development was also inadequate.	Data analysis of four treasuries revealed that 269 contingent bills amounting to Rs 2.13 crore were passed without allotment check resulting from incorrect categorization of bills.	Out of 23.32 lakh and 16.17 lakh transactions in Central Server during the year 2005-07, 44,676 and 17,026 had accounting classifications that did not exist in the budget.	Budget figures of 2006-07 on the system did not reconcile with budget book in case of 22 grants. Eighteen bills amounting to Rs 1.04 crore were passed on 31 March 2007 without obtaining Finance Department's orders in contravention of the codal provisions. Bills of Rs 42.68 lakh pertaining to a financial year 2005-06 were passed fter close of that financial year.
Computerisation of State Treasuries in Uttar Pradesh (Audit Report	Study of the Users Requirement was not undertaken which led to frequent changes in software versions. There was no record of approval of	Physical and logical access controls were inadequate in absence of documented password policy and user logs were not	The system of payment of pension through the computerized system was not effective as data relating to pensioners was not validated.	Budget control upto object head level was ineffective as expenditure in excess of budget provision and Drawing and Disbursing Officers' allotment was

(Civil) for the year ended 31 March 2007)	the System Requirement Specification document. Change request statements were not documented and records of testing and acceptance of the amendments carried out were not maintained	maintained. Re-appropriation orders were not validated leading to incorrect re-appropriation in test checked treasuries.		incurred through correction of expenditure option.
Computerisation of Treasuries in Rajasthan (Audit Report (Civil) for the year ended 31 March 2007)	User Manual was not available in 10 out of 11 test checked treasuries. There was no documented Information System Security policy and password policy. There was no record of testing and acceptance.	Transmission of data between sub-treasuries and treasuries through floppies/tapes without appropriate security precautions made the data vulnerable and open to unauthorised manipulation(s).	Absence of Treasury Wide Area Network resulted in non-interlinking of sub-treasuries, treasuries and Directorate of Treasuries and Accounts. Function of Treasury Computerisation System was reduced merely to compilation of transactions and no information was retrievable from the system for macro level budget monitoring and financial management.	Some modules of the planned system were not implemented and some were partially implemented (June 2007) in the test checked treasuries. Incomplete and inaccurate data in master file and non-validation of input data in Data Depository System resulted into presence of unreliable data.
Computerisation of Treasuries in Tripura (Audit Report for the year ended 31 March 2007)	There was a delay in implementation of the system. Non incorporation of important modules like PLA, Pension, Deposit and Stamp account etc led to only limited use of system.	Deficiency in designing of database structure resulted in slowing down of the system. In the absence of change management control policy, different versions of application software were being run in treasuries and sub-treasuries thereby	Lack of adequate processing controls resulted in payment of bills other than salary/wages being passed under salary/wages sub-object head without ascertaining the availability of funds in the concerned head of account.	Discrepancy in the figures of expenditure generated by the system and actual payment made by the treasury were noticed, due to generation of expenditure reports from allocation table instead of actual payment transaction tables. In the absence of segregation of

		increasing the risk of non recovery of data in the event of data loss due to disaster like virus attack etc.		duty, the treasury personnel were performing the duties interchangeably and in some cases the data entry operators were virtually discharging the duty of Treasury Officers. This posed a major risk to the system.
Kerala Treasury Information System (Audit conducted from August 2003-January 2004)	There was no record of testing and acceptance of the TIS version 3.0 software by the Department.	Treasury Wide Area Network for interconnecting the treasuries and Data Centre vital for updating master files and macro level budget monitoring had not yet been set up.	Report generation in respect of Personal Deposit/Savings Bank transaction was defective. Improper data validation in the case of Savings Bank Accounts resulted in inflating of the balance to the extent of Rs 310.73 crore.	Saving Bank Account, Personal Deposit Account and Fixed Deposit Account balances were increased by Rs 4.62 crore, Rs 103.30 crore and Rs 211.60 crore respectively using the facility in TIS for alteration of balances, without any supporting documents to verify such transactions.
'Khazane' - Computerisation of Treasuries in Karnataka	Codal provisions were ignored while awarding the contract for establishing network connectivity.	The System was not able to take care of the relevant rules for adjustments of NDC bills against AC bills. The System was ineffective in ensuring correctness of payments made to the Housing Development Finance Corporation.	The System either did not have proper input validations or these validations were bypassed resulting in violation of various financial and service rules.	The System did not facilitate uploading of budget related data from the Finance Department Package. Inadequate security arrangement exposed the IT assets and data to risk of damage/misuse, while change control procedures were inadequate. The back up

				data was not stored off-site which may lead to avoidable loss of data in case of crashes.
On Line Treasury Information System & e-Pension Software in Himachal Pradesh (Audit Report (Civil) for the year ended 31 March 2007)	The User Manuals, Operational Manuals and System Manuals were not available in all the test checked treasuries.	Department had not formulated and documented any Disaster Recovery Plan. There were no documented procedures indicating frequency for taking back up of data, its storage and restoration. The Treasury Officers were taking back ups on an adhoc basis.	Due to absence of input controls, possibility of double drawal of bills in OLTIS and overpayment/ incorrect payment of pension existed. No checks were exercised to monitor expenditure vis-à-vis budget provisions by the Treasury Officer at the time of passing the bills.	Allocation of payment of DA arrears to Punjab Government was not made in e-Pension software. There was no provision of revalidation of bills after expiry of the currency period in OLTIS module. Absence of validation checks resulted in DDOs operating head of accounts for which they are not authorised.
Treasury Computerisation in Assam (Audit conducted from April-June 2007)	Only one out of the five modules had been implemented (May 2007) even after 4 years of implementation of CTMIS at a cost of Rs.13.3 crore.	Back up policy was ineffective and off-site storage of back up was not ensured, thereby exposing the system to risk of non-restoration in the event of a disaster.	Non-mapping of business rules and checks prescribed under Assam Treasury Code make the system incomplete and ineffective. An expenditure of Rs.2.39 crore on implementation of Treasury Accounting and Application software (TAAS) turned out to be unfruitful.	Inadequate security policy made the system vulnerable. Network system was also not protected by antivirus programme. Presence of redundant data made the database inconsistent and un-reliable.
Treasury Computerisation in Madhya Pradesh	Due to inadequate validation, 1,403 Drawing and Disbursing Officers were allotted more than one code and some of them	There were no validation checks in the software to flag excess expenditure on account of discount	Deficiencies in the design of the software led double drawal of Rs. 10.55 lakh on duplicate bills. DDOs could draw and encash bills	Analysis of MIS reports generated by the system revealed huge mismatch between RBD figures and other figures generated by

(Audit conducted from April 2007 to October 2007)	operated both the codes to draw and encash bills. Further, the data contained in DDO master table was incomplete and incorrect.	allowed/ commission paid to stamp vendors over and above the budget allotment. Inadequate password controls rendered the data vulnerable to unauthorized access/modifications. Disaster Recovery Plan was not formulated and Rs.1.30 crore meant for this purpose was diverted for making other expenditure.	through the system in contravention of Treasury Rules.	the SFMS package and those prepared manually, which seriously undermined the reliability of the data generated by the package.
Treasury Computerisation in Punjab (Audit Report (Civil) for the year ended 31 March 2007)	The software was developed and implemented without formulation of Information Technology strategy and without adoption of a System Development Life Cycle approach and Information Technology security policies. There was no evidence to suggest that comprehensive acceptance testing was done before implementing the computerised system.	The Directorate failed to incorporate input/ validation controls in the iTISP despite adoption of software six years ago thereby causing passing of bills without removal of objections, with duplicate bill numbers, on dates prior to the date of its receipt, etc.	Due to lack of coordination between the Directorate and National Informatics Centre, mapping of some business rules, one to one link between cheques issued in lieu of cancelled cheques and audit trails provisioning could not be done in the software so far.	The objective of providing web-based linkages with banks and Finance Department was also not achieved, though planned in October 2004, thereby affecting monitoring of ways and means. Password policy, back-up policy, disaster recovery and business continuity plans was not framed and documented.