FINANCE DEPARTMENT

5.3 IT audit of Computerisation of Treasury Operation System

The Government of Tripura initiated the Computerisation of Treasuries Operation System (CTOS) in 1998, which was implemented in all the Treasuries and Sub-Treasuries by 2003-04 at a cost of ₹ 1.47 crore. Subsequently, in 2010, the State Government decided to upgrade the CTOS from Client Server Architecture to Web Based Online Treasury Operation System (WBOTOS) to achieve better financial management. Further, during 2014, it was decided to include additional three modules namely budget preparation and funds management, integration of Public Financial Management System (PFMS) and integration with bank portal for direct payment from treasury through e-payment.

The online system was developed using Oracle 11 g Relational Database Management System under Dot Net Architecture and implemented in all the treasuries and sub treasuries in 2015-16. However, the budget module, integration with bank portal and integration with PFMS had not been developed/achieved. Audit of WBOTOS was conducted to evaluate the efficiency and effectiveness of the system as well as the adequacy of the controls in terms of the stated objectives of the system.

Highlights

Implementation of WBOSTOS was not fully completed. Integration with PFMS had not been achieved.

(Paragraph 5.3.7)

There was no provision in the system to capture the data relating to submission of Detailed Countersigned Contingent Bills so that the treasury officer could generate reports to ensure that no Abstract Contingent Bills was pending for adjustment beyond prescribed periods.

(Paragraph 5.3.9.2)

The computerised system was not maintaining the balances under 8443-Civil Deposit head. This led to inability of the system in facilitating the checking of balances under Civil Deposits while passing the relevant bills.

(Paragraph 5.3.9.4)

Non-activation of audit trail and weak logical access controls rendered the system vulnerable to unauthorised access.

(Paragraphs 5.3.10.1 and 5.3.10.2)

5.3.1 Introduction

The Government of Tripura initiated the project Treasury Operation System (TOS) in 1998 to computerise all the Treasuries and Sub-Treasuries. The Computerised Treasury Operation System (CTOS) was implemented in all the treasuries and sub treasuries in 2003-04 at a cost of ₹ 1.47 crore. The computerised system was Client Server Architecture based. Subsequently, in 2010 the State Government decided to upgrade the CTOS from Client Server Architecture to Web Based Environment. The online system was developed using Oracle 11 g Relational Database Management System (RDBMS) under Dot Net Architecture and implemented in all the treasuries and sub treasuries by 2015-16. The database was maintained centrally at State data centre.

Further, in September 2014 it was decided to include budget module for preparation of budget and releasing of funds to departments through online system, integration of bank portal for direct online payment from treasury through e-payment and integration with Public Financial Management System (PFMS) to capture details of funds received from Government of India. These modules had not been developed.

5.3.2 Expenditure on Web Based Online Treasury Operation System

The expenditure for implementation of modified Web Based Online Treasury Operation System (WBOTOS) was financed from the State budget. The Finance Department incurred an expenditure of ₹ 68.34 lakh on software and ₹ 36.43 lakh on hardware and its maintenance during the period from 2007-08 to 2015-16.

5.3.3 Organisational set up

The Principal Secretary, Finance Department is responsible for implementation of the computerisation of treasury operations. The Principal Secretary is assisted by a Director of Treasuries, Finance Department and an Additional Director at State level. There are 16 treasuries/sub-treasuries in the State, which are under the administrative control of the District Magistrates and Collectors (DM & Cs) and Sub-Divisional Magistrates respectively.

5.3.4 Audit objectives

The objectives of the audit were to evaluate:

- Whether the planning and implementation of WBOTOS achieved the objectives;
- Whether policy regarding human resources was effective and in place;
- Whether there was integration of legacy data and a system in place to ensure data quality; and
- Whether reliable controls were in place to ensure data security and necessary audit trails have been incorporated in the system.

5.3.5 Scope of audit and methodology

The data and records relating to the WBOTOS were analysed with the help of Interactive Data Extraction and Analysis (IDEA) tool. As the data of old system was not migrated into the new system, the data analysis covered the period from the date of implementation of the WBOTOS, *i.e.* data entered into the system from August 2015 to July 2016.

Audit covered Directorate of Treasury, Finance Department, five treasury offices[1] out of 16 treasuries/sub treasuries, five Controlling Officers[2] of user departments selected randomly and five DDOs each of the directorate offices of selected departments.

Entry conference was held in April 2016 where the audit objectives and audit criteria were discussed with the Principal Secretary, Finance Department. The draft report was sent to the State Government in September 2016. The exit conference was held on 03 November 2016. The results of the discussion and replies given (October 2016) by the Joint Director of Treasuries had been incorporated wherever applicable.

Audit of WBOTOS was conducted during May-August 2016 to evaluate the efficiency and effectiveness of the system as well as the adequacy of the controls in terms of the stated objectives of the system.

The audit findings are discussed in succeeding paragraphs.

5.3.6 Audit criteria

Application packages developed and implemented in the treasuries were evaluated with respect to Request for Proposal document, treasury rules, planning of computerisation project, methodology of development of application packages, data management and monitoring mechanism.

Audit findings

Planning and implementation of Web Based Online Treasury Operation System

5.3.7 Planning and monitoring

With a view to establish online connectivity for transferring/sharing of data among all treasuries/sub treasuries, Finance Department had taken an initiative to migrate the treasury operation system from Client Server Architecture to Web Based Environment in 2010.

For any project development, the organisation needs to document the requirements and segment them into phases as per requirement of the project. The Department did not prepare Detailed Project Report (DPR) and Comprehensive User Requirement Specifications (URS) for implementation of WBOTOS which led to delayed implementation and deficiencies in application controls.

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[1] Agartala-I and Agartala-II, Udaipur, Ambassa and Dharmanagar.

[2] Agriculture, Health Services, Family Welfare and Preventive Medicines, Higher Education and School Education.

The vendor (RITES Ltd.) which had developed the original software for implementation of CTOS was requested (May 2010) by the Department to submit a proposal for migration of TOS from Client Server Architecture to Web Based Environment. The proposal indicating scope of work and rates as proposed by the firm (RITES Ltd.) was accepted by the Department and work was awarded in December 2010 at a cost of ₹ 49.50 lakh with a stipulation to complete the works within 44 weeks *i.e.* by November 2011. It was, however, completed after a delay of almost four years *i.e.* in August-December 2015.

In September 2014, the Department decided to add a budget module for preparation of budget estimates, release of funds to departments, revised estimates, re-appropriation of fund, supplementary demand for grants, generation of budgetary documents, online release of funds to departments and integration of bank portal for direct online payment from treasury through e-payment. In addition, integration of PFMS to capture funds received from the GoI was to be achieved. Accordingly, the work was awarded (October 2014) to the same firm at an additional cost of ₹ 45.30 lakh (as proposed by the firm) with a stipulation to complete the work within five months, *i.e.* by the end of April 2015. The work had not been completed as of October 2016.

In order to monitor the progress made in development of new web based system, a Technical Committee consisting of officials from Finance Department and IT Department was formed (May 2011) to review the progress from time to time and submit their report on the progress of the project to the Finance Department. However, the Committee met only once in July 2011 to examine the system design documents submitted by the firm. Thereafter, the Committee did neither review the progress of the development/implementation of WBOTOS nor submitted any progress reports to the Finance Department.

This resulted in little or no monitoring of the progress of works by the technical committee and the Finance Department. As a consequence, the implementation of WBOTOS was not fully completed even after lapse of more than five years from its initiation.

During exit conference the Director of Treasuries stated (November 2016) that the inadequacy in planning and the delay in implementation was mainly due to non-availability of adequate IT personnel with the Department.

5.3.7.1 Procurement and utilisation of hardware

The online system was developed using Oracle 11g RDBMS and Dot Net Architecture. The database had been maintained centrally at State data centre. The computer hardware including printers, UPS, etc. procured prior to 2007-08 were utilised for implementation of WBOTOS. In addition, ₹ 15.81 lakh was spent during 2010-11 for procurement of computer hardware and peripherals. Though the procurement was done centrally at the Directorate of Treasuries, Finance Department, records like installation reports, details of model/brand name, serial number of

machines (CPU, monitor, printer, scanner and UPS) and names of treasury where installed, etc. were neither maintained at the directorate nor made available to audit by the treasury officers of five test checked treasuries. Apparently, no inventory/asset register of IT assets created under CTOS was maintained either in the Directorate of Treasury, Finance Department or in test checked treasuries. Further, a periodical physical verification of assets is required to be done to ensure the availability and condition of the assets, but the same was never done as of July 2016.

The Joint Director of Treasuries replied (October 2016) that as the system is functional at treasury/sub treasury level the inventory/asset register were being maintained at treasury/sub treasury level. The reply is not tenable to audit as a consolidated record of the assets of all treasuries and sub treasuries were required to be maintained at the Directorate of the Treasuries as well as treasury/sub treasury level which was not available either in the test checked treasuries/sub treasuries or at the Directorate of Treasuries. Besides, the objectives of the computerisation did not envisage maintenance of inventory/asset register in the system.

5.3.8 Human resource management

The Department must ensure that it has competent and trustworthy data management personnel. Existing staff should be equipped with the technical know-how in order to cope with the transition to a new system.

5.3.8.1 Manpower management

The existing staff of treasuries, Controlling Officers and DDOs were provided in-house training for operating the computer systems. Further, 25 persons having knowledge in computer application had been appointed at treasury level for looking after the computerised system. However, the picture is different at the directorate level. Not a single IT managerial staff had been deployed at the State level (Directorate of Treasury) for maintenance of application software. The Department failed to put in place required technical workforce and continued to rely entirely on the firm for maintenance of application software.

During exit conference the Director of Treasuries stated (November 2016) that the Tripura Public Service Commission was requested to fill up the newly created IT posts at the directorate level.

5.3.8.2 Training

Scrutiny of records showed that for smooth operation of WBOTOS, the Department planned to provide one-time training to all the staff connected with the IT system in a phased manner. Accordingly, 38 personnel posted at different treasuries/sub treasuries were provided four days in-house training in October 2015 as master trainers who were to be utilised for providing training to the DDOs and their staff.

It was however, seen that no training programme was organised for the DDOs and their staff in respect of Kailashahar Treasury and Kanchanpur Sub Treasury. In

respect of Khowai Sub Treasury, while the user training was imparted as planned, only nine persons out of 130 nominated had attended the training programme in November 2015.

The Joint Director of Treasuries replied (October 2016) that several refresher training are being conducted by the Directorate of Treasuries to keep them update with recent knowledge to handle new technology and system.

Integration of legacy data and a system in place to ensure data quality

5.3.9 Application controls

Application controls ensure that the data received for processing are complete, accurate and the transactions are processed according to the rules and regulations governing them. The following deficiencies were noticed as regards application controls:

5.3.9.1 Errors in data capture of bill types

(i) While entering the details of bills, the data entry operators are tasked to select the relevant bill type e.g. contingent bill, medical bill, etc. The drop down menu giving list of bill types is not configured so as to restrict the bill type according to object head involved. In fact, all the 40 bill types are available in the drop down menu at data entry stage. It was observed in audit that in 217 cases, bill type was erroneously entered as 'Group Insurance' while these bills pertained to other bill types e.g. Grants-in-aid. Similarly, validation checks were not devised in the application to restrict the transaction in a particular object head with its respective bill type. Say, if a bill is passed under Object Head 'Wages' then the bill type should be 'Wages', but in the database different bill types like LTC bill, Medical bill were found to exist under same object head 'wages'. In the case of Object Head 'scholarship/stipend', the bill type should also be scholarship/stipend. But in the database the bill type was reflected as stamp advance bill, contingency bill, others, etc. Errors in bill type would lead to incorrect Management Information System (MIS) reports related to expenditure analysis.

(ii) In WBOTOS, there is a master data file that had been designed for bill types with a link in the front end for capturing the types of bills presented by the DDOs for monitoring bill type-wise expenditure.

It was noticed that the bill type code 19, 23 and 24 which were maintained for Personal Ledger Account, April Salary/Wages bill and Salary in Grant-in-aid bills in the old computerised system had been changed to 33, 24 and 25 respectively in the new master table of WBOTOS due to which no time series analysis of data would be possible. This would limit the usefulness of data for MIS purposes.

5.3.9.2 Non linkage of Detailed Countersign Contingent Bills with corresponding Abstract Contingent Bills

During examination of application system, audit observed that there was no provision in the computerised system to capture the data relating to submission of Detailed Countersign Contingent (DCC) Bills either by the DDOs or by the Controlling Officers so that the treasury officer could generate reports to ensure that no Abstract Contingent (AC) Bill was pending for adjustment beyond prescribed period.

As per Delegation of Financial Power Rules of Tripura, the total outstanding unadjusted AC Bills amount should not exceed ten times of the ceiling of individual bills in each case at any point of time. As there was no provision in the software for comparing the AC Bills with the DCC Bills, the receipt of DCC Bills and previous AC Bills pending for adjustment could not be monitored in the system at the time of passing the subsequent AC Bills.

During exit conference (November 2016) the Joint Director of Treasuries stated that the matter would be consulted with technical persons to overcome the shortcomings as pointed out by audit.

5.3.9.3 Non migration of data from old system

As per scope of work for development and implementation of WBOTOS, the vendor (RITES Ltd.) was to import the data of old system into the WBOSTOS. However, analysis of the database of WBOSTOS revealed that only few master tables like head of accounts, treasury code, demand number and department, DDO directory, etc. were migrated in the WBOSTOS but the data in two primary tables *viz.* receipt table and voucher table which contained all the details of receipts and payments of the Government made by the DDOs was not imported into the new system.

5.3.9.4 Lack of processing controls for making payments from Major Head-8443

The Major Head 8443-Civil Deposit is maintained for deposits like security deposits from contractors, etc. However, due to non-importing/non-migration of the old data of receipt and payment master table in the new system, the treasury officers could not generate any report during passing of any bill under 8443-Civil Deposit head to ensure the bill amount was not exceeding the deposit balance lying against concerned DDO. As a result, the treasury officers had to depend on the DDOs for getting evidence about the balance amount lying under civil deposit head against that DDO at the time of passing of bills.

This indicated that the application system was not useful in ensuring that no payment under 8443-Civil Deposit was made to a DDO unless money was available under the same head against that particular DDO.

During exit conference (November 2016) the Joint Director of Treasuries stated that the matter would be consulted with technical persons to overcome the shortcomings as pointed out by audit.

5.3.9.5 Master code changed for Drawing and Disbursing Officer

In computerised system, there is a master data file which had been designed for capturing the data about operational DDOs for monitoring the DDO-wise budget and expenditure. The Department had not laid down any procedure to link the DDO codes if any DDO code was changed subsequently on account of merger/demerger of treasuries/sub-treasuries. In the absence of a laid down procedure, as and when a new treasury/sub-treasury is created, the DDOs which come under the jurisdiction of a new treasury/sub-treasury, their DDO codes were also changed in accordance with the new treasury code.

Thus, due to changing of DDO codes, the time series analysis of data is not possible for generation of any reports on transactions made with previous DDO codes. In the absence of a link between old and new DDO code, there were limitations on the usefulness of data for MIS purposes.

Data Security

5.3.10 IT security

The Directorate of Treasury, Finance Department had not formulated and documented any IT security policy regarding the security of IT assets, software and data security even after 12 years of implementation of CTOS. Further, security of features as provided by the system was inadequate as detailed below:

5.3.10.1 Audit trail not incorporated

Audit trail is required to be incorporated into an IT System for tracing an item from input through its final stage and depicts the flow of transaction at every point of processing upto the output stage. For effective monitoring and control over the system, maintenance of log files and audit trail are essential.

Scrutiny of software disclosed that the Directorate of Treasury, Finance Department did not enable the audit trail options for tracing the details of terminal logon, start up time, activities of users, etc. Due to not incorporating audit trail in the software, the Directorate of Treasury was not in a position to carry out a periodic review of audit trail to watch deviations in access trends and to ensure compliance of instructions relating to system security.

Analysis of electronic data revealed that log out time was missing in 58 *per cent* (3,06,652 out of 5,29,875) cases. In 66 cases, login time was same for logging into the system by the same user from different IP addresses. It was further noticed that the gap between login and log out time was found ranging from 12 hours to 24 hours in 437 cases and in 4,033 cases the gap between login and logout time was even more than 24 hours.

It was also noticed that the provision for automatic terminal shut down after 3-5 unsuccessful log in attempts to restrict unauthorised attempts for login was not

enabled in the system. Thus, possibility of unauthorised access to the system could not be ruled out, which poses serious consequences on the security and integrity of the system.

During exit conference (November 2016) the Joint Director of Treasuries stated that the matter would be consulted with technical persons to overcome the shortcomings as pointed out by audit.

5.3.10.2 Logical access controls

Logical access controls are aimed at protecting computer resources (data, programs and terminals) against unauthorised access attempts. passwords are an important aspect of computer security. The Department did not have adequate password policy for maintaining IT security which is evident from the following shortcomings:

- Normal password control procedures like restriction on unsuccessful login attempts by the users or automatic lapse of password after a predefined period and system enforced periodical change of passwords after a certain period were not in existence. Moreover, the system did not generate any logs to record the number of failed login attempts.
- The date of changing password was not stored in the system due to which the Directorate of Treasury could not monitor the changing of password. Moreover, passwords in respect of 221 users were not stored in the database in encrypted form.
- User IDs were not deactivated immediately after transfer of the concerned users or when no longer required for use.
- Further, during examination of application system for creation of user ID, it was noticed that as and when the system administrator created an user ID, the system automatically generated a temporary password for newly created user ID. However, the system generated password was mandatory to be changed immediately after login in the newly created user ID. But, as soon as the system generated password is changed, the password of all existing user IDs containing combination of the characters of that ID are automatically changed which pose risk for unauthorised access or hacking of the system for manipulation or corruption of the data changed *i.e.* if a user ID is created like 'AD' and when the auto generated password is changed, the password of all other user IDs containing 'AD' like 'AD01', '0ADC2', etc. would be automatically changed to the password of 'AD'. This was risk prone for unauthorised access or hacking of the system for manipulation or corruption of the data.

As a result of the failure to ensure logical access controls as evident by a number of loopholes pointed out, the system is left exposed and vulnerable to unauthorised access and possible manipulation.

During exit conference (November 2016) the Joint Director of Treasuries stated that the matter would be consulted with technical persons to overcome the shortcomings as pointed out by audit.

5.3.11 Inadequate documentation

The Department had not documented the 'User Requirement Specification'. The system analysis and system design report prepared by RITES are available with Directorate of Treasuries, Finance Department but other documentation like user manual, operation manual, IT security and backup policy, etc. were not prepared by the Department (July 2016).

5.3.12 Conclusion

- Lack of adequate planning and assessment had resulted in piecemeal implementation of the project, where requirements of many modules were being firmed up only as the project was underway, with consequences on the completion of the system being developed.
- The Department had failed to put in place the required technical staff at the directorate level for maintenance of application software. Therefore, it continued to rely entirely on the firm for maintenance of the software.
- The legacy data had not been fully imported into WBOTOS.
- The application was being run in a poorly controlled environment with weak password policy, which in conjunction with lack of audit trails makes it extremely difficult to fix accountability/responsibility on those who had performed duties using the application software.

5.3.13 Recommendations

- A holistic plan taking into consideration all the required modules should be firmed up at the earliest.
- IT managerial staff should be deployed at the State level (Directorate of Treasury) for maintenance of application software.
- The legacy data should be imported at the earliest into WBOTOS.
- The Department should formulate a well-defined IT security policy.