CHAPTER V

KALYAN DOMBIVLI MUNICIPAL CORPORATION

5 Information Technology Audit of the Accounts module of the e-Governance project of Kalyan Dombivli Municipal Corporation

Highlights

Neither a documented Information Technology(IT) plan nor the 'Acceptance Criteria Document' containing details of deliverables was available with the Corporation.

(Paragraph 5.7.1)

Inadequate monitoring of the development and implementation of the modules resulted in non-implementation of certain important modules including engineering module and resulted in unfruitful expenditure of Rs 23.15 lakh.

(Paragraph 5.7.2)

Deficient User Requirement Specifications paved way for non utilisation of bank reconciliation module and usage of separate application needed manual intervention and duplication of data entry.

(Paragraph 5.7.3)

Critical business rules relating to daily closure of cash book were not mapped into the system.

(Paragraph 5.8.1)

Effect of bounced cheques were not made against the respective receipts in the functional modules.

(Paragraph 5.8.2)

The system did not ensure automatic carry over of closing balances in the cash book and manual intervention made the system prone to fraud and misappropriations.

(Paragraph 5.9.1)

Lack of validation checks in the system paved way for the entry of transactions on later dates.

(Paragraph 5.9.2)

Lack of controls in the system facilitated generation of internal receipts for adjustment in excess of the advances to the tune of Rs 2.11 lakh.

(Paragraph 5.10.1)

The information security policy prepared in 2005 is yet to be implemented.

(Paragraph 5.12.1)

System allowed deletion of 477 receipt numbers and 1029 voucher numbers in 2006-07 without leaving any audit trails.

(Paragraph 5.12.3)

5.1 Introduction

The Kalyan Dombivli Municipal Corporation (KDMC), which came into existence in October 1983, was divided into seven Wards[33]. KDMC initiated e-Governance project of complete computerisation of the Corporation in December 1999 for better efficiency and citizen servicing standards with the following objectives:

- to utilise information technology for functions of their various departments
- to improve efficiency and avoid repetition
- to computerise all activities and utilise computerised systems for providing services to the citizens

Under this project, application modules were developed for computerizations of various functions such as water billing, property tax, birth and death registration, accounts, city engineering, working of the Commissioner's office *etc*. All these modules had a common user interface *i.e.* KDNET, facilitated through the Citizen Facilitation Centre (CFC) in Headquarters and in the Ward offices. The application software was developed and maintained by M/s Advent Business Machines Ltd (ABM). The software was developed with Oracle 9i as RDBMS and Oracle Forms as the front end tool. The operating system for the Database Server was Sun Solaris and the clients were on WindowsXP platform. In November 2005, Government of Maharashtra decided to implement the applications software in all other Municipal corporations/councils. The Accounts module developed at a cost of Rs 7.52 lakh was implemented in April 2003. The expenditure on maintenance (upto 2006-07) of this module was Rs 2.26 lakh.

The Corporation adhered to the Maharashtra Municipal Account Code, 1971 for maintaining its books of accounts. Services including receiving the payments for the bills due to the Corporation were provided through CFC at the Corporation Headquarters and also at the Ward offices. The details regarding revenue received were entered online in the system and the receipts generated from the system were issued to the citizens. Vouchers in respect of payments made by the Corporation were entered in the system by the Accounts department through the Accounts Module.

[33] A,B,C,D,F,G and H wards

The receipts and expenditures of KDMC for the period from 2003-04 to 2006-07 were as follows:

(Rupees in crore)

Year	Receipts	Expenditure
2003-04	191.31	189.34
2004-05	213.56	213.67
2005-06	246.53	239.72
2006-07	272.94	268.76

5.2 Organisational Set Up

The Commissioner is the administrative head of KDMC. The Computer wing of KDMC is headed by a Systems Manager and supported by a Systems Analyst, a Programmer, five computer operators and other supporting staff.

5.3 Scope Of Audit

The IT Audit of the Accounts module of the e-Governance project was conducted during February to March 2008, covering the data pertaining to the Corporation Headquarters office and the Wards for the period from April 2003 to March 2007.

5.4 Audit Objectives

The audit objectives were to evaluate the following:

- Planning of IT systems
- Adequacy of incorporation of business rules in the Accounts module
- Completeness and correctness of the data and reports generated in the accounts module
- Input, processing and output controls in the Accounts module
- Adequacy of security controls to ensure the integrity of data

5.5 Audit Methodology

Audit commenced with an entry conference held on 22 February 2007 with the Municipal Commissioner and Heads of the Departments of the Accounts and Computer wings of KDMC. The application and database were reviewed with respect to the relevant rules and procedures relating to Accounts. The data in the Oracle database system was analysed using CAATs[34].

[34] Computer Assisted Audit Technique

5.6 Audit Findings

As the Accounts module was linked to the other modules of the e-Governance project which handled the receipts and expenditure of the Corporation, it was imperative that the software being used was developed based on the user requirements, mapped the business rules correctly, maintained the data integrity and generated all the information required by the users. It was, however, noticed that relevant business rules were not completely mapped into the application and weaknesses in input, processing and output controls resulted in incomplete, incorrect and unreliable data.

These deficiencies are discussed in the following paragraphs :

5.7 Planning

A structured planning approach was required to achieve the optimum benefits of IT. In this regard, a documented IT plan was required to be prepared covering the organisation's mission and goals, IT initiatives to support the organisation's mission and goals, feasibility studies including risk assessments of IT initiatives, business process re-engineering, staffing, out-sourcing *etc*. The following observations were made.

5.7.1 IT plan

In January 2000, M/s ABM was appointed as a consultant with a view to provide "start to end" services for total computerisation of KDMC. As per the agreement, a document, *viz* 'Acceptance Criteria Document' which would indicate inputs, outputs and deliverables was to be prepared by M/s ABM. Further, target dates for development of various modules to calculate delays and subsequent penalties would also find place in that document.

Audit observed that neither a documented IT plan nor the 'Acceptance Criteria Document' was available with the Corporation, even though expenditure of Rs 1.51 crore for development and Rs 47.85 lakh for maintenance of the applications software was incurred during 2003-04 to 2006-07.

KDMC accepted the non availability of the 'Acceptance Criteria Document'.

5.7.2 Non-implementation of modules of e-Governance project

As per the agreement signed in May 2000, M/s ABM developed (2002-03), fifteen modules[35] relating to the activities of the Corporation. It was noticed that the three modules developed *viz.* City Engineering Module intended for preparation of proposals, estimates for new works, tendering, works monitoring and billing *etc.* Municipal Secretary and Commissioner's office Modules for administrative purpose were not implemented so far, rendering

[35] Accounts, Birth and Death, CARE, City Engineering, Commissioner's Office, Garden, Health Scheme, Legal, Municipal Secretary, Property tax Assessment, Town Planning, Trade Licence(Market & Food), User & Work flow, Water Billing and Web services.

the expenditure of Rs 23.15 lakh spent for the development of the same unfruitful.

KDMC attributed the non-implementation of City Engineering Module to City Engineering wing, Secretary Module to non compatibility with Marathi language and Commissioner's office Module to incomplete user requirements. This indicated inadequate monitoring of the development and implementation of the modules.

5.7.3 Incomplete elicitation of user requirements

Development of a major transaction processing system such as the Accounts system of the Corporation required a complete and detailed analysis of user requirements. It was observed that the System Requirements Specifications (SRS) document, prepared in respect of the user requirements analysis, pertained to recording of receipts and payments and bank reconciliation only. Other functional areas like accounting of Deposits, Refunds, Advances, Investments, and Loans had not been covered in the document. Further, requirements for the internal audit were also not considered.

It was also observed that the developed bank reconciliation module was not used due to absence of provision to make correction in respect of incorrect credits entered against wrong bank accounts. Hence, another separate application developed in-house using Foxpro was used for bank reconciliation purpose since 2005. Since the application was not linked to the existing system, it required manual data entry of all the relevant details once again.

KDMC replied that necessary action to rectify the errors in the developed modules was taken up with M/s ABM. They further stated that the SRS was prepared after consultation with the concerned wings. However it is reiterated that the SRS prepared was deficient as observed above.

5.8 Mapping Of Business Rules

5.8.1 Daily closing of Cash book

Maharashtra Municipal Account Code, 1971 stipulates that every entry made in the General Cash Book should be attested by an officer responsible for the maintenance of the same and the Cash Book should be closed and balanced daily under the signature of the concerned officer. Audit observed that though these requirements were identified in the SRS, the same were not incorporated appropriately in the developed system. The lack of adequate safeguards in maintaining cash book is fraught with the risk of misappropriations and possible frauds.

KDMC stated that action would be taken in this regard.

5.8.2 Treatment of dishonoured cheques

Cheques in respect of payments by consumers were received at the CFCs and necessary entries made in the system which in turn updated the Water Bill, Property Tax and the Accounts module. Audit observed that in respect of bounced cheques, entries were made only in the Accounts module, leaving the corresponding receipt entries in the Water Bill or Property Tax modules not reversed and due from the consumer was not increased to such extent, although the payments against the bounced cheques were monitored through the system. This prevented the levy of penal interest through the system.

KDMC accepted the observations and informed that this would be considered in the proposed new application module based on the double entry accounting system.

Recommendations:

KDMC should

- **draw up a time frame to develop and implement all the modules of the system as envisaged.**
- **upgrade the Accounts module by incorporating all user requirements.**

5.9 Input Controls and Validation Checks

Input controls and validation checks ensure that the data entered is complete, accurate and reliable. Data analysis revealed the following discrepancies due to lack of input controls and validation checks:

5.9.1 Modification of cash book balances

Maharashtra Municipal Accounts code, 1971 stipulated that all moneys received or disbursed by or on behalf of a Corporation including Government grants should immediately and without any reservation be brought in the general cash book.

It was noticed that at the beginning of every financial year, the Opening Balances (OB) were fed into the system instead of the balances being carried forward from the previous year. Audit observed that the differences between the Closing Balances(CB) and subsequent OB in the cash book of the Corporation Headquarters office generated from the Accounts module for the years 2002-03 to 2006-07 varied from Rs (-)14031526 to Rs 41227080 as detailed in **Appendix XI**.

On comparison with the related figures as depicted in the Annual Accounts of the respective years, it was revealed that :

(i) the CB as per the Annual Accounts did not tally with the CB as per the cashbook maintained in the system in all the five years from 2002-03 to 2006-07.

(ii) the CB of cash book as per annual accounts were adopted as the OB for the subsequent years only for the period 2005-06 and 2006-07 and for the earlier period *i.e.* 2002-03 to 2004-05, differences amounting to Rs 1.38 crore to Rs 6.65 lakh were noticed.

Similarly, the cash books in respect of the Ward offices generated from the Accounts module showed differences between CB and OB and with that of the figures adopted in the annual accounts as detailed in **Appendix XII**.

System should ensure that the OB were invariably carried forward from the previous CB and the CB were not altered after finalisation of the accounts. It was seen that the system allowed entering of transactions after the closure of accounts and altering the OB. This made the system insecure against fraudulent transactions and manipulations.

Reply of KDMC in this regard was awaited.

5.9.2 Back dated and delayed entries of payments

Maharashtra Municipal Accounts Code, 1971 stipulated that all receipts and realisation in cash or by cheques should be entered in the cash book daily and all payments made in cash or by cheques should be entered in chronological order daily, as and when the transactions occurred. The validation of the voucher entry date or receipt date with system date could prevent irregular entries on later dates. The same was not built in to the system. It was seen that the voucher data was being modified on later dates and audit trails to store the history of the changes made had not been built in to the system. Test check of data in respect of the Headquarters office for one month (April 2006) revealed the following:

- 104 vouchers dated 1 April 2006 and 7 April 2006 were entered in the Accounts system on 20 April 2006 and 21 April 2006.
- Voucher number 8233 dated 12 April 2006 for an amount of Rs 157901 was entered on 23 June 2006
- Voucher number 556 dated 12 April 2006 was modified on 27 September 2006 and Voucher number 565 dated 19 April 2006 was modified on 19 June 2006. In the absence of details of such modification in the system the reason and the impact could not be assessed.

Thus the absence of input controls, made the data unreliable and the system is prone to risk of fraud or manipulation.

Recommendations:

KDMC should ensure that :

- **the CB were carried forward to the next year without manual intervention and**
- **necessary input controls and validation checks were incorporated into the system so as to make the data complete, accurate and reliable.**

5.10 Process Controls

Process controls inbuilt in the system ensure that only valid data and programme files were used, process was complete and accurate and processed data was updated in the relevant files. Weaknesses in the process controls noticed in audit are discussed below:

5.10.1 Internal receipts in excess of credit available

Internal receipts were generated by the system at the time of generation of water bills and property tax bills to adjust advance/excess payments made by the consumers previously. Analysis of the database revealed that internal receipts generated exceeded the advance payments in 6118 cases of water bills by Rs 203069 and in 17 cases of property tax bills by Rs 7793. Thus the system failed to restrict the internal receipts to the extent of credits relating to advance payments to such an extent.

KDMC stated that such feature for verification of internal receipts generated was not available in the application and the lacuna would be rectified through M/s ABM.

Recommendation:

- **KDMC may incorporate necessary controls in the system for restricting the adjustments through internal receipts to the credits available**

5.11 Output Controls

Output controls ensure accurate, complete and timely outputs and ensure the correct destination. Data analysis revealed the following weaknesses:-

5.11.1 Erroneous report

It was noticed that the summaries of payments and CB were exhibited incorrectly on the receipt side of the cash book. For example, the Corporation Headquarters cash book for 31 March 2006 showed the OB as Rs 11.95 crore on receipt side of cash book where as the same was indicated as Rs 31.18 crore on payment side and total payments was exhibited on receipt side of cash book as Rs 29.54 crore instead of Rs 32.23 crore on payment side.

KDMC stated that the balances as per the payment side only were considered for reporting purposes and balances as per the receipt side of the cash book were ignored.

The reply could not be accepted since the lacuna in the system needed to be rectified. Further, there was risk of adoption of incorrect CB on the days when there were only receipts and no payments being made through the system.

Recommendation:

- **KDMC should review the reports for such errors and rectify them.**

5.12 IT Security

Every organisation is required to adopt an IT security policy clearly identifying the organisation's priorities and necessary controls need to be built in based on the IT security policy. The following were the observation of the IT security policy :

5.12.1 Information Security Policy

Information Security Policy prepared in August 2005 by M/s Secure Synergy Private Limited was not implemented in the Corporation even after two years of its formulation. Further the Corporation had not formulated any password policy and deficiencies were noticed in the users' passwords as detailed below:

- Length of passwords varied from one to seven characters in respect of 1254 out of 1554 user IDs existed in the system.
- The system did not have password-protected screen savers to deny access after a specified inactive period.
- Passwords were not changed at regular intervals *i.e.* only 44 out of 1554 users were changed their password in 2008.
- No provision to lock the user accounts after specified consecutive unsuccessful log-in attempts

KDMC accepted the observations and informed that necessary action would be taken through M/s ABM.

5.12.2 Audit trails

Audit trails depict the flow of transactions necessary in a system in order to track the history of transactions, system failures, erroneous transactions, changes/modifications in data *etc*. It was observed that adequate audit trails did not exist in the system as follows :

5.12.3 Deletion of receipt and voucher numbers

Maharashtra Municipal Accounts Code, 1971 stipulated that receipt entries should be carefully scrutinised by an officer duly authorized to verify completeness with special emphasis on erasures and corrections.

Analysis of data for the period 2006-07, in respect of water bills and payments revealed that:

- Deletion requests were not authorised by any higher authority showing inadequate controls over modification or deletion of data.
- There were 573 missing receipts numbers and 1052 missing voucher numbers in the system indicating deletion but only details of 96 receipts and 23 vouchers deleted from the system were available.
- 2524 out of 148669 receipts and 10335 out of 44530 vouchers were modified at a later date. However the history of modified data was not stored in the system facilitating audit trails.
- There were 118974 gaps in serial numbers (receipt transactions) and 23586 gaps in serial numbers (payment transactions) allotted by the system indicating deletions.

These discrepancies indicated lack of controls over modification and lack of audit trails in the system. This showed the system was insecure and vulnerable to fraud and manipulation. KDMC stated (May 2008) that the missing receipts and vouchers would be reviewed.

5.12.4 Backups

It was observed that backups taken were not stored in an offsite remote location and not in fire-proof containers rendering the purpose of taking backups futile.

KDMC stated that the points had been noted.

5.12.5 Modification of Data through Backend

In order to secure data and system, ownership were required to be identified and defined. Permission of such owners was required in respect of any modification in the data. It was observed that data ownership had not been defined and data was being modified by the vendor (M/s ABM) through the back end to rectify problems reported by any of the users without appropriate authorisations. Error handling module which is required in a system to facilitate the rectification of data errors through the front end was not available in the system. Further, it was observed that even the Oracle database system was not configured to record any modifications of data through the backend. Modification through the back end by the personnel of M/s ABM was not authorised and thus led to the risk of irregular manipulation or deletion of records and made the system insecure.

KDMC stated that necessary audit trails would be incorporated in the system.

5.12.6 Network Connectivity

The CFCs in KDMC Headquarter and those in the Ward offices were connected through optical fiber cables except for A, F and G Wards which were connected through wireless technology. No mechanism was in place to monitor the network uptime (network connectivity and power backup) in CFCs in Ward offices to ensure continuous service delivery.

Recommendations:

- **KDMC should ensure that security policy and password policy are implemented.**
- **Audit trails to track missing receipts and vouchers should be built into the system.**
- **Backups should be stored offsite and in fire-proof enclosures.**
- **Audit trails available in the Oracle Database system should be configured to record modifications of data.**
- **A mechanism to monitor network down-time periodically should be introduced.**

5.13 Conclusion

The objectives of computerisation of KDMC were to utilize information technology for the functions of their various departments and to improve efficiency. However, eight years after initiation of its e-Governance projects, the modules developed for major functionalities like City Engineering Wing were not implemented. The system permitted corrections of opening balances and made the data incomplete, inaccurate and unreliable. Lack of input controls and validation checks resulted in missing receipt numbers, generation of internal receipts more than the advances paid by consumers. Inadequate IT Security, modifications of data by providers of technical support coupled with weak audit trails in the system made the system vulnerable to irregular data manipulation and incomplete information. Thus the accounts module developed was not utilised effectively and efficiently for the purpose envisaged.

Appendix XI

(Reference: Paragraph : 5.9.1; Page 52)

Differences between the closing and opening balances in the cash book of the Corporation

(Figure in Rupees)

Year (1)	As per computerized system			As per Annual Accounts Reports	Difference of Annual Accounts Reports with computerized system	
	CB as on 31st March (2)	OB as on next 1st April (3)	Difference (4) = (2)-(3)	CB as on 31st March (5)	Computerised system in CB (6) = (2) –(5)	Computerised system in OB (7) = (3) –(5)
2002-03	160747363	119520283	41227080	133395106	27352257	(-)13874823
2003-04	105521910	119553436	(-)14031526	120219043	(-)14697133	(-)665607
2004-05	106005457	108372624	(-)2367167	109273972	(-)3268515	(-)901348
2005-06	156809191	157827192	(-)1018001	157827192	(-)1018001	0
2006-07	147306017	147304403	1614	147304403	1614	0

Appendix XII

(Reference : Paragraph 5.9.1(ii) ; Page 59)

Differences between the closing and opening balances in the cash book of the Ward offices

(Figure in Rupees)

Year (1)	Ward	As per computerized system			As per Annual Accounts Reports	Difference of Annual Accounts Reports with computerized system	
		Closing Balance as on 31st March (2)	Opening balance as on next 1st April (3)	Difference (4) = (3)-(2)	Closing Balance as on 31st March (5)	Computerised system in CB (6) = (2) –(5)	Computerised system in OB (7) = (3) –(5)
2003-04	A Ward	6262935	6262943	8	6273444	(-)10509	(-)1051
	B Ward	10429657	10681984	252327	10681984	(-)252327	0
	F Ward	13202057	13161439	(-)40618	13161439	40618	0
2004-05	A Ward	6093500	6094785	1285	6094785	(-)1285	0
	B Ward	5097014	5097014	0	5097014	0	0
	F Ward	11608279	11728694	120415	11472513	135766	256181
2005-06	A Ward	6804745	6804767	22	6804767	(-)22	0
	B Ward	12176155	12117634	(-)58521	12117634	58521	0
	F Ward	10193436	9937515	255921	9937515	255921	0