

CHAPTER XXVII: MINISTRY OF ROAD TRANSPORT AND HIGHWAYS

National Highways Authority of India

27.1 Assessment of Information Technology under Cobit Framework

Highlights

The Authority did not prepare a structured Information Technology plan.

(Para 27.1.5.1)

There was lack of planning and coordinated approach in the three major software applications leading to duplication of efforts.

(Para 27.1.5.2)

Since major software applications were developed against World Bank loan release commitments, there was little scope for the Authority to undertake cost benefit analysis.

(Para 27.1.5.3)

Expenditure of Rs.5.07 crore (Rs.2.07 crore and US\$ 0.66 million* equivalent to Rs.3.00 crore was rendered wasteful in development of technical assistance for ‘operation and development of pilot corridor management units’ as the system did not lend itself to integration with Road Information system and also because the database was to be eventually hosted on the servers located in a foreign country.

(Para 27.1.6.2)

27.1.1 Introduction

National Highways Authority of India (Authority) is a statutory authority established by the National Highways Authority of India Act, 1988 for the development and maintenance of National Highways. The main activities of the Authority are to:

- (i) Upgrade and broaden existing National Highways corridors connecting the four metros of Delhi, Mumbai, Chennai and Kolkata of the country forming the Golden Quadrilateral (GQ) and Srinagar to Kanyakumari and Silchar to Porbandar that form North South East West (NSEW) corridor.
- (ii) Undertake other highway projects such as connectivity to ports development of bypasses, etc.

* One US\$ = Rs.45.61

- (iii) Implement externally aided road projects.
- (iv) Improve, maintain and augment the existing national highways network including ensuring road safety measures and environmental management.
- (v) Collect toll tax on highways on behalf of Government.

In 1995 the Government of India entrusted to the Authority the responsibility of implementing the externally aided projects of length around 333 kms. Later the Authority was entrusted the responsibility of upgrading and four laning of the following length of national highways:

(i)	NHDP Phase I (December 2000)	7,498 kms
(ii)	NHDP Phase II (December 2003)	6,736 kms
(iii)	NHDP Phase III (December 2004)	10,417 kms
Total	-	24,651 kms

27.1.2 Organisational set up of Information Technology and Planning Division

The Authority has Information Technology and Planning Division to look after development, procurement and customisation of IT systems/ solutions for office automation, computer based project monitoring and planning of the works. The Division functions under the directions of a Chief General Manager (CGM) who in turn reports to Member (Administration).

27.1.3 Audit objective and scope

The Audit of Information Technology focused on key information systems supporting the operations of the Authority *viz.* Project Financial Management System, Road Information System for planning and management of highways and high quality data collection for corridor management and toll collection.

The objective of Audit was to assess the extent to which information needs of the Authority under Information Technology had been aligned with its business objectives/ needs, IT related risks, existence of a regulatory environment to ensure strict control over information assets and value for money spent in the creation of information systems.

27.1.4 Audit Methodology

The Audit was conducted with reference to the benchmarked international standards for good IT governance – COBIT (Control Objectives for Information and Related Technology) which was used for assessing key aspects of Authority's systems.

The Audit was performed by walking through the systems of the Authority and study of the documentations and records available at the headquarters office of the Authority.

27.1.5 IT planning and organisation

27.1.5.1 A good IT planning and organisation set up assures the existence of sound control practices so that the information requirement necessary to achieve corporate objectives is achieved.

However the Authority did not follow an approach of preparing a structured IT plan which involved adoption of a methodology to formulate and modify plans. Though the Authority was set up in June 1989 and had an IT division within the organisation, it was yet to formulate an IT plan/ initiatives to support the organisation’s mission and goals.

The Management stated (October 2005) that it had engaged a Consultant (M/s. Price Waterhouse Coopers) in June 2002 for studying the Authority’s requirements and formulating plans for institutional strengthening of which Information systems, planning and communications formed a major part. It further stated that the Consultant did an extensive review of the existing IT systems of the Authority and formulated phased implementation plan comprising different functions such as office automation, executive functions, technical functions against immediate/ short term/ long term implementation by the Authority.

Though the draft report was available in 2003, neither the final report was available nor the acceptance of the same was available on record. The Authority also could not inform Audit of the initiatives taken by it after the Consultants submitted the report for institutional strengthening relating to information technology/ information systems.

27.1.5.2 The existing capacity planning of IT resources was either on the basis of *ad-hoc* requirement sought by the user division or at the instance of term lending institutions which insisted on creation of such IT facilities. The formulation of Project Finance Management System (PFMS) and Road Information System (RIS) were at the instance of the term lending institution - World Bank. The Electronic Drawing Management System, Payroll Accounting, Geographical Information system based Road Management and Construction System, Computerised Project Information system (CPIS) etc. were envisaged by the user divisions of the Authority.

Audit observed that there was lack of planning and co-ordinated approach in the following three major software applications being developed in the Authority, due to which same data was collected repeatedly during the development of the applications.

S. No.	Name of application	Area of computerisation
1.	Road Information System (RIS)	Collection and storage of highway related data
2.	Project Financial Management System (PFMS)	Financial Management
3.	GIS based Road Management System (GIS)	Road management system

The Authority’s reply (October 2005) that the initiatives taken by it under various projects on strengthening the information systems such as PFMS, RIS, CPIS etc. were in line with the recommended IT plan on institutional strengthening of the Authority as

submitted by the Consultant were not borne out by facts. The development of PFMS and RIS, which was started in June 2000 and March 2002 respectively was at the instance of the World Bank and CPIS (development started in December 2002) was sought to be developed at the initiative of the Authority and the same were developed before the draft report of the Consultants.

The applications were non-integrating. This was evident from the fact that the Authority had taken up different projects without identifying the information requirements for the attainment of business objectives. In each of the above systems (PFMS, GIS, RIS) the Authority envisaged maintenance of separate database for capturing common data such as name of contractor, contract stretch, state, length of road, date of start/ completion, details of laning, NH number, chainage etc. The capturing of data in same fields across various systems was redundant and led to duplication of efforts.

The Authority stated (October 2005) that the databases created for hosting the IT applications and capturing the data relating to implementation of various projects were not integrated and the Authority was undertaking a feasibility study for implementing an Enterprise Resource Planning solution for synchronising the stand alone databases of different subsystems.

This indicated that the Authority did not envisage an integrated software application and instead created small projects thereby creating redundant data and individual applications which were non integrating and eventually had to plan for synchronising the stand alone databases.

27.1.5.3 The table below summarised the yearly budget for expenditure proposed by the IT Division, approved by the Finance Division and the actual expenditure incurred on information technology assets.

(Rs. In lakh)

Year	IT Division Budgeted Expenditure	Finance Division Budgeted Expenditure	Actual Expenditure	Actual expenditure in comparison to IT Division Budgeted Expenditure (in per cent)
1999-2000	115.00	Not available	9.99	8.69
2000-2001	90.00	70.00	54.71	60.79
2001-2002	390.00	265.00	79.05	20.27
2002-2003	300.00	300.00	161.53	53.84
2003-2004	300.00*	300.00	151.20	50.40
2004-2005	Not available	Not available	40.38	--

Analysis of the budget provisions for expenditure on information technology asset creation revealed that there was non utilisation of 39 to 80 per cent of the budget estimates between 2000-01 to 2003-04 which indicated that the budgeting was not based on any scientific objective criteria, thus indicating faulty planning. Further Audit

* Finance Division Budgeted Expenditure

observed that the Authority made only *ad-hoc* estimation of the expenditure for the projects on hand every year.

The Authority stated (October 2005) that its IT budget estimates were prepared yearly and the estimates were based on the likely expenses on the approved and on going IT projects and the cost benefit aspect of each IT project was discussed and documented. However, Audit was not provided access to any cost benefit study undertaken.

The reply of the Authority that a cost benefit study of each project was undertaken is also not borne out by facts as the software applications developed at the instance of the outside funding agencies had to be compulsorily implemented as part of the terms of loan agreement.

27.1.6 Wasteful expenditure in Development of Software Applications

27.1.6.1 Wasteful expenditure of Rs.26.59 lakh on development of Geographical Information System based Road Management and Construction System

A pilot project*, Geographical Information System based Road Management and Construction System, was conceived (July 2001) as a web based road management and construction system for executive decision support. The contract was awarded (September 2001) to M/s. Hope Technologies Limited at a cost Rs.26.59 lakh for supply of web interface software to have interactive access to design drawings, maps and data through internet and its installation. Besides data collection* from Detailed Project Reports (DPRs) and conduct of ground survey for pavement condition after the date of completion of construction work it also included conversion, web designing, system integration and training. The data was proposed to be hosted on the webserver of the Authority. The entire work was completed in June 2002. Though the system envisaged updation of data by the user division, the same was not carried out both for the completed stretches and the stretches which were under construction as the Authority did not prescribe a mechanism for data collection and capturing of the same. Also, the Authority did not make any attempt to utilise the capability of the software in other completed stretches as well as in the stretches still under progress. As a result, the investment of Rs.26.59 lakh in the above system was rendered wasteful.

The Authority did not reply to the Audit observation nor did it state as to how the drawings for the completed and ongoing projects were captured in the electronic databases, if at all, to be available for future maintenance of road projects constructed at huge costs.

* *Two stretches – one completed stretch(Delhi-Jaipur) and another under construction (Sikandra-Bhaunti);*

* *pre constructions activities, geographical location of highway stretch, highway parameters such as pavement conditions, approach roads, speed, road side plantation and utilities, traffic details including accident data and construction/maintenance programme details*

27.1.6.2 Wasteful expenditure of Rs.5.07* crore due to abandonment of development of information solution of corridor management study

The Authority awarded (April 2002) a contract to Louis Berger Group Inc., USA (Contractor) for technical assistance for development and operation of pilot corridor management units* (CMU) at a cost of Rs.3.83 crore and US\$ 0.84 million to be completed by August 2004. The scope of technical assistance also included High Quality Management System (HQMS)* to prioritise corridor and pavement maintenance schemes, procure and establish appropriate IT infrastructure and provide training and coordinate other relevant studies i.e. Road information, Minor Improvement to National Highways etc. being carried out by the Authority. However, there was no mention in the contract about the hosting of the data base for the HQMS.

Review in Audit of the deliverables showed that the Authority changed (August 2002) two stretches of the Delhi unit proposed to be taken up for data collection as long term operation and maintenance contracts had already been awarded thus making them unsuitable for consideration as pilots. It was also noticed in Audit that both the changed stretches had also been selected for data collection at the time of GIS (Delhi-Jaipur) and RIS (Barwa-Panagarh, Vijayawad-Chilkaluripet and Vijayawad-Eluru) software implementation, thus, resulting in duplication of efforts.

The Authority suspended (August 2003) the development of IT solution of HQMS as it did not provide possible integration with the RIS software concurrently under implementation. As a result, the amount of Rs.5.07 crore paid to the Contractor (upto December 2005) relating to data collection, development of IT solution, etc. which were required to facilitate the functionality of HQMS was rendered wasteful due to suspension of development of HQMS.

The Authority stated (October 2005) that the terms of reference of HQMS provided only for procurement and establishment of appropriate IT infrastructure and HQMS was proposed as possible software for the purpose by the Consultants. This was not found suitable by the Authority as the main domain was hosted in a third country and all the data was to be kept there and that integration of the software with Road Information System application was not an issue and no payments on account of procurement of HQMS was made by the Authority.

The contention of the Authority is not borne out of facts as the scope of study and duties of the Consultant included a clause to procure and establish appropriate IT infrastructure for operation of pilot corridor management units alongwith coordination with other relevant studies i.e. road information, minor improvement to National Highways etc. being carried out by the Authority. Thus, the amount had been paid towards development

* Comprising of Rs.2.07 crore and US\$ 0.66 million equivalent to Rs. three crore (One US\$ = Rs.45.61) – December 2003

* One at Delhi (Delhi-Agra section of NH 2 and Delhi-Jaipur section of NH 8) and another at Vijayawada (Vijayawade-Eluru section of NH5 and Vijayawada-Nandigama section of NH 9)

* prepare inventory and pavement condition data including locational referencing, highway patrolling, traffic accident management, land management, Right of width control including control of utilities, etc

of IT solution even when the Authority itself had stated as early as August 2003 that the development of the software application be put on hold pending solution of the problem of its integration with Road Information system. Also the hosting of the database for the HQMS in a foreign country should have been known at the time of finalisation of contract. Thus, the eventual purpose of technical assistance for development and operation of pilot corridor management units, which also included cost for suggestion of suitable information system, was not met.

27.1.7 Conclusion and recommendations

27.1.7.1 Conclusion

As the Authority had not formulated a coherent IT strategy and IT plan, integrating its needs on the various facets of its operations, the result was:

- (i) Duplication of efforts
- (ii) Erection of different platforms and consequent training needs
- (iii) Extra expenditure due to another effort to study the systems of the Authority

27.1.7.2 Recommendations

Audit recommends that:

- (i) The Authority should follow a structured information technology plan with a coordinated approach so as to gain from the huge investments made in information technology assets created so far which would lead to improving the Management Information system.
- (ii) Authority should integrate the areas of Road Information system, Project Financial Management system and GIS based Road Management and Construction System so as to avoid duplication of efforts.
- (iii) The Authority should plan and prepare realistic budgets after making cost benefit analysis of IT projects.

The matter was reported to the Ministry in December 2005; its reply was awaited.