ICT in Transport Sector: Towards effective Governance

by
Shashank Ojha
e- Government Practice - ISG
The World Bank
Transport Projects - Key Components

• Network of Roads & Bridges (New / Upgrade / Widen)
  – Land acquisition & resettlement
  – Environment Control
  – Civil Works
• Road maintenance
  (Conventional / Performance based / Technical Reviews)
• Traffic Management
• Safety & Accident control
• Financing Models (Fund / PPP/ Toll etc)
E- Governance - Lessons

Benefits

• *Improvement in Traffic conditions*
• *Transit time reduction*
• *Transport Prices reduction*
• *Road safety*
• *Others*
  – *Poverty reduction, Labour migration, Livelihood diversification, Women participation, Industrial growth, Tourism etc.*
ICT in Transport Sector

Governance - Key Issues
E- Governance

- As per Transparency International, Germany - India 9th most corrupt country
- 4 root causes:
  - Lack of transparency
  - Scarcity
  - Red tape
  - Outdated laws and delays in justice
- Five major players in corruption
- e-Government focus is on efficiency, cost effectiveness, transparency, better monitoring and performance measurement.
E- Governance

E- Governance

E- Governance

ICT in Transport Sector

Key ICT Components
E- Governance - Lessons

Key Components in Bank Projects

- Roads Maintenance Information Systems
- Roads Information Systems
- Financial Management systems
- Project Management systems
- GIS based Information Systems

* Capacity Building Components?
Overall Framework

Assam PWD Roads Project

APWD SOLUTION

<table>
<thead>
<tr>
<th>Project Management</th>
<th>Project Accounting</th>
<th>Resource Management</th>
<th>RIMS</th>
<th>RMMS</th>
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</thead>
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<tr>
<td>Proposal</td>
<td>Planning</td>
<td>Employee Management</td>
<td>Roads Information</td>
<td>Roads DB</td>
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<td>Approval</td>
<td>Budgeting</td>
<td>Asset Management</td>
<td>MIS</td>
<td>Budgeting</td>
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<td>Tender</td>
<td>Controlling</td>
<td></td>
<td></td>
<td>Maintenance</td>
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<tr>
<td>Contracts/Contractors</td>
<td>Accounting</td>
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<tr>
<td>Disbursement</td>
<td></td>
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<tr>
<td>Project Execution and Management</td>
<td></td>
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</tr>
</tbody>
</table>

MIS

OMMS (PMGSY)

Future Systems at STATE level

Groupware

Technical Design

GIS Future System

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Key Components

External System

Divisional Office

Proposal Management
- Define Project
- Scope Project
- Costing
- Scheduling

Tender Management
- Undertake Tendering (for < 25 Lakhs)

Contracts Management
- Prepare Contract
- Manage legal aspects

Project Management
- Control time and cost overruns
- Project completion status

Disbursement Mgmt
- Cash Accounting

Stores Accounting
- Store Receipt
- Manage reorder qty
- Manage store release

GIS
- Design of Roads
- MSL (Level)

Admin. Management
- Mgmt.
- Transportation Mgmt.

Recruitment Mgmt
- Recruitment
- Allocation

CE Office

Proposal Management
- Consolidate recd. proposals

Tender Management
- Undertake Tendering (for > 25 Lakhs)

Capital Asset Mgmt.
- Roads Inventory Mgmt.
- Bridge inventory Mgmt.

Litigation Management
- Legal cases
- Update contract database

HR Management
- Training Management
- Employee Career Mgmt.

Stores Accounting
- Material Management
- Procurement Mgmt.
- Distribution Mgmt.

G I S
- Design of Roads
- MSL (Level)

Office of Commissioner & Spl. Secretary

Approvals Management
- Provide Approval
- Allocation of funds

Budget Management
- Planning
- Budgeting

P & D

Financial Management
- Revenue Accounting

External System

Grants Management
- WB Grants
- Central Govt. Grants
- External Grants

Treasuries’ Systems
- WB Grants
- Central Govt. Grants
- External Grants

Payroll Management
- WB Grants
- Central Govt. Grants
- External Grants

Approvals Management
- Planning
- Budgeting

Recruitment Mgmt
- Recruitment
- Allocation

Recruitmen t Mgmt
- Recruitment
- Allocation

P & D External System

- P & D External System

E’enabling

- Assam PWD Portal
- Integration with e’Governance
- Project Online
- Citizen Complaint Management
Key Components

Software Strategy

• Open Source Software.
• COTS Vs Bespoke Development.
• Integration Issues.
• Licensing Policy.
• Cost Effectiveness.
Key Components

**Hardware Strategy**

- Data Center Architecture.
- Server Clusters.
- Environmental Conditions.
- Scalability Criterion.
- Security.
- Concurrency of the Architecture.
- Uninterrupted Power Supply
Key Components

Data Strategy

• Centralized Availability of Data.
• Highest Level Organizational Support for Data Creation Activity.
• Separate Data Management Team.
• Modular Data Entry Teams.
• Right Size the data. (Use Live Data First)
• Data Entry at the point of inception.
Key Components

Network Strategy

- Network Access Requirements.
- Bandwidth Requirements.
- Medium for connectivity.
  - Leased Lines.
  - VSATs
  - Fiber
- Connectivity Time Requirements.
- Access Control.
- Security of Connection.
Key Components

Web Strategy

• Creation of Departmental Intranets.
• Seamless Integration with Internets.
• Use of E-mails as a tool for capacity building.
• Information Dissemination over the web as a tool to Transparency.
• Browser Based GUIs for Internal Applications.
• Multi Lingual Interface.
• Response Times to capture eye balls.
Key Components

People Strategy

- Change Management is Very Important.
- Build capacity - Continued Training.
- Bringing in Corporate Culture.
- Creating IT environment within the Roads Organization.
- Presence of Effective IT department.
- Buy in from the senior most management within the organization.
- Reducing Corruption.
Key Components

*Roads Maintenance Management system*

- Inventories and Condition Assessments.
- Roads Surface Assessment Systems.
- Roads Decision Support Systems.
- Pavement Management Systems.
- Bridges and Dams Management System.
- Information systems for studies including:
  - Traffic Volume assessment study.
  - Vehicle weight age study.
- Budget Requirement Analysis.
- Priority Analysis.
Key Components

Rocks Information Systems

- A System to Monitor roads inventory, roads surface condition, pavement deterioration, condition of bridges, drainage systems.
- A Comprehensive MIS for the Roads Inventory in the state.
- Graphical interface to the Roads Inventory.
- Graphical Tools to Monitor Distances etc.
- Graphical DSS support tool
Key Components

GIS Based Systems
ICT in Transport Sector

e-Procurement
e-Procurement

- New Concept being implemented worldwide
- Australia & South American countries took the lead
- India – AP Govt, Indian Railways, Karnataka, Chhattisgarh, Assam etc.
- Complex implementation - needs commitment at top levels.
e-Procurement

**e-Procurement - Key issues**

- Systems functionality
- Standardized solution / PPP
- Cost – Benefits Analysis
- Regulatory Issues
- Security & Authentication
- Technology Model
- Critical success factors
E-Procurement

**e-Procurement - Systems functionality**

- **Generation of Indent/ Tender documents & their approval**
- **Demand Aggregation**
- **Procurement Process**
  - Tenders, Auctions
  - Reverse Auctions
  - Rate Contract
  - Catalogue Buying
- **Bid Evaluation**
  - Technical bids
  - Commercial bids
- **Award & Purchase Order**
- **Supply Management**
- **Quality Management**
- **Inventory Management – e-logistics**
- **Payments Management - e-payments**
- **MIS & EIS**
### e-Procurement - Functionality

<table>
<thead>
<tr>
<th>Item To be procured</th>
<th>High Value, Low Volume</th>
<th>Low Value, High Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Code</td>
<td>Example</td>
</tr>
</tbody>
</table>
| Goods               | HG   | Medical Equipment, Engineering Equipment, Scientific Equipment .. | LG   | Medicines, PCs & Peripherals Stationery..
| Services            | HS   | Consultancy Services, e-Government Services, Legal Services, Professional Services | LS   | Maintenance Services Facility Mgt Services Printing, Dispatch & Communication Services |
| Civil Works         | HW   | Bridges, National Highways, Airports, Ports, Building Complexes | LW   | Small roads, Small buildings, Maintenance works |

Source: NISG
e-Procurement

Standardized solution / PPP Models

- Customized solutions
- Licensing Models for Products
- Service Provider Model
- JV model
- Others – BOT, BOOT etc
**e-Procurement: Cost – Benefits Analysis**

- **Increased competition** (MERX in Canada reported 15% savings and the state of Virginia reported that the number of bids received increased from 12-15 to about 40-80 bids)

- **Reduced expenses in preparing purchase order** (the state of North Carolina reported savings of 35 million USD)

- **Reduction in time taken for processing purchase related administration** (Brazil reports 70% reduction in administrative work)

- **Savings in operational costs** (Guatemala reported savings of 302,000 USD)

- **Purchase of office supplies** (Philippines claims to have saved 20-40% savings) and through the use of e-catalogue (Chile reports to have saved 14%)

- **Lower bid prices** (Brazil claims to have saved 20% due to lower bid prices and North Carolina claims savings of 127 million USD)

- **Process improvements benefiting the private sector** (the Korean government estimates private sector to have saved 2.8 billion USD a year; 90% of such savings is allocated to the private sector)
e-Procurement

Regulatory Issues

• Mandated in many countries – Chile, Phillipines etc.
• Executive Order - Law
• Regulatory body
e-Procurement

Security & Authentication

- Supplier registration
- PKI & smart cards
- Security Mechanisms
- Payment Gateways
- Internal checks and controls
e-Procurement Technology Model

Source: NISG
ICT in Transport Sector

Lessons Learned
E- Governance - Lessons

Need for a Overall Framework

• Piecemeal approach is normally ineffective

• Need to develop a Framework - to achieve benefits of integration & effectiveness

• Adhoc approach, standalone systems and multiplicity of databases create more problems

• Business Process Re-engineering is the key.
E- Governance - Lessons

Need for a Overall Strategy

Technical Maturity (ICT) vs. Govt. Systems - Policies & Process Maturity

Ideal Point

Points A, B, C, D represent different levels of maturity and integration.
# Industry Best Practices

## Information Systems Projects – Standards

### Planned Project Phases - Large Projects

<table>
<thead>
<tr>
<th>Phase</th>
<th>Duration</th>
<th>Key Activities</th>
<th>Deliverables</th>
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<tr>
<td>I</td>
<td>3 Months</td>
<td>- Meet client staff and senior management.</td>
<td>- High Level IT strategy&lt;br&gt;- Project Cost Estimates&lt;br&gt;- Project Approach&lt;br&gt;- Implementation Plan&lt;br&gt;- Project Organisation</td>
</tr>
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<td>II</td>
<td>3 Months</td>
<td>- Confirm Project vision and objectives.</td>
<td>- Detailed Implementation Plan&lt;br&gt;- Hardware / Software / Network plan &amp; RFP’s.&lt;br&gt;- Staff and Project Organization&lt;br&gt;- Project Costing&lt;br&gt;- Project Schedule&lt;br&gt;- BPR Study Plan&lt;br&gt;- Change Mgt. Plan</td>
</tr>
<tr>
<td>III</td>
<td>1 Year</td>
<td>- Take inputs from institutional study.</td>
<td>- Systems acquisition&lt;br&gt;- Systems installed and tested&lt;br&gt;- Staff recruitment&lt;br&gt;- Staff training completed&lt;br&gt;- BPR Completed&lt;br&gt;- Change Mgt. Completed&lt;br&gt;- Systems in parallel Run.</td>
</tr>
<tr>
<td>IV</td>
<td>1 Year</td>
<td>- Develop understanding of client organization, systems, process locations,</td>
<td>- System fully operational.&lt;br&gt;- Troubleshooting&lt;br&gt;- Handholding&lt;br&gt;- Support and Training.&lt;br&gt;- Complete one year cycle&lt;br&gt;- System fully operational.</td>
</tr>
<tr>
<td>V</td>
<td>6 Months</td>
<td>- Staff Training.</td>
<td>- Handover procedures&lt;br&gt;- Handover completed&lt;br&gt;- User Sign off&lt;br&gt;- Client staff takes over systems.</td>
</tr>
</tbody>
</table>

**Duration**
- Phase I: 3 Months
- Phase II: 3 Months
- Phase III: 1 Year
- Phase IV: 1 Year
- Phase V: 6 Months

**Key Activities**
- Meet client staff and senior management.
- Confirm Project vision and objectives.
- Take inputs from institutional study.
- Develop understanding of client organization, systems, process locations, Staffing etc.
- Develop long / medium term IT vision / strategy.
- Purchase and install Hardware / Software / Network Equipment.
- BPR Implementation.
- Testing of Hardware / Software / Network Equipment.
- Master Data creation.
- Modules / System Integration Testing.
- Test Run.
- Parallel Run.
- Change Mgt. processes.
- Staff Training.
- New Staff recruitment.

**Deliverables**
- High Level IT strategy
- Project Cost Estimates
- Project Approach
- Implementation Plan
- Project Organisation
- Detailed Implementation Plan
- Hardware / Software / Network plan & RFP’s.
- Staff and Project Organization
- Project Costing
- Project Schedule
- BPR Study Plan
- Change Mgt. Plan
- Systems acquisition
- Systems installed and tested
- Staff recruitment
- Staff training completed
- BPR Completed
- Change Mgt. Completed
- Systems in parallel Run.
E- Governance - Lessons

Industry Best Practices

Implementation Models

- 'Big Bang'
- 'Parallel'
- 'Phased'
- 'Pilot'
Focus on Project Management

Project Management - Challenges

- Objectives
- Physical Progress
- Financial Management
- Legal
- Disbursement
- Safeguards
- M&E
- Country Risk
- Risk Management
- Funds Flow
- Staffing
- Procurement

E-Governance - Lessons

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Need to ‘Manage the Curve’

Performance Curve

TIMELINE
Development
Go Live
Second Wave

Stage I
Stage II
Stage III

Transformed Performance
Improved Effectiveness (70% of benefits)
Improved Efficiency (30% of benefits)
Baseline Performance

Project Costs

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Thank you.