

Case Studies on e-Governance in India

e-Procurement in Indian Railways

Sanjay Aggarwal
V. K. Srivastava



e-Procurement in Indian Railways

Sanjay Aggarwal

V. K. Srivastava

About the Initiative

This publication is a part of the Capacity Building initiative under the National e-Governance Plan (NeGP) by NeGD with an aim to draw out learnings from various projects implemented in various States/ UTs and sharing this knowledge, in the form of case studies, with the decision makers and implementers to benefit them, by way of knowledge creation and skill building, from these experiences during planning and implementation of various projects under NeGP.

Conceptualised and overseen by the National e-Governance Division (NeGD) of Media lab Asia/DeitY these case studies are submitted by e-Governance Practitioners from Government and Industry/Research Institutions. The cases submitted by the authors are vetted by experts from outside and within the Government for learning and reference value, relevance to future project implementers, planners and to those involved in e-governance capacity Building programs before they are recommended for publication. National Institute for Smart Government (NISG), working on behalf of this NeGD provided program management support and interacted with the authors and subject matter experts in bringing out these published case studies. It is hoped that these case studies drawn from successful and failed e-Governance projects would help practitioners to understand the real-time issues involved, typical dilemmas faced by e-Governance project implementers, and possible solutions to resolve them.

Acknowledgment

NISG sincerely thanks all the authors for documenting and sharing their rich experiences in terms of challenges and lessons learned and allowing us to publish and use these case studies in various training programs of NeGD and NISG. NISG also thanks all the external and internal experts who helped review the submitted cases, providing critical observations and for helping in articulating and presenting the case studies, both for class room use as well as a reference article.

Copyright License

This case study submitted by author/s and accepted for publication under the project of National e-Governance Division (NeGD), Ministry of Communications and Information Technology, Government of India by NISG, the program management agency, is governed by the following license of the Creative Commons. For any specific permission/feedback the publisher may be contacted.

(cc) Creative Common License - Attribution-Share Alike 2.5 Generic

The user is therefore free to make derivative works, with credit to the original author.
<http://creativecommons.org/licenses/by-sa/2.5/in/>

Disclaimer

This publication is a work product produced by external authors with information sourced from their own sources as provided under reference in respective articles and is based on experiences with Projects undertaken directly or as research initiatives closely working with the project owners or with their consent to publish the findings. The authors have provided a plagiarism declaration as per project guidelines and National Institute for Smart Governance (NISG) has put in best efforts to validate the authenticity and learning value of the article submitted. NISG has acted mainly as a content reviewer with support from identified expert resources. NISG is not responsible for any plagiarism violations or copyright infringements and respective authors are fully responsible for the same as per respective declarations provided by them. The case study should not be used as a definite source of data.

The case studies are meant for use as a background and quick reference on the topic(s) by e-Governance practitioners, and should not be treated as a guideline and/or instructions for undertaking the activities covered under any e-Governance project/s. It may also be used in a classroom for discussion by the participants undergoing e-Governance related training programs. The document by no means has any commercial intention and is solely developed for the purpose of knowledge sharing.

NISG-CBKM 71-200/Case Study/10-2014/V2

Printed & Published by
National Institute for Smart Government
www.nisg.org
on behalf of the
National e-Governance Division (NeGD)
Department of Electronics & Information Technology
Ministry of Communications & IT
Government of India

Table of Contents

1. Abstract.....	1
2. Key Words/ Key Phrases.....	1
3. Note to Practitioners	1
4. Project Context	2
5. Benefits.....	10
6. Issues and Challenges Faced.....	12
7. Lessons Learnt and Take Away	15
8. References	16
Authors.....	16
Project Fact Sheet	17

1. Abstract

After enactment of IT Act 2000, Railways in the year 2001 decided to conduct trial of web based e-Procurement. Trials were started in 2005 in ASP (Application Service Provider) mode on Northern Railways and considered successful as about 5000 tenders were successfully floated during July'05 to Jul'08. Based on this experience, another project was sanctioned in the year 2006 for implementation of e-Procurement system on eight zonal railways and five production units through railways own society CRIS. This was sanctioned to improve the transparency in procurement process and also to eliminate various problems of manual tendering.

It was also decided that initial investment made by the railways in IT infrastructure for Materials Management Information System (MMIS) should be protected and e-Procurement system should be dovetailed with this not only for economic considerations but also for better acceptability among Railways personnel who are familiar and used to the existing system.

The project of e-Procurement on Indian Railways (handling about 10,000 tenders per month) has been a great success mainly due to thrust on training, education and hand holding the users and successfully handling security concerns of the stake holders to bring confidence in them. It has improved competitiveness and image of the buying organization apart from being of immense use to vendors. As a result of this implementation, the processes have also been standardized and streamlined.

The commitment and support of the top management, telephonic and email helpdesk and continuous improvement using stakeholder's feedback/suggestion were the additional factors leading to success of the system.

2. Key Words/ Key Phrases

Centre for Railway Information Systems (CRIS), Controller of Certifying Authority (CCA), Materials Management Information System (MMIS), Diesel Locomotive Works (DLW), Rail Coach Factory (RCF), Limited Tender (LT), Open Tender (OT), Global Tender (GT), National Physical Laboratory (NPL), Standardization, Testing and Quality Certification (STQC), Indian Railways (IR), Central Vigilance Commission (CVC), Application Service Provider (ASP)

3. Note to Practitioners

The manual system of tendering has problems regarding non receipt of tenders, clerical mistakes, inordinate delays in tender processing; Tampering/Misplacement of tender files etc. Further there is lack of adequate transparency and discretionary treatment in tendering process. There is proliferation of agents/ local offices for various tender related works like purchase of tender document, submission of the bid and attending the bid opening etc.

Infructuous expenditure in preparing tender document in physical form, travel by bidders, communication, paperwork, postage/courier etc. is physical and financial barriers in the whole process. Bidders may be prevented from dropping tenders and participation in tender opening at some of the places resulting in complaints.

The E-Procurement system as described in the case study has tried to solve the above problems by leveraging the technology and using modern tools like cryptography, web technology, Public Key Infrastructure etc. This has resulted into substantial benefits to Indian Railways/ Bidders and effectively addressed the problems stated above.

Large number of available IT service providers not conforming to security and regulatory requirements as laid down by Ministry of Finance, CVC etc. are available in the market. Any new practitioner willing to opt for E-Procurement as trial or for other economic considerations must ensure proper eligibility criteria in their tender for procurement of IT services so as not fall in trap.

4. Project Context

Ministry of Railways, Government of India established Centre for Railway Information Systems (CRIS) in 1986 for design, development and implementation of Computer Systems on India Railways. Most of the early implementations or applications in the area of Freight/Passenger services were for capturing of data, compilation, transaction processing and generation of MIS.

With the enactment of IT Act 2000, electronic transactions and electronic documents got legal recognition, an essential part for e-commerce applications. It was around this time, regulatory bodies such as Controller of Certifying Authority (CCA), Cyber Appellate Tribunal etc. were established in accordance with the provisions of IT Act. Licensing of Private players to set up Internet Gateway and improved networking through availability of higher bandwidth in early 2000 led to conducive environment in the country to start e-commerce applications both in private as well as Government sectors.

Railways typically procure goods valuing about Rs.30,000 crores per year. This includes simple consumable items to highly technical and sophisticated equipments required for train operations and maintenance and manufacture of rolling stocks.

The Railway system in India is headed by Railway Board under Ministry of Railways. For ease of freight/passenger operations, Railway system is divided into seventeen Zonal Railways such as Northern Railways, Eastern Railways, Southern Railways, Western Railways etc., spread geographically across various locations in India such as New Delhi, Kolkata, Chennai, Mumbai etc. It has also number of production units to manufacture rolling stocks such as Locomotives, Coaches etc. Bulk of procurements is centralized at these locations.

Most of the Railways and Production Units had MMIS (Material Management Information System) and supporting IT infrastructure to take care of internal procurement processes such as demand forecasting, demand generation, tender generation etc. as well as warehousing requirements such as receipts, issues, inventory valuation etc.

With the above background Railways in 2001 identified trial and implementation of the e-Procurement as a vision for Materials Management Department. However considering the complexity involved in Government procurement and size of the organization, it was decided to do a pilot run at two locations. Two Railway units viz. Northern Railways and Diesel Locomotive Works (DLW) were, therefore, identified to conduct trials. Northern Railway formed an internal committee of three officers to study e-Procurement implementations in Government departments and suggest roadmap to be followed by Railways.

The committee noted that implementation of e-Procurement system especially in Government departments was in a very nascent stage. Only some Central Public Sector Undertakings and State Governments like Karnataka and Andhra Pradesh had made some early attempts on this new technology. Till then, there was no big success story of e-Procurement implementation in any Government Department which are bound by rigid rules and regulations of procurement. Hence, there were apprehensions in the mind of the stakeholders whether this new technology would fit into business processes in Railways. The department of Materials Management, which is more than 100 years old, had also evolved rules and procedures for procurement with its own typical procurement manuals, codes etc. Any proposed e-Procurement system would be supposed to conform to internal railway procedures.

Considering the risk factor, the committee gave its recommendation to conduct trial in outsourced model on the “third party infrastructure”. It was therefore recommended to invite private players, through tendering process, who had e-Procurement solutions available with them for conducting trials. Apart from being fast to implement, it also required minimal investment from Railways. Once considered successful, the Railways would switch over to their own infrastructure with full control on application software. The committee also recommended that initial investment made by the railways in IT infrastructure for MMIS should be protected and e-Procurement system should be dovetailed with this not only for economic considerations but also for better acceptability among Railways persons who were familiar and used to the existing system.

MMIS on different railway units are stand-alone application and developed at different time independently using diverse technology. While some of the applications are developed on Power Builder, others are on D2K or J2EE. Similarly back end database is also on different versions of Oracle, Fox Pro, and MS SQL etc. Even forms, queries and reports on different

railways' MMIS are not uniform. They also do not communicate with each other for exchange of materials information.

Ideally the most appropriate solution in the above circumstances was to develop an integrated MMIS to be used across all the Railway units which could directly communicate to e-Procurement systems. However considering the mandate and financial approvals it was not considered appropriate to disturb the existing legacy system of MMIS running as standalone application on different Railway units and enjoying some level of acceptability among railway users.

In the above circumstances and also due to diversity of platforms on which these MMIS were developed and the level of IT skills available on these railways in the staff handling these applications, the transfer of data between MMIS and e-Procurement systems through flat file was considered most appropriate and simple.

Eventually success of e-Procurement system has led to sanction for another project for integrated MMIS across all railway units in the country.

4.1 Pre implementation scenario

Many issues which were commonly encountered in the Procurement office prior to the implementation of this project are –

- Non receipt of tenders, clerical mistakes, inordinate delays in tender processing, Tampering/Misplacement of tender files etc.
- Lack of adequate transparency, discretionary treatment in tendering process. Leakage of confidential information.
- Infertuous expenditure in preparing tender document in physical form, travel by bidders, communication, paperwork, postage/courier etc.
- Bidders prevented from dropping tenders and participation in tender opening resulting in complaints.

4.2 Project Overview

The recommendations of the committee were accepted and Northern Railway decided to conduct trials through HCL Infosystems by signing the contract in July 2004. They were required to provide their application software license duly customized to Railway needs and host it on HCL infrastructure. They were to run the services and charge Railways on per tender basis. As per contract they were to be paid onetime fee of Rs 31 lakhs for providing licenses of their customized e-Procurement software. They were also to be paid Rs 3,000 per tender up to first 500 tenders with an option to extend beyond 500 tenders by paying Rs 2,000 per tender (up to 1500 tender) and Rs 750 per tender beyond 1500 tenders as running

expenses. Training was also imparted by the service provider to users. The website www.nreps.com was finally launched with bidder registration and trials were started in July 2005.

Even though the computer literacy among bidders was not adequate, the electronic tenders by Northern Railways in trial stage had good response in about sixty percent of the tenders. It had a good level of acceptability among railway users due to inherent benefits of the computer-based or IT-enabled systems. Trials were therefore considered acceptable and Northern Railway decided to extend the existing contract on HCL and continued usage of the portal till the time full-fledged e-Procurement system was launched on Indian Railways in August 2008. About 5000 electronic tenders were dealt by this pilot project of Northern Railway during Jul'05 to Jul'08.

Success of trials of Northern Railways gave enough confidence to the management and therefore a project for implementation of e-Procurement system was finally sanctioned in September 2006 at an estimated cost of Rs 20.30 crores. It was also decided that implementation would be made by Railways own organization CRIS and application would be hosted on CRIS infrastructure. The sanction was initially for implementation on eight zonal railways and five production units.

4.3 Implementation Plan

As the pilot application of Northern Railway was in ASP (Application Service Provider) mode customized for single buying organization, it required significant changes in design at basic level to make it scalable and pan India roll out. It also required addition of enhanced features such as Global tendering, Reverse Auction etc. From the functionality point of view, the application was divided into different modules such as e tendering, reverse auction and post tender/contract processing. It was decided that e tendering module of application would initially be released to two Railway Units in Delhi viz. Northern Railway and Rail Coach Factory (RCF), as the CRIS project team was stationed at Delhi and initial teething problem of the railway users could be properly understood and resolved. Thereafter the same would be released to rest of the Railway units. The other modules of the application were however planned to be released simultaneously. After initial success of e tendering at these two units, this application was launched at all other Railway Units in next two months. Other applications like reverse auction/ Post contract processing are being tested and would be launched by the end of 2013.

The main thrust area was on training and educating the users not only on application process flow but also on other related issues such as browser setting, Internet usage, digital signature certificate- storage, usage and other do's and don'ts.

The CRIS adopted “Train the Trainer Approach” and decided to extensively train users of all the railway units in small batches of twenty to twenty five persons so that they could go back to their respective units and train other users of their office as well as local bidders of their area.

The training was divided into four different modules to be imparted to target users in three separate phases. Module 1 was one day program designed for senior managers to provide them complete overview of the application and its capability. Module 2 was three day program designed for junior managers and staff. It included classroom sessions followed by hands on session and question answer sessions. This training was imparted in each railway unit onsite. As the application was required to be rolled out at different locations, the system was designed to provide for an administrator at local level in the railway unit so as to administer the roles and privileges to their employees. These administrators required specialized kind of training to handle the responsibility. Therefore Module 3, one day program, was designed targeting these administrators. Implementation of e-Procurement would have been incomplete and would have failed if suppliers who are equal stakeholder in the entire process were not adequately trained, enabled and made comfortable with the system. Module 4, again a one day program was therefore designed to target these bidder users and was imparted at various locations in India.

The three phases of the training, as stated above, were designed for three different component of the application such as e tendering, e action/reverse auction and post tender/ post contract processing. Special care was taken to impart training at the most appropriate time i.e. just before release of these application modules so that these could be effective.

Apart from above structured training, special provision was made in the contract for providing handholding of the users for three days onsite by the application delivery team.

4.4 Technology Selection

Open competitive bids were invited at pilot stage for trial in “application service provider mode”. Based on the evaluation criterion and relative financial ranking order was placed on M/s. HCL Infosystems to provide the services of e-procurement already developed by them

Once the pilot was successful, it was decided to extend the application on the same platform with necessary changes in presentation layer.

4.5 Web Site Development

The following possible strategies for design and development of the website were considered and evaluated

a. Early Outsourcing:

- Initial site design and development is out-sourced to launch the project quickly. The outsourcing team trains the in-house information systems professionals in the new technology before handing over operation of the site to them.
- Since operating an e-commerce site can rapidly become a source of competitive advantage for a company, it is best to have the company's own information systems in which people work closely with the outsourcing team and develop ideas for improvements, as early as possible, within the tenure of the project.

b. Late Outsourcing:

- In a traditional approach, the in house IS professionals do the initial design and development work, implement the system and operate the system until it becomes a stable part of the business operation.
- Once the company has gained all the competitive advantage provided by the system, the maintenance of the e-commerce system is outsourced so that the in house IS professionals can turn their attention and talent to developing new technologies that will provide further competitive advantage. Although for years late outsourcing has been the standard for allocating scarce IS talent to projects, e-commerce initiatives lend themselves more to the early outsourcing approach. Further the in house team may not have the required skill to launch the application.

c. Partial Outsourcing:

- In both the early outsourcing and late outsourcing approaches, a single group (either inside or outside the company) is responsible for the entire design, development and operation of a project. This typical outsourcing pattern works well for many information systems projects. However, e-commerce can benefit from a partial outsourcing approach too.
- In partial outsourcing, which is also called component outsourcing, specific portion of the project that can be designed, developed, implemented and operated by another firm, that specializes in a particular function, is identified and out sourced
- Some of the components which can be outsourced are web hosting, e-mail handling and response function, transaction processing, payment process etc.

After the project was assigned to CRIS, the Project In charge analyzed the above options and availability of resources with requisite skill sets in CRIS. It was noted that this was a new project and there was constraint in availability of software professionals who could be attached to it. Even resources attached on other projects were also not trained in developing such a complex e-commerce application involving PKI technology for asymmetric encryption and digital signature etc. None of the applications developed by the CRIS till then had used these technologies and also such a strong level of authentication and security/confidentiality of information were never considered essential in other web based projects. On the other hand outsourcing the complete development process to a third party had its own pitfalls. Apart from chances of leaving the project midway by the outsourced bidder, if it became non remunerative to them, it would pose a serious challenge to get the application transferred to in house team and subsequent maintenance of the application. It was therefore decided to have a mix of two to get the best results. The application development was therefore outsourced with the condition for onsite development and also a small team of software professionals were constituted to work hand in hand with the development team. While this strategy has helped in proper learning and complete walk through the application by in house team, it ensures future maintenance/ up gradation of the application by in house team after the outsourced bidder hands over the application and leaves the project.

4.6 Salient Features of the Project

The project was for design, development and roll out of e-Procurement system on Indian Railways through their own organization. The project was aimed to improve transparency and add efficiency to entire-Procurement process.

The main stakeholders in the project are railway users and bidders. The salient features of the application are described below:

- a. The admin module of the application allows online registration of the users. EPS administrator at the apex level had been authorized to create profile of admin users in each department of each railway unit. Login access is allowed to these users through two factor authentication using their user ID, password and digital signature certificates. They are in turn authorized to create profile of railway users in their department and also to assign roles and privileges to them. Railway users are required to have their active email account and class II/III digital certificate with organizational name. As they are internal users, they are relaxed to use Class II digital certificates instead of class III digital certificates (Class III certificates require physical verification of the certificate applicant in addition to required documentation).

- b.** Bidders are also required to have their active e-mail account and class III digital signatures certificate with organization name. Bidder account creation has been centralized at CRIS so as to avoid duplicate registration and single point contact to bidders for registration related issues. The system provides for single log in for the requirement of all the Railway Units. Login access is allowed to these users through two factor authentication using their user ID, password and digital signature certificates. The registration process involves online submission of form duly signed by the authorized bidder user. The bidder registration is free so as to encourage more and more participation. The online form submitted by bidder is examined by CRIS based on laid down procedure regarding duplicity, validity of digital signature certificate etc.
- c.** A software utility has been provided to Railway users to fetch the tender data from MMIS to EPS and sign and publish the same. Railway users have been provided facility to issue different type of tenders such as LT, OT and GT. It also allows issue of single stage – one packet as well as two packet tenders. If desired railways users can also opt for reverse auction for invitation of financial bids instead of traditional electronic tenders. Attention of prospective bidders in case of OT and approved bidders in case of LT can also be invited while issue of e-tender. Publishing of tender triggers e-mail as well as SMS to attached bidders. For the convenience to railway users tender data is filtered on different criteria and provided through different folders on their dash board.
- d.** Registered bidders are provided filtered tender data on their desk top through folders. They can also search tenders of their interest through search utility. Bidders are provided a stream line flow of bids submission by first making payment for tender document cost online through SBI payment gateway or declare the provisions under which they are exempted from submission of the tender document cost. They are also prompted to upload relevant documents as evidence. The entire bidding process basically involves filling up of technical data, commercial data and financial bid for the items included in the tender. Bidders have also been provided an upload utility to attach pdf documents to their bids. Bidders are required to sign and encrypt every page on their machine before submission. Digital Signatures on every page is considered essential to ensure authenticity and integrity of records, and non-repudiation. It provides legal sanctity to the transactions and made the application compliant to IT Act 2000, duly amended from time to time. Bidders get an acknowledgement of bid submission with unique bid ID having server time stamp. Server time is synchronized with IST acquired from NPL (National physical laboratory). Bidders

are allowed to submit their revised bid any number of times before bid closing time. They can also submit alternate offers in response to e-tenders.

- e. After lapse of bid closing time, authorized and nominated officials from Stores and finance of the respective Railway/department are allowed access to tenders for decryption of the bid data. They after authenticating themselves decrypt the bid data, thereby changing the status of the tender as “opened”. This process triggers alert to all the participating bidders and also generates pdf documents comparing financial bids and techno commercial bids separately. All the authorized users including bidders can view, download and print these documents.

5. Benefits

The list of benefits accrued to buyers and sellers are many but only few considered important by the authors are listed below:

(i) Benefits to buyer:

The e-procurement system resulted in the following benefits to the buying organization.

(a) *Improved image and transparency of the buying organization.* The e-procurement solutions made the purchasing process easy and visible to widely dispersed sellers of goods. Transparency in procurement process has reduced the opportunity for corrupt practices due to reduced human interface.

(b) *Savings in cost of purchase.* Low cost communication in real time, has led to savings in phone/fax charges as well as postage/courier charges. There is a reduction in advertisements cost too. Apart from above there is a direct saving in cost of manpower involved in procurement activities. There is a ban on recruitment of clerical staff apart from regular surrender of vacancies arising due to retiring employees. In spite of the above constraints, Materials Management Department of the Railways have been able to meet with the challenges of users’ expectations in procuring goods which is rising due to increased level of train operations. A study of **“Northern Railway Tender Opening Cell” revealed that they are able to handle increased number of tenders only with three staff as against eight to ten staff required in old manual tendering system.**

(c) *Reduced Paper work.* The traditional system of printing of large number of bulletins containing 100 to150 small value tenders, and its dispatch to registered bidders have been completely abandoned. This led to direct saving in cost of printing and distribution of bulletins. **The average annual cost in printing and distribution of the bulletins on Northern Railway only was Rs 11.40 lakhs. Almost same amount of saving is expected by remaining zonal railways as well as production units.**

(d) *Improved decision-making.* Management reporting capability of e-procurement system has helped the management to take better decision. The access to central repository of bid data against tender of all the railway units for the same/similar item is now available to users for analysis and arriving at most judicious rates for entering into the contracts. This also has given a very strong tool in the hand of purchase managers to negotiate and bring down prices in tender on hand.

(e) *Audit trail.* E-procurement system is so articulated that it leaves behind a record of activities ensuring that a robust audit trail is always available of all the activities either at the application level or the database level for auditors to verify the transactions.

(f) *Reduction in procurement cycle.* Due to elimination of dispatch and receipt time of tenders/ bids the time interval between publication of tender and closing of the bid has been reduced **by an average of ten days. Further, time required in compilation of comparative statement of financial and techno commercial bids and its checking by the associated finance has been reduced from average of 26 days to NIL.** This leads to saving of around three week time in tender processing.

(g) *24*7 availability.* The system is available online 24*7 and can be accessed by users from anywhere all the time.

(h) *Wider choice of suppliers.* E-procurement has opened up a wider choice of suppliers and access to new bidders.

(ii) Benefits to seller:

(a) *Centralized information of all the business requirements* of goods. As website allows single sign-on, bidders get information for all their business requirements arising out of railways tenders at one place. Automatic E-mail/SMS alerts are also generated through the system to draw attention of prospective suppliers.

(b) *Information regarding Corrigendum.* With the introduction of E-Procurement System, corrigendum to the tenders issued by the Purchase office triggers automatic Email/ SMS to all prospective suppliers and all those bidders who had shown their interest in the respective tender. Chances of any skewed/ discriminatory transmission of tender information, whether deliberately / unknowingly, to prospective suppliers have been totally eliminated.

(c) *The system has offered reduction in cost of travel in collection of tender documents, dropping of bids and attending tender opening event.* Also cost associated with communication, paper, manpower, courier etc. have been eliminated. The system offers convenience of bidding from anywhere and anytime in a fearless manner.

For carrying out the above activities earlier in the manual system, many bidders were required to maintain their local offices near Purchase offices which are scattered all across the country. The need for creating such establishment is no more considered useful.

(d) *Greater confidence due to transparency and fairness in purchase process.* Access is allowed to participating bidders to view and download the same comparative statement of bids, duly ranked, which is available to Purchase Officers for decision making. Bidders can even verify the content of the tender document, which is digitally signed by the Purchase Official, to ascertain its integrity.

Small and medium suppliers also got an opportunity to participate in tenders in a fair and fearless manner and compete with big players. They no longer face the threat of being physically prevented from participating in tenders by large suppliers/ contractors, Mafia or cartels.

6. Issues and Challenges Faced

- a. **Providing interface with MMIS – Heterogeneous, non-standard.** MMIS system developed and implemented on different Railways during the last about two decades are on heterogeneous and even some are on obsolete technologies. Some of these are developed using D2K platform while others are on PowerBuilder, J2EE etc. Even the backend database is varying from Oracle 8i to 10g, FoxPro, Microsoft SQL etc. These legacy systems are independent and standalone systems and widely accepted and adopted by railway users. As discussed earlier, Railway decided not to dismantle the same but provide the E-Procurement System as plug in utility for tendering requirements. E-Procurement System was therefore required to communicate with the legacy system in a seamless manner. This was a major challenge not only considering the technology but also from the availability of skilled technical manpower in different Railways all across the country.

Considering all the factors, it was decided to develop small utilities at different interfaces to create text file of required data and also for fetching the same to E-Procurement Systems/ MMIS. The project implementation teams were physically sent to install these utilities in these local systems and also to train local resources.

- b. **Managing bidder database:** There cannot be any automatic system to detect duplicity of bidders seeking multiple registrations, deliberately or otherwise, to the portal by entering the information differently. This would have created same bidder participating in a tender and submitting multiple bids as different entity. This was required to be looked into since beginning. It was therefore decided that portal registration for the bidders will be centrally handled at CRIS. All

registration requests will be manually checked to detect duplicity, if any, based on certain laid down parameters such as name of the owners, company registration number, Sales Tax registration number etc.

- c. **Standardization of processes** by introduction of standard forms and validations (including drop down values of standard inputs) has addressed the issues of diverse requirements and local practices. For example in the manual system bidders used to quote different delivery terms, various kinds of conditional/unconditional discounts expressed either in absolute terms or percentage etc. Purchase Offices used to struggle to establish freight elements to be loaded to unit rate in case bidder quotes on ex - works basis. These issues have been successfully handled through standardization and also through validations built on the platform.
- d. **Change management:** Railways, one of the leading Government departments in procurement of goods through large number of tenders has more than 5000 procurement personnel. Bringing about change and breaking the inertia, which was affecting power shift in the organization, was one of the big challenges which the implementation team has faced.

These stakeholders were not only educated about the benefits and trained but also facilitated to make them comfortable with the new system. Two pronged strategy – i.e. Top down and Bottom up were used. While strong worded instructions with strict targets were laid by Railway Board to each railway to start e-Procurement, the implementation team simultaneously hand held these users and provided prompt support to their queries and problems. However, no specific incentives were considered for motivating the employees.

To ensure buy-in of the top management periodical meetings were held involving all the stakeholders at the Ministry's level to evaluate the progress made and fix up the future targets with strict timelines. Problems arising out of development/implementation were also discussed during these meetings to arrive at acceptable solution. Well defined process for **patch management** with review at different hierarchy level and its library has been evolved for traceability and analysis of changes made.

- e. **Educating users** including bidders and making them comfortable with the system was also a big challenge especially when the level of the computer literacy was not adequate and also the digital signature technology (embedded in the application) was evolving. Extensive onsite as well as offsite training were planned and imparted to all the users. Even training had been organized on demand from the users group. Adequate care has been taken for hospitality

arrangements of participants with interactive sessions to make it success. Appropriate **FAQs** (Frequently Asked Questions) have been provided at the website to address commonly faced issues. These were also regularly updated based on the queries and feedback.

A **dedicated helpdesk** was setup to receive telephonic as well as Email queries of the users and their prompt disposal was ensured. An effort was made to resolve queries within 24 hours leaving exceptional cases where some changes are necessitated in the system.

- f. **Managing security issues:** Managing Security issues is an ongoing process and has to be handled not only during the lifecycle of the project but also during running and operations of the system. An application considered secured today may not be secured tomorrow due to new threats and also due to deployment of patches. Lot of thrust has been given to this aspect of the application and same has been looked into in a holistic manner, including application, network, physical etc. It was considered by the Project Management Team that the security testing and audit should not only be attempted at the end but the third party testing / audit personnel should be involved since beginning at each and every stage of development of the application. STQC from Department of Information Technology, Government of India were therefore contracted in the early stages for testing individual modules at intermediate stages, and also before final delivery and periodically thereafter.
- g. **Feedback** from all the stakeholders were encouraged and highly appreciated. These were discussed and deliberated upon during workshops and meetings with Railway Board and changes made in the application wherever considered necessary.
- h. **Regulatory Compliance:** During the lifecycle of the project there were some changes to be essentially complied to conform to the instructions issued by regulatory bodies such as CCA, Ministry of Railways, and Ministry of Finance etc. For example change in hash algorithm from SHA1 to SHA256 and increase in length of public /private key with effect from Jan 01, 2012 necessitated changes in database structure etc.
- i. **Coordinating with multiple Railways/ Departments:** As the application was to be deployed in large number of railways/ departments, adequate capacity was built by CRIS to attend to their queries/problems. The project team was also informally imparted attitudinal counseling to handle such requests in a polite, friendly and positive manner. Apart from above the administrator created in each department of the Railways was educated and enabled to work as catalyst

and Project Champions and provide first level of support on the spot. While release of the application simultaneously at various locations raised certain challenges, it helped in motivating laggards and showing them the path followed by the departments which are doing relatively well.

- j. **Cartel Formation:** The issue of cartel formation in bidding **could not be solved** completely through this system. However, cartel formation is a phenomenon occurring in tender system due to many reasons such as limited number of approved vendors, their capacity vs. order book, ethics, physical barriers etc. Infact e-procurement system can never take care of all these factors leading to cartel formation. However, the issues like physical barriers in dropping of bids etc. are taken care of by the e-procurement system. Apart from this, transparency and unrestricted availability of symmetric information among bidders community reduces the tendency of cartel formation.

7. Lessons Learnt and Take Away

Simple Registration Form for bidders and minimal pre-registration requirement with no portal registration fees has made it a great success among bidders. It has helped the bidders to break the initial barrier and has also helped the portal to gain popularity in the initial stages. Once registered, these bidders start accruing enormous benefits as stated earlier.

When there was the risk perception, railways involved private player to host and run the services but when the trials became successful it decided to completely own the infrastructure and application. This has been considered as most logical and economical approach for implementation of such a complex project which was not proven in any other Ministry at that time.

Hosting the application on its own infrastructure not only addressed the users' concern of sensitive bid data available on third party server but also complied with the regulatory requirement of Government of India.

The support of the top management from the day one has been one of the critical success factors in implementation of the project.

Complete handholding, including comprehensive and continuous training for planned for 192 days in the beginning (2580 trainee days) and thereafter on demand has made it popular among all the stake holders.

The committed project team comprising of business experts and experts from the field of IT, help desk, strong security features and MIS has also contributed to the success of the project and its timely implementation without any cost overrun.

Participative design process using feedback from all stake holders is essential for success of any project.

8. References

- a. www.indianrailways.gov.in
- b. www.cca.gov.in
- c. www.ireps.gov.in
- d. IT Act 2000
- e. Interoperability guidelines issued by CCA

Authors

Sanjay Aggarwal

Deputy Chief Materials Manager

Northern Railways

Sanjayag6@gmail.com

Sanjay Aggarwal is an officer of Indian Railway Stores Service (IRSS) having experience of more than two decade in public procurement, General Administration and Planning and launching of various e-governance projects.

V K Srivastava

Chief Materials Manager

Northern Railways

Sriv.vk@gmail.com

The author belongs to Indian Railway Stores Service (IRSS) 1981 batch and has worked on many railways in various capacities as procurement expert. He was also General Manager/CRIS from Nov'06 to Jul'11 and was project in-charge for implementation of E-Procurement system on Indian Railways.

Project Fact Sheet

Project Owner: **Rajaram Prasad**
General Manager/PS
Center of Railway Information Systems
rrp@cris.org.in

Sanction of pilot project	:	August 2004
Tendering started on pilot setup	:	July 2005
All India project sanctioned	:	Sept 2006
Estimated cost	:	20.30 crores
Website Launched on	:	25 th Aug 2008
Number of Railway Units	:	36
Number of Departments	:	56
Total number of tenders uploaded Till Jan 2013	:	4, 20,000
Number of registered bidders	:	16,100
Present workload	:	10,000 tenders per month
Penetration of e tenders on IR	:	95%

HW/ SW Environment of the project:

- DB and Web servers on RHEL and App server on Windows Advanced 2003
- RDBMS – Oracle 10g with RAC
- Application – Broadvision E-Commerce
- Web server – Tomcat 5.0/Apache



**National Institute for
Smart Government**

Hyderabad

YSR Bhavan, Financial District, Nanakramguda,
Hyderabad - 500032
Telangana, India.

Ph: 040-66545352, Fax: 040-66545300

Delhi

Mahanagar Door Sanchar Sadan, 9, CGO Complex,
Residential Complex,

1st floor New Delhi-110003

Ph: +91-11-24321445, Fax : +91-11-24321444

Website : www.nisg.org



National e-Governance Division

National e-Governance Division

Department of Electronics and Information Technology (DeitY)
Ministry of Communications & Information Technology
(Government of India)

Electronics Niketan, 6, CGO Complex,
Lodhi Road, New Delhi- 110 003

India

Ph. +91-11-30481624

Website: www.negp.gov.in