

Assessing e-Service Quality of IRCTC Portal, an e-Government Project in India

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This study was conducted to understand citizens' views on the service quality offered by the IRCTC portal. The service quality of the portal has not been given enough importance in India and feedback from users is rarely accepted. Generally the government web sites or portals are judged based on the perception of the service provider and technological purview. This study can help to improve government portals which need to be predominantly citizen centric.

Indian Railway Catering and Tourism Corporation (IRCTC), a Government of India enterprise, had launched a portal to make the process of rail based tourism efficient and transparent. www.irctc.com is a popular e-government portal as it serves as a big relief for citizens to plan their travel easily. In this study we have tried to assess the effectiveness of the portal in terms of service quality as perceived by the users.

We adopted a scale proposed by Yang, Cai, Zhou and Zhou (2004) based on Technology Acceptance Model (TAM). A survey was conducted based on questionnaire. A regression analysis was then carried out of responses to understand the contribution of factors like usefulness-of-information, adequacy-of-information, usability-of-the-portal, accessibility to different services and interactivity of citizens with the railway authority in service quality offered by IRCTC.

We found significant relationship of most of the factors in the scale with service quality. The scale can be improved further to use it as a tool to assess effectiveness of government portals.

Introduction

In a developing economy like India, the need of electronic government has become quite essential to fight corruption and serve the citizens in a better way to gain their confidence. Different government levels as a general trend, has adapted to technological sophistication shifting the focus from the paper work to a more organized approach and technically enhanced procedures. Hence e-government has gradually evolved from its nascent state of mere presence on net to a transactional and integrated application. Information Technology was deployed to manage data intensive functions related to elections, census and tax administration to name a few.

Early nineties, Information Technologies were supplemented by Communication Technologies (ICT) to extend its use for wider sectoral applications with policy emphasis on reaching out to rural areas. Some major policy initiatives in 1998 led to introduction of major programs for e-enablement of government departments and related projects on e-governance.

In late nineties, Indian Railway Catering and Tourism Corporation built a portal to promote rail based tourism in India and achieve high growth in coordination with state agencies, tour operators, travel agents and the hospitality industry. This portal was exclusively an endeavour of Indian Railways which later was connected to the official portal of Ministry of Railways. This portal is one such few portals which have been able to gain popularity among the citizens from the very beginning. To conduct this study we have referred to e-government-specific research journal, conference series and various government reports. In this research we have studied effectiveness of IRCTC portal from the user's perception.

Role of Portals in e-Government

The fact that e-government is neither a homogeneous nor a static phenomena had led to several studies on the dynamics involved in different stages of e-government implementation (Gil-Garcia & Martinez-Moyano, 2007; Heeks & Bailur, 2006) Focus

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of studies had been the perspectives, methods and practices to integrate each system of the government. Varied theoretical and conceptual models have been proposed by researchers to conceptualize and characterize e-government (Fountain, 2001; Dawes, Pardo & Cresswell, 2004; Gil-García & Pardo, 2005; Gupta & Jana, 2003) so that best possible services can be extended to the citizens. The concept of service quality emerged from marketing and was successfully implemented in e-business through different electronic means specially using websites and portals. E-government adopted the same technology to render better interactivity between government departments and users.

Portals were designed to encapsulate working complexity of government departments, which for decades had acted as barriers for citizens to get an easy access to government services. They offered an opportunity to reorient services around the needs of citizens while consolidating back office responsibilities (Gupta, Kumar & Bhattacharya, 2004).

The demand for direct access to government information, from both inside and outside government, is influencing the design and management of these information services. Government departments are becoming increasingly focused on maintaining electronic data and records in the format which is easily retrievable by users, as and when desired by them. Government portals allow for self service, from searching for information to paying tax. The diversity of e-Government applications and functions is offered to citizens through various types of websites and portals:

- National Entry Points: Gateways or Portals
- Citizen- or Business-Centric Portals
- Ministry-level Websites
- Parliamentary Websites
- Judicial Branch Websites
- Portals for Provincial, Local and Municipal Governments

- Personal Websites for Elected Officials

Each portals has its own importance because e-government services extend across different government department, organisational boundaries and heterogeneous infrastructures, there is a crucial need to manage information resources stored in these separate systems.

About IRCTC

Indian Railway Catering and Tourism Corporation Ltd. is a Government of India enterprise and came into existence in 1999. The website www.irctc.co.in, played an important role in changing customer experience for booking tickets. Official website of Ministry of Railways, Government of India, is www.indianrailways.gov.in, yet the portal www.irctc.com was launched to ensure user friendly and quality service to citizens and tourists. Now both the portals have been linked through options like finding a train number or the right train going to a particular area.

Long queues for booking tickets and black marketing of tickets were successfully curbed to a large extent. It has also changed the concept of hospitality, travel and tourism and provides comparable service to befit the best of industry practices. Today the site encourages customer loyalty program like redemption of points, and travel coupons which have added to its popularity. Recently this site has introduced the concept of IRCTC Authorized Agents, who are either public or private organizations entrusted with the authority of booking tickets, e.g. IATA (International Air Transport Association), RSTA (Rail Travel Services Agents), e-Mitra, e-Seva and Thomas Cook India Ltd. Besides this, IRCTC has the internet café scheme where the café is authorised to book tickets for customers. The cafes can be used as public kiosks for booking tickets in remote areas. Over a few years the portal has proved to be efficient in understanding its customers and thus has gained popularity among the citizens of India.

Railway Tourism has experienced excellent growth in India from IRCTC's inception. Dynamic marketing

strategy has been adopted with major tour operators and State Tourism as partners so that citizens and tourists can avail exclusive tour packages across the country. This has been the main concern of IRCTC. It also arranges for full train charters, coaches as well as reserved berth programmes through regular trains for tourism purposes. Tickets are delivered at the doorsteps through organized courier services. The delivery network is vast; with a prompt service of maximum three days .India being a subcontinent some remote districts of states like West Bengal, Orissa, Gujarat Manipur, and Nagaland are yet to be included in the list.

IRCTC has plans to set up over 50 multi-cuisine food plazas at major railway stations throughout the country. The Food plazas will have contemporary service facilities fair pricing and round the clock operation to suit passenger convenience. IRCTC also provides voice service through call centre. 139 has to be dialled from anywhere in the country to get all information from Indian Railways.

This web portal also provides interaction forum for opinion poll on any issue on board. In the portal www.irctc.com an on-line Complaint Management System has been introduced to facilitate the passengers for lodging their complaint. Complaint is sent directly to the concerned licensee for immediate submission of comments. A unique complaint number is allotted to the complainant for viewing the status by the complainant at any time. An auto-generated reply with the unique complaint number is sent to the complainant's mail id. This system is also assessed by all the Zonal/Regional/Corporate Officers. In addition to this, a process of automated inspections in CMS has been introduced by IRCTC.

Electronic transaction is secured by Broad Vision, Veri Sign, Master Card Secure code , Verified by Visa and CRIS in the portal. Special concessions for senior citizens are available which is automatically calculated and induced in the price of tickets. Refunding of fare is done electronically both for i-tickets and e-tickets.

Different schemes and package tour information are updated in sites and are informed to citizens through e-mails. Mobile ticketing has been enabled in sites which make the purpose of the portal successful to a greater extent. IRCTC interface is also available in Hindi. The home page of the portal is informative and educative too. A new interface is ready to be deployed in near future which will render an improved usability for the citizens. A snapshot of the present home page has been given below to justify the features stated above. IRCTC received National award for E-Governance Best Citizen Centric Application for the year 2007-08 and was also awarded the National Award for E-Governance, 2007-08 jointly by Department of IT, Government of India and Government of Haryana.

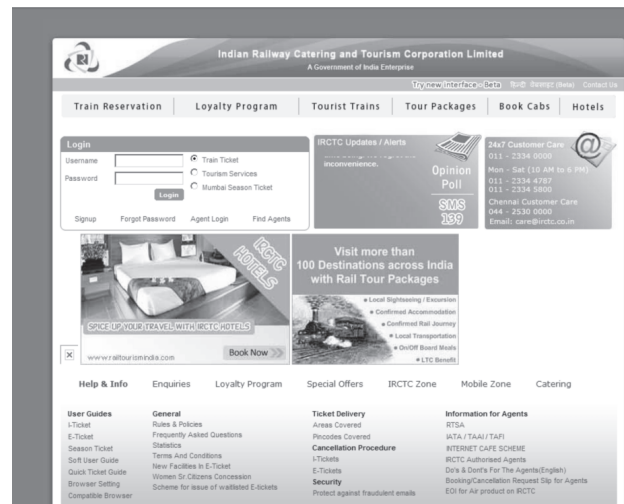


Fig1: Snapshot of IRCTC portal

Quantifying Service Quality

Bitner (2000) and Grönroos (2000) emphasized that all firms virtually compete on the basis of the service they offer on their core product. According to Hallowell (2002), the link between operations' strategy and service delivery is the base for creating a "virtuous cycle." A virtuous cycle is a customer loyalty cycle which starts with navigation, continues through information delivery, customer support, logistics phases, and results in customer loyalty. For last two decades 'service quality' has

been a topic of academic investigation. Increasing research and development in internet technologies and extensive implementation of ICT in commerce and government activities led to emergence of significant growth in e-commerce and e-government in the last decade. Analogous to e-Commerce, which allows businesses to transact with each other more efficiently (B2B) and brings customers closer to businesses B2C, e-Government aims to make the interaction between government and citizens G2C, government and business enterprises G2B, and inter-agency relationships G2G more friendly, convenient, transparent, and inexpensive. With the introduction of e-commerce and e-business 'service quality' was redefined to e-service. Santos (2003) defines e-service as online consumers' overall evaluation and judgement of excellence and quality in virtual marketplace. Government activities use electronic modes like biometric recognition, unique identity number and voice aid besides internet usage. Most of e-government activities are generally carried out through websites or web portals as internet is a well accepted and efficient medium to reach out to citizens.

Websites or web portals need to be effective in e-government paradigm; as citizen centricity is a major concern for service delivery. Effectiveness of e-government portals can have two perspectives: organizational determinants and citizen determinant (Welch & Pandey, 2007). This study is based on users' perception of the portal so we have deliberately omitted the former perspective. Citizens' satisfaction and loyalty depends on three basic factors: ease of navigation, complete information dissemination and online support. Ease of navigation leads to a decrease in citizens' support costs and service improvement. Complete information dissemination involves providing relevant, accurate, and up-to-date information to navigators. Difficult navigation, and lack of ready availability of necessary information, requires online support for citizens and other users. Extensive reliance on customer support might lead citizens to return to bricks-and-mortar systems. So, design and effective operation of

the portals in the service delivery system is crucial to the success of any e-government operation.

Three key elements of user-centric evaluations of e-government web portals are essentially: functionality, usability and accessibility. Functionality testing is used to assess the performance of Web site in a desired way that the site is meant to fulfil. These functions can include basic search functions, filling forms, document delivery, multiple languages, and any other operational elements of the site that users need to employ. It has been noticed that even if a wide range of information and services are available on a site, there might be no search function, flawed instructions, poor design and layout, missing navigation and orientation elements, no contact information, inaccurate or incomplete search results thus preventing users from accessing and using the available information and services.

Most of the works have been done on formulating strategies which can help to build successful phases of development in e-commerce and design perspective to be adopted for different portals so that users find it lucrative to use them. Several scales have been developed to quantify the quality of service. Zeithaml, Parasuraman & Malhotra (2000, 2002), Zeithaml, Rust, & Lemon, (2001) and later Parasuraman, Zeithaml & Malhotra, (2005) carried out a study on internet service quality and developed the e-SQ scale, an extension of SERVQUAL. E-service quality was defined as the extent to which a Web site facilitates efficient and effective shopping, purchasing, and delivery of products and services.

This scale was proposed to measure the degree to which a web site facilitates effective and efficient purchasing. Initially, the e-SQ scale comprised of 11 dimensions. Later it was refined and reduced to seven dimensions. Parasuraman, Zeithaml & Malhotra, (2005), Gefen, (2002) suggested three dimensions: tangibility which ensured increased consumer loyalty; a combined dimension of responsiveness, reliability, and assurance associated with increased

consumer trust; and empathy. Further study of service quality dimensions, excluded tangibility, and reinstated that assurance was associated with consumer agreement (Devaraj, Fan & Kohli, 2002).

Jun, Liang Liang and Fubin, 2009 had examined the applicability in Evaluating E-government Web Sites Service Quality using E-S-Qual. The researchers had drawn an analogy of interaction of commercial sites and e-government sites and made subtle changes to encompass the service quality expected by citizens from a government site. The scale hence developed is a replica of E-S-Qual and E-Res-Qual befitting the requisition of e-government.

A brief literature review is given below:

Table 1: Literature Review of Scales given by different researchers to measure service quality of web sites/portals

Researchers with years	Dimension
Liu & Arnett (2000)	<ol style="list-style-type: none"> 1. Quality of Information 2. Service 3. Security 4. Playfulness perceived by consumers 5. Design of the web site
Loiacono, Watson & Goodhue (2000) WEBQUALTM	<ol style="list-style-type: none"> 1. Informational fit to task 2. Interactivity 3. Trust 4. Response time 5. Design appeal 6. Intuitiveness 7. Visual appeal 8. Innovativeness 9. Flow (emotional appeal) 10. Integrated communication 11. Business process 12. Substitutability
van Riel, Liljander, & Jurriëns (2001)	<ol style="list-style-type: none"> 1. Core service

Yoo & Donthu (2001) SITEQUAL	<ol style="list-style-type: none"> 2. Supporting services 3. User interface 1. Ease of use 2. Aesthetic design 3. Processing speed 4. Security
Researchers with years	Dimension
Barnes & Vidgen, WEBQUAL 4.0	<ol style="list-style-type: none"> 1. Web site usability 2. Information quality 3. Service interaction
Wolfenbarger & Gilly (2001, 2002, 2003) ECOMQ/ETAILQ	<ol style="list-style-type: none"> 1. Web site design 2. Reliability 3. Privacy/security 4. Customer service
Aladwani & Palvia (2002)	<ol style="list-style-type: none"> 1. Web site design , 2. Specific content, 3. Content quality 4. Technical adequacy,
Li, Tan & Xie (2002)	<ol style="list-style-type: none"> 1. Responsiveness 2. Competence 3. Quality of information 4. Empathy 5. Web assistance 6. Call-back systems
Yang, Cai, Zhou, & Zhou (2004)	<ol style="list-style-type: none"> 1. Usability 2. Usefulness 3. Adequacy of information 4. Accessibility 5. Interaction

Applicability of Web Portal scale in E-government web portal

Yang et al. (2004) developed a scale to assess the service

quality of Information Portal. The ‘instrument’ was prepared based on ‘information quality’ and ‘system quality’ of a web portal as perceived by the users of the portal. Six dimensions were initially proposed to evaluate service quality of portals, but later five dimensions were considered and validated by data collected for a commercial property developer portal. The five dimensions were usefulness of information and adequate information which contributed to information quality and usability, accessibility and interactivity which constitutes system quality.

Service provided by a government site or portal is different from a commercial site because of multiple reasons. Foremost the service offered is predominantly informative. Secondly the user category differs. Thirdly government authorities

are hardly answerable to public even in a democratic country like India. Cyber laws in India need to be robust to deal with any transaction issue. Fourthly government site rarely prioritize citizen feedback at the frontend. Since citizen feedback system is underplayed the assessment of usage of e-government portal remains an issue.

As most of the government portals are designed to communicate information to citizens, we have tried to draw an analogy between an information portal, and e-government service portal.

The reference scale was devised based on Technology Acceptance Model given by Davis (1989). The scale identifies five dimensions which are described in Table 2:

Table 2: Analogy between properties and purpose given for a web portal and for irctc portal

Property	Purpose served for web portals	Purpose to be met in IRCTC
a. Usefulness of information	Refers to value information, its reliability and accuracy along with relevance of the information to the user. Reliability necessarily means the consistency and dependability. Information provided in the web should be timely and has to be updated regularly. The information is expected to be free of error.	Refers to accurate, updated and reliable information which is useful to citizens buying tickets
b. Adequacy of information	Explains the completeness of information. Complete information for existing and potential customers and hyperlinks to relevant web portals should be provided. e-governance.	Explains the completeness of information. Government web portals should provide information for the users so that they understand the working of government agencies thus helping to promote Hyperlinks to relevant web portals (www.indianrailways.gov.in)should be provided.
c. Usability	Refers to user friendliness. Content layout, website structure, user interface web site appearance and visual design, clarity, search facilities greatly influence user visiting the site.	Content layout should be distinct to avail service to the maximum. User interface with multilingual facility (user friendliness), clarity and search facilities can enhance number of users. Privacy and confidentiality add to the

d. Accessibility	It essentially refers to availability and responsiveness. All time availability of information along with speedy log-on, search, downloads	security quality of the site. 24/7 availability of information along with speedy log-on, responsiveness and downloads
e. Ease of interaction	Interaction can be between service providers and users, users and website or between peer users. Personalized services may be expected by users can add value to the web site service	Opinion poll and Complaint management system is good way to interact with customers.

VI. Assessment of IRCTC Portal Research Methodology used:

Questionnaire was designed based on the items provided in the research of Yang et al. and a survey was conducted on factors like usefulness of information, adequacy of information, usability, accessibility and ease of interaction, privacy and security. A Likert scale of 1-5 was used in the questionnaire ranging from strongly agree to strongly disagree. A sample size of 500 respondents was taken from the population of Delhi NCR region. Only 286 responses were complete and could be considered for analysis. Multiple Regression method was used to study the influence of five factors proposed in the scale on overall service quality (SQ) and overall satisfaction (S). As we were using a previously validated scale, we used Model fit method of calculation in multiple regressions. The independent variables were fed through 'enter' method. A second order relation is also mentioned in the original scale between service quality of portal and overall satisfaction of users about the portal. Table 3 provides the model summary for both first order and second order relation.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.593	.352	.340	.42614
Dependent Variable: SQ				
1	.658	.433	.431	.48286
Dependent Variable: S; Independent variable: SQ				

Since Adjusted R Square gives the most useful measure of the success of the model, we considered

this value and found the model accounts for 34% variance of the Service Quality (Criterion Variable). Though the first order relation defined in the scale has service quality as the criterion variable, we have also tried to assess influence of the predictor variables on total satisfaction. Table 4 gives a correlation matrix with Pearson r for individual factor.

Table 4: Relationship (correlation coefficients) of Independent variables with dependent variables: (N=286)

		SQ	S
Usefulness	Pearson Correlation	.276**	.328**
	Sig. (2-tailed)	.000	.000
Adequacy	Pearson Correlation	.432**	.496**
	Sig. (2-tailed)	.000	.000
Usability	Pearson Correlation	.478**	.362**
	Sig. (2-tailed)	.000	.000
Accessibility	Pearson Correlation	.104	.151*
	Sig. (2-tailed)	.079	.010
Interactivity	Pearson Correlation	.417**	.302**
	Sig. (2-tailed)	.000	.000

**Correlation is significant at the 0.01 level (2-tailed).

*Correlation is significant at the 0.05 level (2-tailed).

Correlation matrix shows significant individual correlation of most of the predictor (independent) variables, with service quality (dependent variable) of the portal. Adequacy shows a highest correlation coefficient of .496 and is significant. This result

can be easily justified as the citizens are new to the service of e-government and railway portal providing sufficient information for booking tickets, availability of seats and fare of tickets are considered important criteria for a portal to be used frequently. Accessibility does not significantly influence service quality but it contributes in overall satisfaction of a customer with a correlation coefficient of .104 and .151 respectively. The observation implies that though the speed of the system or page download is not fast yet people are satisfied with the portal service.

The beta value is a measure of how strongly each predictor variable influences the criterion variable in the complete model and is known to be the standardized coefficient.

Table 5: Standardized coefficients of regression		
Usefulness	-.025	.690
Adequacy	.297	.000
Usability	.259	.000
Accessibility	-.109	.052
Interactivity	.238	.000
a. Dependent Variable: SQ		

From the above table we conclude that usefulness of information and accessibility does not affect service quality significantly. This is because people are happier with adequate information which gives them well organized search option, complete train information and comprehensive tour details which are not available in other sites rather than usefulness of information which necessarily should provide updated information and valuable tips on making plans for travel. Since the portal is not very prompt in updating information or providing any valuable information concerning touring package, citizens tend to rely on other media for these information.

Accessibility which indicates server speed or sometimes login problems does not have a negative influence on opinion of the customers because the relief they get by booking tickets from anywhere and at any time is a great service provided by IRCTC

especially for people who have busy schedule and cannot stand in long queues for booking tickets or hotels. It was also evident from interviews with many citizens that though the present condition of accessibility is acceptable to certain extent, they definitely want an improvement in the service quality.

Usability takes care of privacy and security of transaction information along with finding right information in less time. Analysis shows that it has a significant effect on service quality. Interactivity is also found to show considerable significance in assessing service quality.

The model had a second order relationship of overall service quality with overall satisfaction. So regression was used to find the significance of this relationship and was found to be significant with 43% of variance and a beta value of 0.658 at $p = .000$ ($p = \text{significance}$).

Conclusion and Recommendation

The research had two aspects, firstly whether the instrument adopted for the study is proper for evaluating IRCTC web portal and secondly to what extent the IRCTC portal has been able to serve the citizen of India. Regression result shows that 34% of variance is explained by the model. It can be thus concluded that the scale though was devised to measure the service quality of an information portal (for Real estate) the same scale can also be used to evaluate the quality of service of an e-government portal to an appreciable extent. It is recommended that the scale can be improved by introducing one more dimension, citizen centricity. This dimension can take into account features like provision for multiple language, 24/7 availability, safe transaction, interoperability of different departments and opinion poll by citizen.

About the portal the study concludes that IRCTC has been able to encourage citizens for online reservation and plan their travel to an extent but still a lot of improvements need to be made. Insignificant contribution of Usefulness of information on the

service quality is quite surprising as previous studies show that this factor is supposed to have strong influence on the dependent variable. The result can be justified by explaining the nature of usage the portal has. The portal though tries to update the news and provide a platform of relevant information, yet the citizens generally use the portal just as an 'alternative' to long standing queues for booking tickets.

If we consider the citizen centricity factor, then the portal lacks a number of important information. The site does not have information regarding change of schedule of trains which reduces the usefulness of information. The portal www.irctc.com lacks efficient mode of handling public grievances; there is no interactive message board so that the citizens can actively participate in suggesting new ideas. To encourage more citizens, multilingual option should be introduced especially Hindi interface. Since Hindi is the national language it should be given appropriate importance. Besides, multilingual facility, an animated tour guide will be appreciated by the citizens who are not comfortable with computers or electronic mode. Bank service is rarely available after 11:00 pm. Thus the server fails to work if debit card option is availed and in case some banks allow the transaction the response is very slow. Some citizens have reservations against the refund policy of IRCTC which needs a new approach altogether. The i-ticket though booked online cannot be cancelled online. Cancellation charges are quite high and need to be revised; otherwise online booking remains a luxury for high class and upper middle class people.

To make it a portal for common people who avail railway services regularly, a proper voice aid instruction option is a must requirement. The study has been an effort to view www.irctc.com in international standard by using an established scale. To take this research ahead a proper scale to evaluate service quality of e-government projects is recommended and then evaluated.

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