

**Title of the paper - Can Customer-Centric E-Business System Help The Indian Railways?**

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# Can Customer-Centric E-Business System Help The Indian Railways?

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## **Abstract**

The article provides significant new insights into the development and implementation of e-business strategies that will contribute to the Indian Railways' efficiency in satisfying passengers.

The success of application of e-business strategy to railways depends on the value added of e-business to railways. Currently, the Indian Railways is looking at e-business to protect its assets and to secure customer's satisfaction, and to be successful in generating more revenue. In view of the new features of Internet, the core question of this paper is:

*Can Customer-Centric E-Business System Help The Indian Railways?*

In order to provide an answer to this question, the researchers conducted an online survey and developed a Customer Centric E-Business (CCEB) System Model for the Indian Railways. With respect to the typology suggested by Porter, the results indicate that Porter's model was essential in evaluating the railways under both descriptive and elucidative aspects.

It has been 3 years since Indian Railways introduced e-ticketing with the intention of doing away with the need for carrying a physical ticket. The Railways need to develop an overall strategy covering: strategic management, IT infrastructure, design, content, e-commerce systems, marketing and customer service. The Railways also needs to be creative and entrepreneurial. As every entrepreneur knows, one will only be truly successful if one provides genuine value to the customers and solves their problems.

The success of the Indian Railways applications and the communications, data, and control afforded by the Internet are encouraging. The Internet is not just another medium or a distribution channel to reach customers. It is an important medium to find new customers and continue relationships with current customers.

*Key Words – Indian Railways, E-Ticketing, Porter's model, Indian infrastructure, Passenger Reservation.*

## **Introduction**

The history of The Indian Railway began on 22 Dec 1851 when a goods train started. The first passenger train started on 16 Apr 1953 between Mumbai and Thane. Currently, the Indian Railways is having more than 8700 passenger trains. A normal passenger train consists of eighteen coaches where 9 coaches are sleeper class; 3 to 5 are air-conditioned coaches. A normal passenger sleeper coach accommodates 60 to 72 passengers. Indian Railways makes 70% of its revenues and most of its profits are from the freight sector. Indian Railways operates with more than 7,500 Engines, more than 37,800 passenger coaches and more than 2,22,000 wagons. There are approximately 6,850 stations and 700 repair shops. Indian Railways maintains total workforce of 15,40,000 and is the largest employer in the world.

Electronic Commerce is defined as "buying and selling of goods and services through electronic technology utilising on line services such as Internet, interactive television, commercial online services and screen telephones so that an organization's objective can be achieved." [Arthur,T et al 2002]

In the 21st century, digital technologies will push beyond the existing boundaries in all the spheres of our lives [Choi, S. Y. 2000]. The transition from brick-and-mortar business to "clicks" business is happening in all sectors of the economy [Deitel, H.M. et al 2001]. Any size business can have an e-commerce strategy; from a garment shop, to a medium-sized business selling confectionary to a giant retailer like Wal-Mart [Matthew, R 2000]. Some e-commerce companies sell only over the Internet; others sell both over the Internet and in standard brick-and-mortar distribution channels [Afuah, A 2001]. The railways airline managers realize that a major business transition is taking place. Some believe that the various processes by which this monopoly has developed will need to change.

Regardless of which business model the Railways adopt, to be successful, it needs to understand how the Web and e-commerce affects their business [O'Brien.T. 2000]. The Railways need to develop an overall strategy covering: strategic management, IT infrastructure, design, content, e-commerce systems, marketing and customer service. The Railways also needs to be creative and entrepreneurial. As every entrepreneur knows, one will only be truly successful if one provides genuine value to the customers and solve a problem for them.

The scope of this research was to create an e-business solution, which will concentrate on developing a Customer-Centric E-Business (CCEB) System Model for the Indian Railways.

### ***Objectives***

- To define the value added process of passenger requirements.

- To provide information for Railways Administration of India, Railway managers and Railway employees for decision making about application of an e-business model to the Railways industry.
- To apply this e-business model for the Indian Railways and assess its comprehension to business efforts.
- To develop an e-business framework that is aimed to create better passenger relationship with the Indian Railways.

### *Literature Review*

One of the faster-growing business sectors is Internet-based commerce, commonly called e-commerce (electronic commerce) or I-commerce (Internet commerce). E-commerce includes both B2C (Business-to-Consumer) and B2B (Business-to-Business). The demand for e-commerce systems will translate into career opportunities and new challengers for systems developers. Advances in technology have greatly expanded the role of e-commerce in business. Some business analysts believe that the Internet is changing consumer buying habits and reshaping the economy. E-commerce is changing traditional business models and creating new ones [Shelly, G.B., Cashman 2001].

In India, e-ticketing is the fastest growing e-commerce category. The railways have sold over Rs. 700 crore worth of e-tickets in 2006-07. This constitutes about 30% of the Rs 2,300-crore estimated online transactions by Internet and Mobile Association of India. The projected figure for 2007-08 is a whopping Rs.1,500 crore, double that of the previous financial year. It is the perfect example of self-service e-economy and the Internet is the domain of all information, bookings, and allocation of capacity [Komenar, M. 1999].

BroadVision Inc, a provider of enterprise business portal applications based in California, USA, runs the IRCTC site on its BroadVision e-commerce platform. A big challenge for BroadVision was integrating the legacy system with the existing reservation system, and verifying credit card information in real-time as bookings had to be confirmed on the Passenger Reservation System (PRS) of the railways immediately. At the start, the PRS had to handle about six lakh reservations per day. Internet connectivity at that time was poor, and pages took a lot of time to load. Moreover, sometimes customers used to book a ticket multiple times since they kept clicking repeatedly. Initially, IRCTC was ready for 1,00,000 to 2,00,000 hits per day. But, the actual number went up to 1.3 million enquiries daily in addition to over 2,000 actual bookings. This resulted in terrible traffic jams, due to which their payment gateways also went down. ICICI Bank and Citibank (the payment gateways) were therefore asked to upgrade their services. Also, there were issues related to failed transactions, which cost the organisation about 20 percent of the overall transactions. Besides, they had to deploy extra people whose primary job was to refund money for failed transactions. IRCTC's system runs on Intel-based servers and according to the organisation, it provides them with cost efficiency, robustness, smooth integration with legacy applications, and reliability for Web-enabling the system. The organisation also uses a combination of Intel, Red Hat and Oracle products. The IRCTC site is secure, and stealing credit card details is not possible since they use 128-bit

encryption. Further, credit card details are not stored in the system [Gustafsson, A at al 1999].

It's been 3 years since Indian Railways introduced e-ticketing with the intention of doing away with the need for carrying a physical ticket. All one has to do is log on to [www.irctc.co.in](http://www.irctc.co.in) and book the ticket(s) just like any normal booking, after giving details of photo identity card details of any one of the passengers. After getting confirmation of the booking, one takes a printout of the Electronic Reservation Slip (ERS) and can perform the journey with the ERS and the photo identity card. There is also a provision for the cancellation and refund of the booking online, without any extra effort on the part of the individual. These efforts of bringing the Passenger Reservation System (PRS) to the people are for a very nominal charge .

There was a major change after a year, when there was a need to introduce cash payment for booking online. This was because online bookings on the Indian Railway Catering and Tourism Corporation (IRCTC) site involves credit card payments or a net banking facility, limiting its utility for a vast majority of Indians who prefer to pay cash. This problem was solved by Sify, which tied up with IRCTC to enable online railway ticketing services with cash payments at iWay cyber cafes across the country. This path-breaking initiative made railway e-ticketing easier and convenient for passengers all over the country. They no longer had to worry about using credit cards or having a net banking facility, which is restricted to those with access to computers at home or in the office. At present, IRCTC is said to offer the maximum number of payment options among all e-commerce sites. The payment can be made through the payment gateway for credit cards, direct debit (Internet banking) of major banks and a cash-card option (ITZ cash). The direct debit option was introduced due to the fact that many Indians do not like to buy things on credit. The other option that online retailers usually follow is the Cash-On-Delivery (COD) model, where the end-user pays cash after the product is delivered. But, since the IRCTC system is connected to the Indian Railways reservation system and there are many other factors that come into play while booking a ticket online, the COD model is not feasible for IRCTC even though it makes a lot of commercial sense .

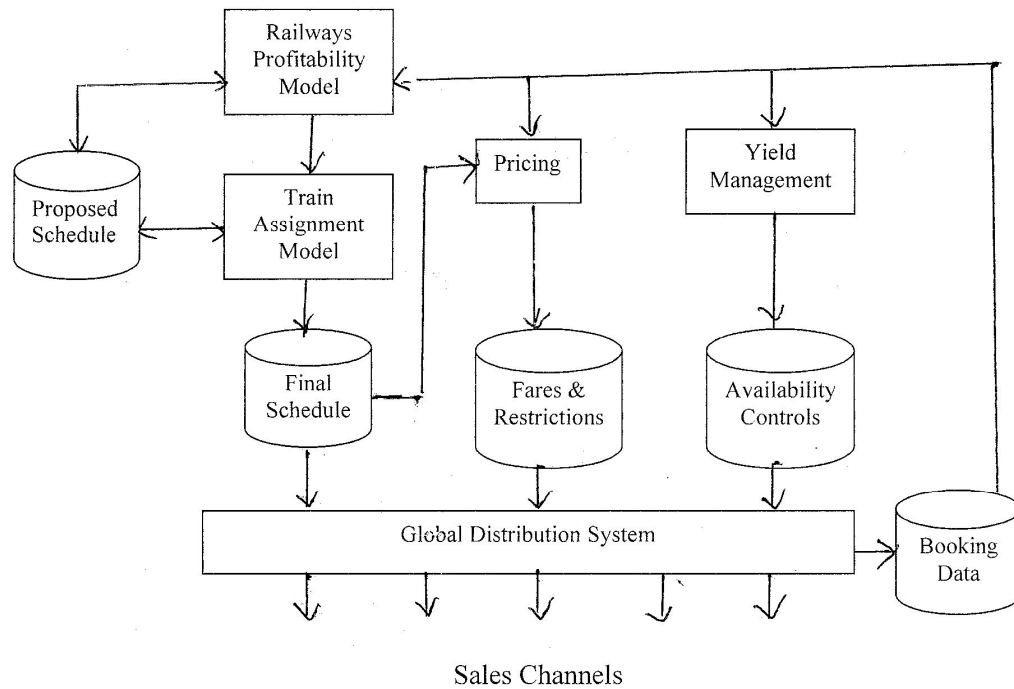
Presently, the scenario is so encouraging with a growth rate of almost 300 percent per month that (IRCTC) has decided to further reduce the service charges. Moreover, to meet the demand of approximately 40,000 tickets on a daily basis, IRCTC has appointed more than 8,000 booking agents including the Rail Travellers Service Agents (RTSA), the RTAs, members of the Indian Association of Tour Agents (IATA) and the (Travel Agents Association of India) TAAI, petrol pumps of Bharat Petroleum Corporation, district magistrates and Deputy Commissioners of the State Governments, e-seva centres of the Andhra Pradesh Government and e-pos through ICICI. The Railway Ministry is planning to tie up with Indian Oil Corporation and other oil public sector utilities for providing e-ticketing facilities at filling stations. This will help in generating more revenue [Sujay Mehdudia 2007].

The Railway Minister, Lalu Prasad's budget for 2007-08 was termed as positive and one that can serve as an example for the other public sector units. The budget's basis was to bet on a buoyant economy and not to tinker with freight charges. The main thrust is on modernisation, technical innovation and better resource utilization.

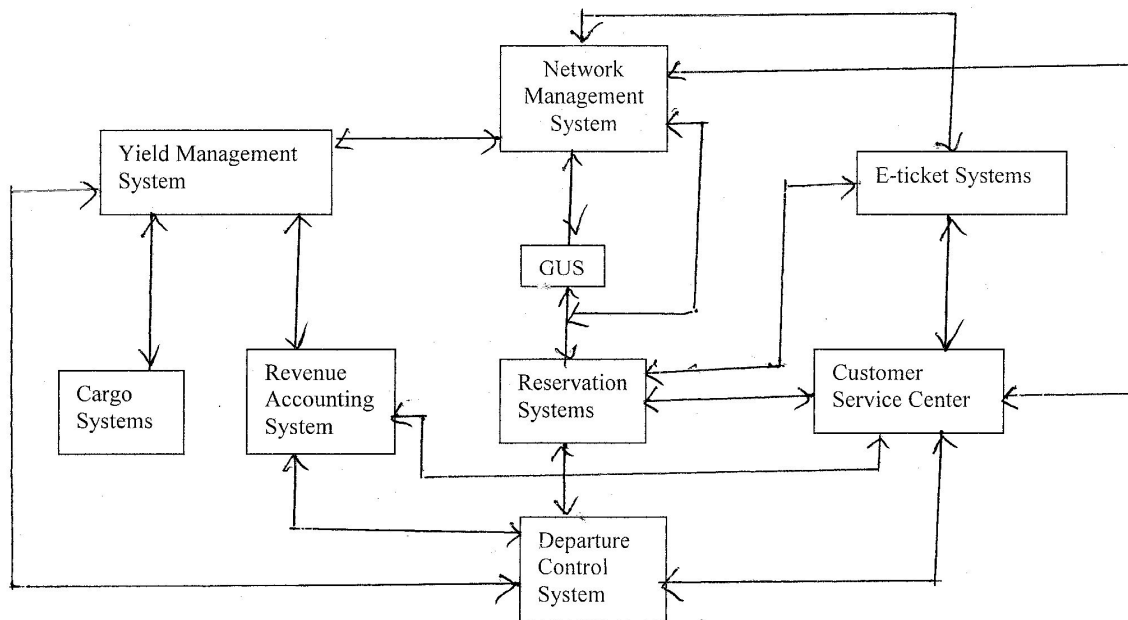
The Customer-Centric Electronic Business (CCEB) system model for the Railways is still in its infancy and therefore, there are limited resources available. Customer-Centric Management is related to what is called Customer Relationship Management (CRM). "CRM is defined as aligning business strategy, corporate culture and organization, customer information, and supporting information technology; so that all customer interactions promote a mutually beneficial relationship between each customer and enterprise ."

In Indian Railways, over 85% of commerce is still conducted through traditional business models and it is investing heavily to deploy customer centric management in traditional channels. Perhaps most significant, the Internet provide a completely new way for an enterprise to interact with its customer-the electronic channel, or the e-channel.

Figure 1 and 2 show typical current e-business models used by the Indian Railways.

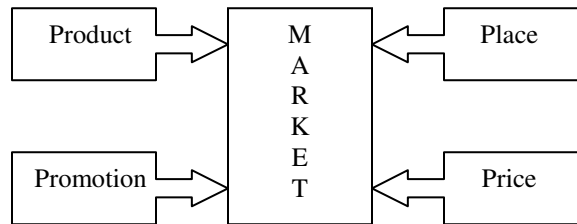


**Figure 1. Generic Railway e-business model**

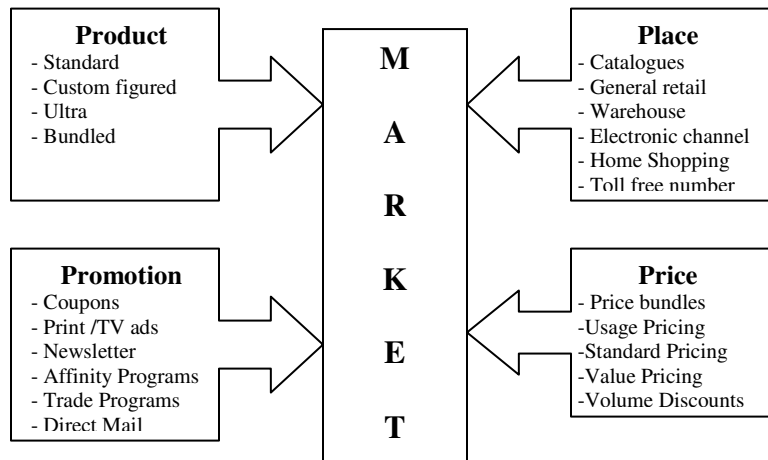


**Figure 2. Integrated current e-business model of Railways**

Figure 3 and Figure 4 show the differences between traditional business model (market-centric) and new business model (customer-centric).



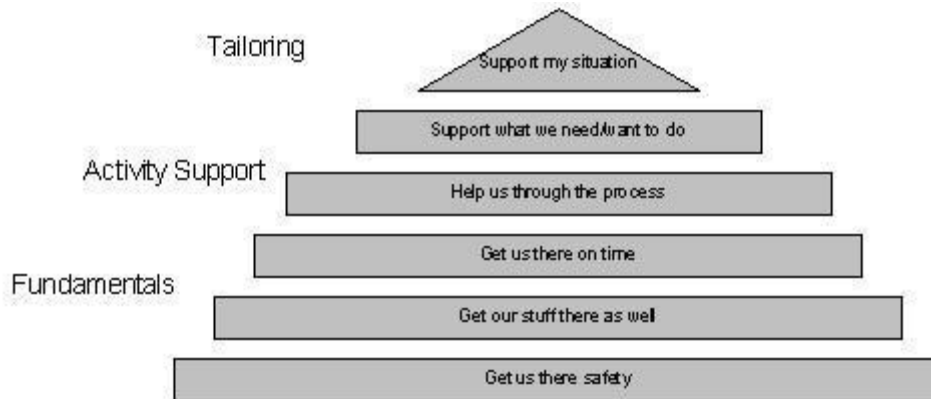
**Figure 3.Traditional market-centric business model [9]**



**Figure 4. Customer-Centric business model [9]**

Figure 5 shows a model to understand how Railways can fulfill its passengers' basic and other needs.





**Figure 5. Model to understand how to fulfill its customer's basic needs**

### *Constraints and Limitation of Previous Models*

Following the current e-business models shown in Figures 1, 2, and 5, and through the literature review, the present research has the following limitations:

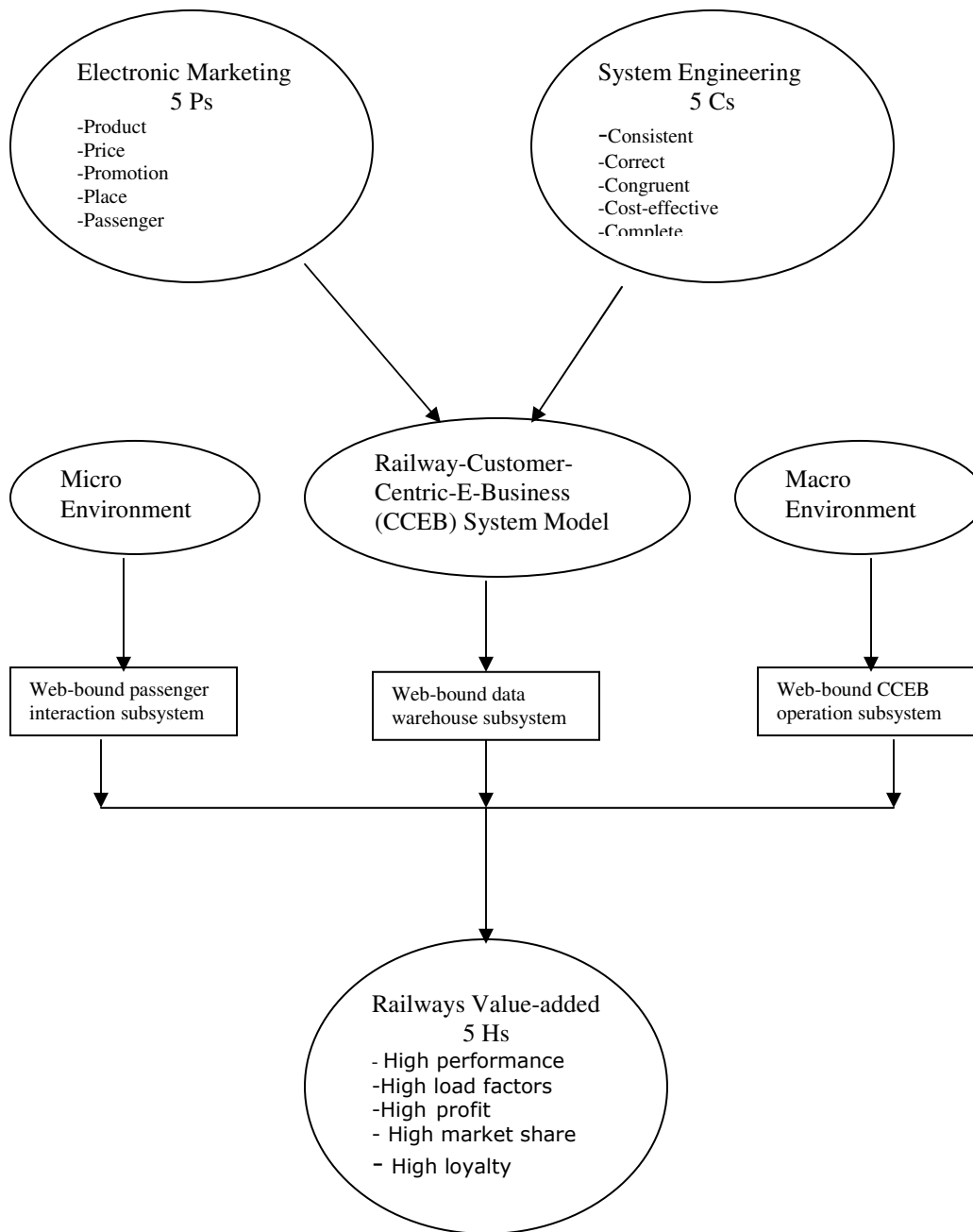
- E-marketing strategies are not widely adopted by the Railways.
- Passengers' needs in today's fast growing e-business environment are not properly addressed.
- Almost all current models are customer data rich and information poor.
- Severe limitations and weakness in dealing with the challenge for the Railways is to sustain and create profits.
- The Railways focuses on CSC (Customer Service Centre), but has neglected the Customer-Centric requirements.

It is obvious that there is an urgent need for further research in the application and development of e-business models to the Indian Railways.

### *A Significant Contribution*

This work presents a significant application of integrating System Engineering methods and marketing strategy to a real world situation. Figure 6 demonstrates the key function of this integrated model, two top-level operations : Marketing and System Engineering drive the model. Each operation satisfies its unique top level requirements e.g. the System Engineering addresses the 5 Cs: Complete, Cost-effective, Congruent, Consistent and Correct, and Marketing the 5Ps: Passenger, Product, Price, Promotion and Place. The Output includes the Value-Added operations, i.e. the 5 Hs: High performance, High load factors, High profit, High market share, and High loyalty. It will help the Railways in pursuit of profits and also passenger satisfaction.

**Figure 6. Integrating Marketing and System Engineering Activity**



### *Benefits to the Community and Industry*

There are many benefits to be gained for Indian Railways and its passengers. Firstly, passengers can book and check in through internet 24 hours, 7 days a week, at any time, anywhere. Secondly, airlines could reduce sales cost. Significance derived from CCEB implementation will allow for new business model, based on the wide availability of information and its direct distribution to end-customers.

- Directly connect railways and passengers.
- Support fully digital information exchange between airlines and customers, reduced cost of a customer contact.
- Suppress time and place limits.
- Support interactivity and therefore can dynamically adapt to customer behaviour.
- To be able to satisfy customers' need, build customer confidence and retention.
- Can be updated in real-time, therefore always up-to-date.
- Enhance airlines competitive advantages over its rivals
- Profitable and sustainable revenue growth.

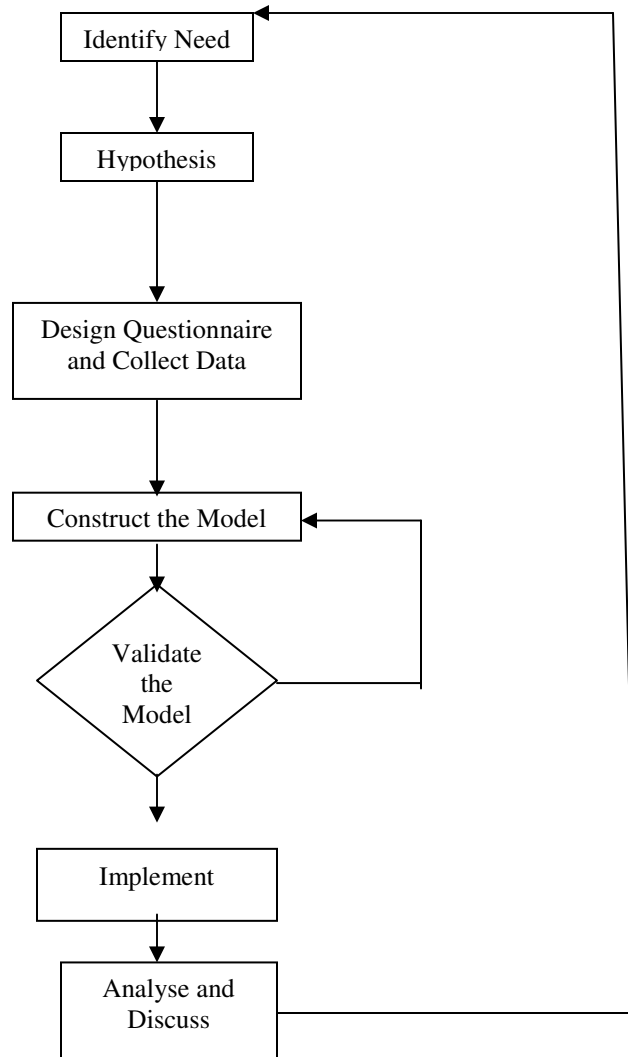
It is hoped that this search will provide information to assist the Railways Authorities of India, to make an informed decision when they consider the application and development of e-business to the Railways industry.

### *Contribution to the Field of Study*

The Railways industry is the one of the largest growth areas of world railways industry. Recent research of application e-business in the Indian Railways has pointed to a lack of subject matter; it is just at the stage of sale air tickets through websites. Furthermore, there is an absence of existing literature that explores the application of CCEB to the Indian Railways and other railways all over the world. Therefore, the current proposed research will open up a new area for further investigation and study of the railways CCEB system. The research can also be used as tool for community education, to generate meaningful discussion on particular findings, and assist with planning and policy developments for adopting particular strategies in application and development of e-business to both Indian Railways and world wide railways industry.

## **Research Flow Chart**

Figure 7 illustrates the research stages undertaken for this work. Starting with needs analysis and closing the loop based on performance results.



**Figure 7. The Research Stages**

### ***Need for the Study***

With the increasing usage of e-ticketing, there was a need to incorporate a model for increasing the performance of the Railways by suggesting a model of E-business strategy.

### ***Experimental Hypothesis***

Application of E-business Strategy could increase passenger satisfaction for Indian Railways.

### ***Design questionnaire and collect data***

For this research, an online survey was conducted. This survey includes 30 questions regarding the impacts if Indian Railways introduces the e-business process and strategy to

improve passenger services. 500 passengers were chosen using stratified sampling. The questionnaire was sent to them by email in February and March 2007. One hundred and twenty four passengers responded to this survey and the response rate was 24.82%. Some questions are as following:

1. Do you think Indian Railways Website increase your satisfaction with Indian Railways? Yes / No
2. Would you give up traditional booking if you have used Internet booking? Yes / No
3. Web based chat room will increase your satisfaction with Indian Railways? Yes / No
4. Web based FAQs will increase your satisfaction with Indian Railways? Yes / No
5. E-mail newsletters will increase your satisfaction with Indian Railways? Yes / No
6. Web based one-to-one services will increase your satisfaction with Indian Railways? Yes / No
7. Web based ticket auction will increase your satisfaction with Indian Railways? Yes / No
8. Personized Website will increase your satisfaction with Indian Railways? Yes / No
9. Have you used the E ticketing option? Yes / No
10. How do you think E-ticket? Excellent / Good / Fair / Poor / Very Poor
11. How do you think E-check in? Excellent / Good / Fair / Poor / Very Poor

### ***Model Design***

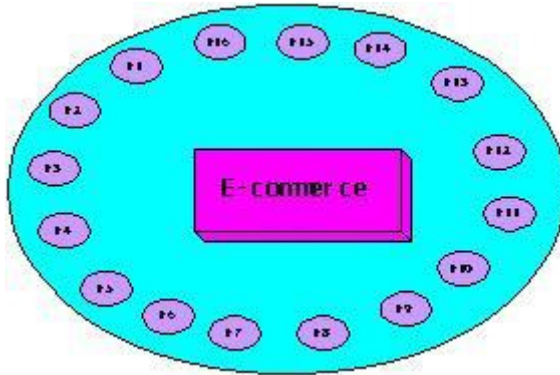
Model design includes:

1. System analysis and concept design (CASE tool: MS Visio 2000)
2. Design CCEB process (CASE tool: MS Visio 2000)
3. Analyse data and test hypothesis (Tools: MS SQL Server 2000; MS Excel 2000; SPSS 10)
4. Validate and simulate model

### **Findings**

It was found that in order to provide an adequate answer to the research question " *Can the Indian Railways increase passenger satisfaction by utilising e-business models?*" One must fully understand the main features of E-commerce and their relevance to Railways passenger satisfaction.

Figure 10 identifies sixteen key features which need to be studied and relate them to business success. [Timmers, P. 2000][Korper, S 2001].



**Figure 8. Features of E-commerce (F-Feature)**

**F1. Online/immediate/24-hour availability, directly connect buyers and sellers**  
 A Web server is usually online 24 hours per day, and virtually immediately accessible. This creates time independence and enables customer service to be decoupled from supplier availability. Such 24-hour availability is a strong facilitator of a global presence, overcoming time differences. As the customer is in the first instance interacting with an automated system, there is a set of service requests that can become 'self-service'

**F2. Ubiquity**  
 Global information networks (fixed and mobile, cable, satellite) promise to offer worldwide, large-scale and low-cost, access to electronic commerce.

**F3. Global**  
 It is often claimed that one of the largest changes brought about by the Internet is that it is global: companies get access to customers globally, customers get access to suppliers globally.

**F4. Digitisation**  
 The Internet and the communication and computer systems connected to it are all processing digital and digitised information. Digital information can be easily stored, transmitted, processed, mixed, transformed, in short manipulated in many ways, independent of its source or carrier.

**F5. Multimedia**  
 Closely related to digitisation is the aspect of multimedia, referring to the capability to deal with and deliver information in several ways: text, graphics, sounds, video, eventually tactile.

**F6. Interactivity**  
 As opposed to EDI, which is for application-to-application data exchange, the Internet offers person-to-person and person-to-application interactivity

F7. One-to-one  
The Internet makes customer profiling fairly easy, by capturing and analysing customer characteristics. Technically, this can consist of storing some information about the customer on the customer's computer (e.g. a 'cookie'), which is retrieved when the customer returns to the site.

F8. Integration  
Customer service is greatly enhanced by integrating the functionalities of the transaction parties on the basis of standardized information flows.

F9. Can be updated in real-time, therefore always up-to-date

F10. Reduce costs

F11. Increase productivity  
Railways can gain significant productivity improvements by using business-to-business e-commerce to streamline and improve its supply chain processes. Railways can save time and money by purchasing supplies via the Web. Similarly, Railways can use e-commerce to communicate and transact with customers in a more cost-effective and timely manner than through traditional channels.

F12. Improve level of customer service  
Railways can improve its level of customer service by allowing customers to access "help" information, complete application forms, pay invoices, or change their account details via its Web site, at their own convenience.

F13. Strengthen customer relationships  
Railways can strengthen relationships with existing customers by allowing them to access - via its Web site - previously inaccessible decision-support information, such as detailed research reports, product specifications and price comparisons.

F14. Enhance business intelligence  
Railways can use its Web site to collect valuable intelligence about customer needs, buying habits and preferences. This intelligence can be a valuable input to the development of new, profit-enhancing processes, products and services.

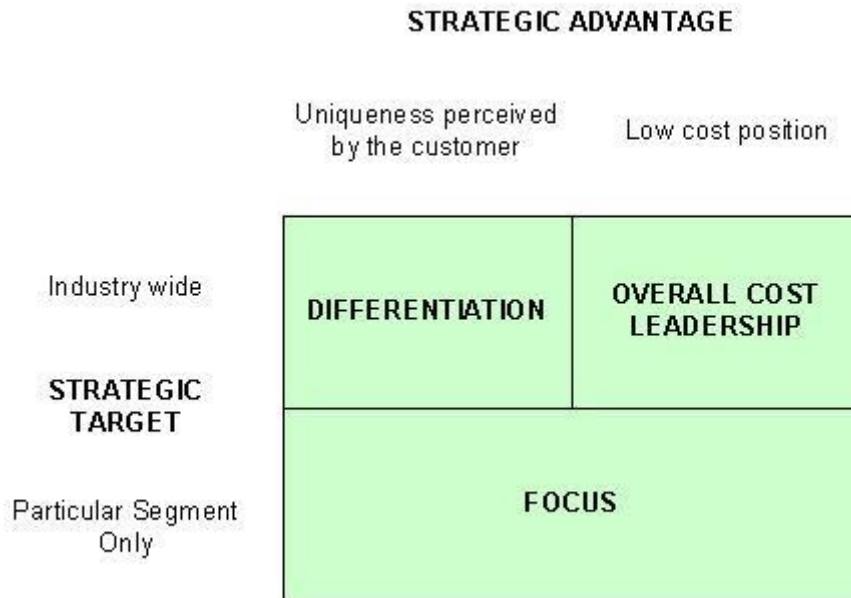
F15. Increase direct sales of products or services  
The Web enables businesses to reach customers all over the world, 24-hours per day, 7-days per week. Railways can use the Web to create a "self-service" environment that allows Railways to offer lower prices and provide more detailed product information than that which Railways can offer in the real world.

F16. Generate advertising, sponsorship or brokerage revenue  
Many "content" and "infomediary" sites generate revenue through advertising or sponsorship arrangements with other sites. Infomediary sites provide useful information

and act as springboard to sponsoring Web sites. Infomediary sites offer earn brokerage fees on transactions that result from the information or service they provide.

***Linkages between these features and Railways passengers satisfaction***

We shall now explore the effects of electronic commerce and its potential for passengers satisfaction for railways industry by using Michael Porter's seminal work on industry analysis as a framework (Figure 9).



**Figure 9. Sources of Competitive Advantage [Porter, M. 1980]**

**Cost Leadership (F10, F11, F15, F16)**

Railways can generate significant cost savings by sending tickets, newsletters, quotes, and other documents via Internet, rather than by post or facsimile. Railways can use Web site to publish - in a cost-effective way - public domain documents such as annual reports, product brochures, positions vacant, contact details and other important Railways information. Railways can save on the cost of running "bricks and mortar" outlets and can reach global markets without having to develop a physical global distribution network. Most importantly, Railways can save on customer service costs by enabling customers to serve themselves.

Massive investment in both business-to-business (B2B) and business-to-customer (B2C) information systems is expected to translate into important cost savings in procurement,



sales, billing and other support activities. The Railways' fully automatic ordering system, for example, should reduce order processing costs by 90%.

### **Differentiation (F1, F2, F3, F4, F5, F6, F8, F9)**

E-ticketing, the issue of a booking code at the conclusion online transition that replaces the traditional railwaysticket. E-ticketing seems to be a 'win-win' solution for the Railways business. It offers the Railways the chance to make considerable savings in both trade terms as well as in invoicing and internal accountancy procedures. Moreover, it helps to fight the downward profit spiral that has affected the industry for years. Secondly, it is very attractive to customers, who may benefit from a service offer both technologically advanced and of high intrinsic value.

### **Focus (F7, F12, F13, F14)**

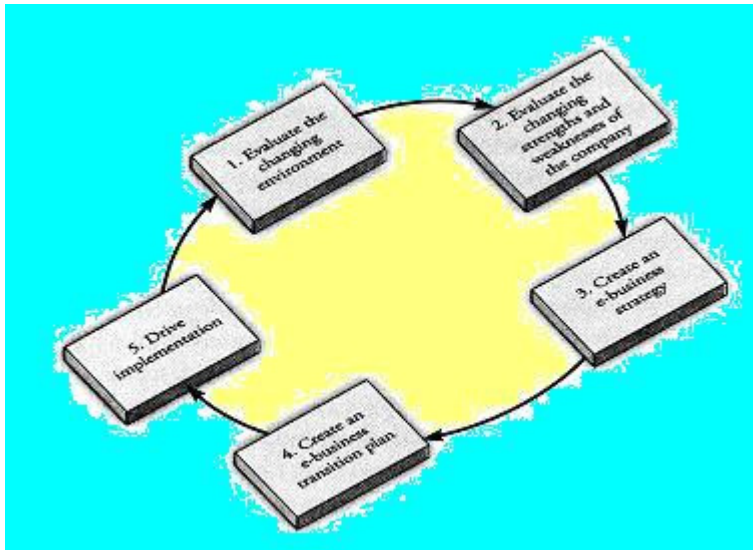
The e-Commerce infrastructure developed by Railways allows collection and central storage of sales and marketing data. Railways use this data to drive decision support tools for planning and marketing.

There is still hesitation among many companies about committing any major effort to electronic commerce, let alone about fundamentally rethinking their business strategy in line with the new opportunities. The reasons for this hesitation are summarized below by Timmers [Timmers, P. 2000].

- Lack of awareness and understanding of the opportunities and implications and uncertainty about the appropriate business model
- Concerns about total costs, including the costs of retaining and the telecommunications.
- Concern about security of sensitive data, such as credit card numbers, personal data and business confidential data.
- Concern about interoperability and the risk that competition between major suppliers will lead to incompatible sets of standards.
- Uncertainty about applicable law and appropriateness of the legal framework.
- Lack of usability of the technology, difficulties in performing slightly more complicated electronic commerce than merely being present with a Web page.

### ***Process for formulating e-business strategy***

According to Porter's overall approach, Harmon extend and give a new sense of dynamics. Figure 10 illustrates an e-business strategy process that is conceptualised as a continuous cycle. In effect, the strategy team never completes its task; it simply works to develop a temporary understanding, makes commitments, and then evaluates the results as it cycles through a subsequent cycle in order to arrive at a new understanding .



**Figure 10. A cyclical process for formulating e-business strategy**

## Conclusions

This research revealed that the Internet contributes more to the core of business process and transformation than other comparable technologies such as the telephone. Whilst the source of competitive advantage is changing - with information becoming a key resource and electronic commerce a key facilitator.

The success of the Indian Railways applications and the communications, data, and control afforded by the Internet are encouraging. The researchers have found that the development of the information economy is as much about strategy as it is about technology. The Internet is not just another medium or a distribution channel to reach customers. It is an important medium to find new customers and continue relationships with current customers. It is almost impossible for business and consumers to ignore this new technology. The users of Internet are not just so-called "techi's". They are people from all age group in many parts of the world. This work demonstrated that integrating key operations such as technologies, marketing, and system solutions can assist the Railways industry to achieve passenger amenities.

The railways have never had it so good. Online ticket sales are keeping the railways' cash register ringing. Figures available with FE show the railways sold over Rs 700 crore worth of e-tickets in 2006-07. This constitutes about 30% of the Rs 2,300-crore estimated online transactions by Internet and Mobile Association of India. Projections for this financial year are a whopping Rs 1,500 crore. In June 2007, for instance, the e-ticketing services of Indian Railways Catering and Tourism Corporation sold tickets worth over Rs 129 crore. On an average, it sells about 40,000 tickets daily through the Internet. On July 3, its online sales touched an all-time high of 44,000 purchases. "We have sold tickets worth Rs 319 crore already, and estimate that by the close of the financial year, our ticketing business would have crossed Rs 1,500 crore," a railway official said. The

massive jump in sales is putting pressure on the weak internet connectivity of most domestic banks. "On an average, only about 71% of all transactions are successful mainly due to the poor online infrastructure of banks," the official said.

The corporation is also concerned that online sales may soon plateau off as Internet penetration is poor in non-metro areas. Sales will increase if it can also provide unconfirmed tickets on its website. The railways' e-ticketing has gone global, with travel agents in Sharjah, Nepal and Singapore providing the facility. On the anvil is a tie-up with the posts and telegraphs department. Post offices can then book tickets online [20].

## References

Afuah, A., Tucci, C.L. (2001), *Internet Business Models and Strategies: Text and Cases*. McGraw-Hill, Boston.

Arthur, T., Bill, D., Stephen, B., Alastair, D., and Andrew, W. (2002), *Management Information Systems: Concepts, issues, tools, and applications*. Data Publishing, Melbourne.

Choi, S. Y., Whinston, A.B. (2000), *The Internet Economy-Technology and Practice*. SmartEcon, Austin.

CXOtoday.com, Mumbai, Sep 22, 2006.

Deitel, H.M., Deitel, P.G. and Nieto, T.R. (2001), *E-Business & e-Commerce HOW TO PROGRAM*. Prentice-Hall, Upper Saddle River.

"E-ticketing chugs along well with railways". Available online [www.Ciol.com](http://www.Ciol.com).

e-ticketing, [www.irctc.co.in](http://www.irctc.co.in)

Gustafsson, A., Ekdahl, F., and Edvardsson, B. (1999), "Customer focused service development in practice: A case study at Scandinavian Airlines System (SAS)" *International Journal of Service Industry Management*, 1999 v.10 n.4 p.344-358.

"IRCTC opens up a new train of thought". Network magazine, May 2006.

Komenar, M. (1999), *Electronic Marketing*. John Wiley & Sons, New York.

Korper, S., Ellis, J. (2001), *E-Commerce Book Building the E-Empire*. Academic Press, San Diego.

"Lalu to flag off cheaper e-ticketing fees", *Economic Times*, 21 March 2007.

Matthew, R. (2000), *Beginning E-commerce with Visual Basic, ASP, SQL Server 7.0 and MTS*. Wrox, Birmingham.

O'Brien, T. (2000), E-commerce Handbook A practical guide to developing a successful e-business strategy. Tri-Obi Production, Melbourne.

Porter, M. (1980). Competitive strategy: techniques for analyzing industries and competitors: with a new introduction. Free Press, New York.

Shelly, G.B., Cashman, T. J., and Rosenblatt, H. J. (2001), System Analysis and Design. Course Technology. Boston, MA.

Sujay Mehdudia, “*Railways service charges for e-ticketing reduced*”, THE HINDU, Thursday, Jul 26, 2007

The Financial Express, July 8, 2007

Timmers, P. (2000), Electronic Commerce-Strategies and Models for Business-to-Business Trading. John Wiley & Sons, Chichester.