

Information Technology Innovations: A Road map to Success in Retail Sector

Dr. KASTOORI SRINIVAS

Associate Professor of Commerce & Project Director,
Vivek Vardhini College, Osmania University. Jambagh, Koti, Hyderabad-95 (TS)

Abstract

Information technology is an important emerging sector of the Indian economy. The size of this sector has increased at a tremendous rate of 35% per year during the last 10 years. Its contribution to the national gross domestic product is expected to be around 8.5%, quite similar to that in the United States today. The journey to business success in the retail industry is neither straightforward nor even. Innovation in technology, both inside the retail stores and in the hands of customers, is one of those external forces that impact the retail industry and is also the primary focus of this study. Retailing is evolving into a global, hi-tech business; and India is no exception for that, rising wealth levels, and the rapidly changing life styles and consumer aspirations of an ever-growing middle class are some major reasons for the organized retail boom in India. The retail business in India is moving from unorganized and family owned business to organized one that follows corporate management.

Today the Indian retail is moving ahead with greater expectations over potentiality; it is subjected to certain challenges as far as its growth is concerned. As retail is not regarded as an industry in India, it is difficult to get a correct picture of the size of the sector. This paper attempt to through a light on the advantages which the use of I.T .brings to modern retail stores in comparison to traditional stores not making use of I.T., also attempts to analyze the impact of I.T. innovation in retail sector as a competitive advantage in the growth of Indian retailing.

Key words: Innovations, GDP, IT & ITES, ERP, RFID, POS, Technology, Retailing,

INTRODUCTION

The retail sector in India comprises unorganized and organized segments. The unorganized sector consists of small family-owned stores, located in residential areas, with a shop area less than 500 sq.ft. They have a low cost structure, with smaller premises, low labour costs and low or no taxes. This sector continues to have a monopoly role in the case of rural areas which have 73% of the population of the country. The organized sector (everything other than these small family owned businesses) accounts of only 2 to 4% of the total market, which is expected to raise by 20-25% by 2010. The organized retailing covers registered retail stores operating with necessary licenses and generating a cash memo for every transaction of sales. The Indian retail industry has emerged as one of the most dynamic and fast-paced industries due to the entry of several new

players. It accounts for over 10 per cent of the country's Gross Domestic Product (GDP) and around 8 per cent of the employment. India is the world's fifth-largest global destination in the retail space. Indian Retail Industry has immense potential as India has the second largest population with affluent middle class, rapid urbanization and solid growth of internet.

Information technology has now become a buzzword. It has become a wide spread tool throughout the world since last couple of years and India is not an exception to this revolution. The incorporation of information technology has enabled various sectors and areas better arrangements and performance. It has become more important in times when marketing is 'customer-driven' where keeping and managing customer behavior related information is key ingredient in decision making because customer behavior is changeable and according to time, the changes are coming in their needs, wants, and desires and also in their brands. The main reason behind this is only customer awareness, consumption level and several options of multiband. So, all the time there is a need of information and takes action in their manufacturing units. The advent and development of information technology enabled IT and ITES services that has facilitate the retail sectors in numbers ways. Reason is that because liberalization, privatization and globalization have made business firms to do business in different-2 countries.

For this purpose again there is a need to collect right information about the consumer behavior, education level, economic level, socio-cultural level etc. time to time and on a regular basis. Even from the initial stage to the extreme stage (continuous stage) to make their image in the eyes of the customers. Because it will help you in getting right information and in managing merchandise management, inventory management, procurement, billing, customer loyalty schemes, stock replacement, shelf-space and even effective shop floor management by using ITES in various ways. Large and successful retailers of international levels like Wart-Mart, Sainsbury, Metro AG etc. give a good chunk of their turnover towards making retail operations more technology and information oriented.

Technology usage in retailing is low in India today compared to levels achieved in advanced economies and varied in their use of IT infrastructure which ranges from simple point of sale (POS) systems to complex retail ERP once. Retailers like Wal-Mart and Metro have started experimenting with Radio Frequency Identification (RFID) technology which is expected to provide much better inventory visibility and hence facilitate efficient management of inventory. Retailers in India are still to adopt bar coding completely. The level of bar code usage is also largely due to retailers' initiatives of printing these codes at their warehouses, unlike in developed countries where all the suppliers print bar codes. Most retailers do not have integrated IT systems today. Many retailers have few IT systems in the areas of supply chain management, vendor development, merchandising and inventory management. The annual spends on IT is quite negligible. Organized retailing is fast becoming a reality in India and it is being made possible only with the adoption of the latest retailing technologies borrowed from the west.

The global economic recession, inflation, and high unemployment rates are some of the challenges that are negatively affecting the retail industry. Indian retail industry is the largest industry in India, with an employment of around 8% and contributing to over 10% of the country's GDP. Retail industry in India is expected to rise 25% yearly being driven by strong income growth, changing lifestyles, and favorable demographic patterns. Shopping in India has witnessed a revolution with the change in the consumer buying behavior and the whole format of shopping also altering. Industry of retail in India that has become modern can be seen from the fact that there are multi-stored malls, huge shopping centers, and sprawling complexes which offer food, shopping, and entertainment all under the same roof. The estimated value of the Indian retail sector is about USD 500 and India's retail sector will become a USD 1.3 trillion opportunity by 2020. By that time, there will be close to 200 cities population of over 0.5 million that will fuel retail growth. Further, modern retail, which currently stands at 5 percent, will grow about six times from the current USD 27 billion to USD 220 Billion in the next 8 years (Shilpa Gupta, 2012).

In the Indian retailing industry, food is the most dominating sector and is growing at a rate of 9% annually. The branded food industry is trying to enter the India retail industry and convert Indian consumers to branded food. Since at present 60% of the Indian grocery basket consists of non-branded items. India retail industry is progressing well and for this to continue retailers as well as the Indian government will have to make a combined effort.



E-COMMERCE

E-commerce can be interpreted broadly to include business-to-business (B2B) transactions, or even internal processes. The latter are taken up in the next section, in a discussion of manufacturing. B2B transactions are part of the supply chain, and management of the supply chain is also a weak link in India. Again, this is an issue discussed further in the next section. In Section 2, I discussed the complementarities between the IT sector and the rest of the economy. These complementarities arise from transactions situated in the B2B arena. In fact, developing countries have the opportunity to leapfrog over older, more expensive approaches

such as Electronic Data Interchange, which represent significant legacy investments in countries such as the US.

E-commerce is expanding steadily in the country. Customers have the ever increasing choice of products at the lowest rates. E-commerce is probably creating the biggest revolution in the retail industry, and this trend would continue in the years to come. Retailers should leverage the digital retail channels (e-commerce), which would enable them to spend less money on real estate while reaching out to more customers in tier-2 and tier-3 cities. Both organised and unorganised retail companies have to work together to ensure better prospects for the overall retail industry, while generating new benefits for their customers. Nevertheless, the long-term outlook for the industry is positive, supported by rising incomes, favorable demographics, entry of foreign players, and increasing urbanization..

Indian e-commerce sites have had to adapt to the Indian scenario, in terms of logistics, payment systems and legal mechanisms. Interestingly, they have been reasonably successful, despite the institutional weaknesses. The use of cash on delivery and private couriers and the importance of trust and reputation have allowed e-commerce transactions to gain a foothold in Indian retailing. Recent moves to allow FDI in multi-brand retail in India specifically exclude e-commerce, providing some “infant industry” protection to India firms. Flip kart, for example, has not had to compete with giants such as Amazon, and will continue to be sheltered in this respect. Of course, content and market intermediary services such as eBay are very much part of online offerings in India. Furthermore, the nature of e-commerce is that Indians are also able to make purchases from foreign e-commerce sites, and in many cases shipping costs are not prohibitive. There is also very little to prevent foreign sites from acting as intermediaries between Indian buyers and sellers.

Online services have played an important role in Indian e-commerce. Of the US\$ 2.5 billion Indian market for e-commerce in 2009, 75 percent was in travel and mobility services (airline and railway tickets, hotel bookings and mobile phone recharges, for example). Indian sites are also used extensively by foreigners, for gift giving (e.g., flowers and sweets), or for travel-related services. In terms of pure e-tailing (excluding travel services as does the US Department of Commerce), the market size in India is still well under US\$ 1 billion. Growth projections for Indian e-commerce are quite optimistic, with annual growth rates of 30 to 60 percent being forecast, but the basis for these projections is not always clear. Much of the outcome of these projections depends on the evolution of Indian retailing in general, as well as the overall growth rate of the economy. A slowing down from GDP growth rates above 8 percent to around 6 percent will inevitably impact growth in consumer spending. The ability of the government to accelerate the penetration of broadband access to the Internet will also be an important factor in the growth of e-commerce.

MARKET SIZE

India's retail market is expected to increase by 60 per cent to reach US\$ 1.1 trillion by 2020, on the back of factors like rising incomes and lifestyle changes by middle class and increased digital connectivity. While the overall retail market is expected to grow at 12 per cent per annum, modern trade would expand twice as fast at 20 per cent per annum and traditional trade at 10 per cent#. Indian retail market is divided into "Organised Retail Market contributes 93 per cent of the total sector and "Unorganised Retail Market contributes the rest 7 per cent of the sector.

India's Business to Business (B2B) e-commerce market is expected to reach US\$ 700 billion by 2020##. Online retail is expected to be at par with the physical stores in the next five years and has grown 23 per cent to \$17.8 billion in 2017. India's total potential of Business to Consumer (B2C) is estimated to be US\$ 26 billion, of which \$3 billion can be achieved in the next three years from 16 product categories, according to a study by Federation of Indian Chambers of Commerce and Industry (FICCI) and Indian Institute of Foreign Trade (IIFT).

India is expected to become the world's fastest growing e-commerce market, driven by robust investment in the sector and rapid increase in the number of internet users. Various agencies have high expectations about growth of Indian e-commerce markets. Indian e-commerce sales are expected to reach US\$ 120 billion! by 2020 from US\$ 30 billion in FY2016. Further, India's e-commerce market is expected to reach US\$ 220 billion in terms of gross merchandise value (GMV) and 530 million shoppers by 2025, led by faster speeds on reliable telecom networks, faster adoption of online services and better variety as well as convenience@. India's direct selling industry is expected to reach Rs 159.3 billion (US\$ 2.5 billion) by 2021, if provided with a conducive environment through reforms and regulation.

India is expected to become the world's third-largest consumer economy, reaching US\$ 400 billion in consumption by 2025. Luxury market of India is expected to grow to US\$ 30 billion by the end of 2018 from US\$ 23.8 billion 2017 supported by growing exposure of international brands amongst Indian youth and higher purchasing power of the upper class in tier 2 and 3 cities, according to Assocham. The size of modern retail in India is expected to reach US\$ 11.25 billion in 2019 from US\$ 70.45 billion in 2016.

INVESTMENT SCENARIO

The Indian retail trading has received Foreign Direct Investment (FDI) equity inflows totaling US\$ 1.14 billion during April 2000–December 2017, according to the Department of Industrial Policies and Promotion (DIPP).

With the rising need for consumer goods in different sectors including consumer electronics and home appliances, many companies have invested in the Indian retail space in the past few months.

- Department of Industrial Policy and Promotion (DIPP) approved three foreign direct investments (FDI), Mountain Trail Food, Kohler India Corporation, and Merlin Entertainments India in the single brand retail sector and two FDI proposals of over Rs 400 crore (US\$ 62.45 million) within the retail sector.
- With 2017 being a successful year for herbal-ayurvedic brands, new Indian organic labels in hair care, cosmetics, food and apparel are belting up to carve an organic niche in the growing herbal segment.
- Investments by private equity firms and wealth firms in Indian retail sector reached US\$ 800 million in 2017
- India's retail sector attracted Rs 9.5 billion (US\$ 147.40 million) investments in FY18, at a growth rate of 35 per cent year-on-year from Rs 7 billion (US\$ 104.34 million) in FY17.

GOVERNMENT INITIATIVES

The Government of India has taken various initiatives to improve the retail industry in India. Some of them are listed below:

- The Government of India may change the Foreign Direct Investment (FDI) rules in food processing, in a bid to permit e-commerce companies and foreign retailers to sell Made in India consumer products.
- Government of India has allowed 100 per cent Foreign Direct Investment (FDI) in online retail of goods and services through the automatic route, thereby providing clarity on the existing businesses of e-commerce companies operating in India.

TECHNOLOGY CONNECTS RETAILERS TO CUSTOMERS

The rapid speed of technology development and rising adoption of mobile digital devices on a global scale, such as smart phones and tablets, have a profound transforming impact on consumer behavior and retail businesses at large (Bain, 2012; Nielsen, 2013). Accenture (2013 a, p.3), in its Technology Vision annual series, supports this claim. Technology is part and parcel of every aspect of business today and “serves as a primary source of market differentiation, business growth, and profitability.” Nowadays, keeping pace with technological developments and innovations, and putting technology successfully to use play a decisive role for businesses, retailers included. Mobile digital technologies, for instance, help create and provide targeted ads, new on-the-go services, and engage the customer. Relationships between customers and retailers are thus extended beyond the physical store into the digital sphere. Retailers contribute and are an inseparable part of new digital connections among customers themselves by creating and participating in discussions on social media.

Apart from mobile digital technologies, some other technological innovations introduced in the retail industry include Quick Response (QR) codes, electronic price tags, digital advertising displays, self-checkout systems,

personal selling assistants, smart kiosks, and an overall interconnection of all of these innovations with social media platforms and retailers' customized platforms and applications (Krafft & Mantrala, 2010).

INFORMATION TECHNOLOGY AND RETAILING

Today the customer is in charge. Providing value to the customer has become a challenge for retailers. Customers want „value“ in terms of not only price, ambience and appearance, quality, service, information but also selection, convenience, service and entertainment. Information technology (IT) helps retailers to manage costs and deliver better value to customers. The use of technology enhances the shopping experiences by providing convenience, better service speed, and value to the customer. The consumer research studies indicated that consumers are also willing to accept technology solutions in retail, especially those Information technology, can impact a firm's competitiveness for this can help fine tune the supply chain to customers' needs. In order to gain competitive advantage from IT, it involves a long term investment on the part of the retailer, on a continuous basis and also to make improvements in most of the functional areas where IT can add value. Leaders and trend-setting retailers, such as Wal-Mart, have expanded their utilization of the technology in recognition of its importance as a key element for remaining competitive and profitable. One of the major reasons of the Wal Mart's success is its investment in state-of-the-art information technology, this include:

- i. Front end scanners that track sales by stock keeping units(SKU) and supply on store shelves
- ii. Beaming of the store's orders via satellite to a computer at its headquarters in Arkansas
- iii. Scheduling of shipments to its distribution centres by vendors
- iv. Movement of merchandise from distribution centre to Wal Mart trucks
- v. Shelf placement within 36 hours of store's order and
- vi. Communication via satellite about vendor discounts on merchandise

The importance of information technology in retail stems from the importance of data. A whole lot of accurate information about customer purchases, the sales of individual merchandise lines or other specific information such how payment has been made by individual customer for the products purchased, a customer loyalty reference number, the time and date when the transaction took place, etc. can all be obtained through data collection. Data collected about consumers, their purchases the frequency of their buying and the typical basket size, helps avoid situations of stock out, spot merchandise or products timely markdowns and higher inventory turns, also helps the retailer can distinguish the customers who shops at his store frequently and reward them. The use of technology aids the collection and transmission of information. Retail data can help in implementing a number of marketing decisions:

- Retail data can help to analyze the likely performance of new product lines and also measure its impact on the sales of other products
- Retailers can also use EPOS (Electronic point of sale) to provide accurate and timely information about the buyers response to their promotional activities carried out at their stores
- Extensive, timely and accurate sales data generated by EPOS systems can be frequently obtained and has become a crucial source of marketing information for retailers and supplier marketing departments
- Retail data can help customers to enjoy the benefits of being well informed, which will also be beneficial for retailer, for „a well informed customer, is potential business for them.

TYPES OF TECHNOLOGIES USED IN RETAILING

Today, retailers need to continuously track customer demand and ensure that he does not get out of stock at any given point of time. At the same time, the retailer can't afford to have huge inventories, thereby increasing his costs and reducing profit margins. The IT tools being used relate to Supply chain management, Inventory management, Electronic Data Interchange and Customer relationship management. Starting from the point of manufacturing to warehousing to distribution and finally to the point of sales (POS), the organized retail business today is essentially driven by an efficient Supply Chain which in turn is dependent on the availability of accurate and reliable data/ information in real time. The Automated Identification and Data Capture (AIDC) Technologies i.e. Bar coding/RFID combined with Mobile Computing and Wireless LAN technologies empowers the retailing business to meet these critical needs of collection of quality data at all the points of activity across the complete supply chain.

BAR CODE TECHNOLOGY

Bar coding is the most widely used technology for product marking and identification system. Bar coding is a proven technology for automated data collection needs of the business. On retail products, the barcode normally contains the product ID (e.g. item code, product code etc.) which is required to be entered into the computer system to update the data at the time of billing, receiving or dispatch. With the barcode in place, the data is fed into the system automatically by scanning the barcode using a bar code scanner instead of punching the same through a keyboard. The fast checkout and reduced queues attracts more customers and ensures that customer visit the store again and again. Barcodes solutions play an important role in utilizing customized in-store marketing, increasing up-selling and cross-selling opportunities, quickly locating merchandise, easily monitoring inventory and checking prices. The state-of-the art solutions based on barcode technology enables retailers to improve the customer's experience at the primary point of decision – the selling floor. The Bar Code scanners at point of sales help in the elimination of queues with fast checkout by automating the data entry into system. Bar codes are widely used to implement automatic identification and

data capture (AIDC) systems that improve the speed and accuracy of computer data entry. An advantage over other methods of AIDC is that it is less expensive.

RADIO FREQUENCY IDENTIFICATION

The role of RFID for the retailer is critical as the differences between a business armed with RFID and one without it is really large. "If the product in a store is tagged, any alteration in the stock or inventory can be tracked. Moreover, any article moved from the shelf without being paid for at the counter can be traced at the exit area where the antenna or the reader is deployed," says Mani. Similarly, the exhaustive task of stocktaking and replenishment are also made easier where the data is immediately updated and notified. Also, comparative study of the data available from loyalty cards and shopping trends can be related to give a deeper insight into customer preferences. The practical working of RFID in matters of: Inventory tracing, automated replenishment, Smart-shelf stock maintenance, and automated check-out. "The benefit of the technology is that approximately 33 per cent of the cost at front-end store execution and 50 per cent at the back-end can be taken care of by RFID.

RFID SYSTEM:

RFID system comprises of RFID tag, RFID transceiver, servers, and middleware and application software. The RFID tag is a low functionality microchip with an antenna connected to the item to be tracked, or identified, and stores the unique identification number of the item. These chips transform the electromagnetic energy of radio-frequency signals/queries from a RFID reader/ transceiver to respond by sending back information they enclose. The readers communicate with the tags for reading/writing the information stored on them as well as update the servers which may be standalone or networked. Readers may be fixed or mobile. Finally, a computer hosting a specific RFID application pilots the reader and processes the data it sends.

ELECTRONIC SHELF SIGNAGE

Electronic shelf signage's are electronic display panels on the shelf. These panels display product description or any promotional schemes offered by the retailer. The pricing and promotion labels on the shelf still have to be attached manually. This leads to duplicity of data and, therefore, to human errors. It can be seen that the product pricing in software and computers be updated immediately but shelf edge labels still have to be printed and replaced. In the case of a price change within the day, the labels would remain unchanged. The solution lies in implementation of automated LCD electronic shelf signage. The signage can be connected to the back end computers, update prices on the LCD panel thus, reducing time and human errors.

INTERACTIVE KIOSKS

Interactive kiosks are computers with touch screen displays that provide shoppers with information about products in the store. With the help of these kiosks, customers can identify and select products without moving around the store. Kiosks help retailers in offering an expanded selection of items. Video kiosks may also provide a map of the store and indicate the location of chosen merchandise. This reduces and controls the movement of the shopper, which is a beneficial for both the retailer and the shopper.

BODY SCANNING

Body scanning is a computerized system for taking body measurements. It helps apparel retailers in finding the exact size of clothing that customers need. It is more useful in the case of custom made products and for altering cloths that have been bought. The system uses video cameras that are attached to a computer. The body measurements are taken from several angles and a 3-D modal of the shopper is generated. They can then select the cloths they wish to purchase. The computer shows an image of the body wearing the clothing. When a consumer chooses and orders the cloths, the information is transferred for manufacturing the cloths as per the unique measurements.

POINT OF SALE TECHNOLOGIES:

Use of computers for a fast and accurate billing system brings efficiency at the retail checkout. Moreover, computers help create the database of sales and customer data, on which future actions and decisions of the company would be based. Retail point of sales is the first place where automation should be initiated. The creation of huge data bases, efficient information systems, and customer satisfaction begins with automatic point of sales in retail. Automating the point of sales operations serves two important purposes: Efficiency in service delivery and Collection of primary sales and customer data

ELECTRONIC POINT OF SALES (EPOS):

The technologies used at a modern point of sale location are Electronic point of sales (EPOS): Electronic point of sales is a computer based billing system mainly used by retailers that have a large number of regular sales, stock-keeping units, and customers. One of the important objectives of automating point of sales is to streamline billing operations and increase efficiency. A basic EPOS, usually a standard PC with all its accessories (barcode scanner, weighing scales), handles payment quickly, updates inventory, and provide instant reports on sales and stocks and vending machines perform tasks of sales person, store, and sales mechanism. The vending machines have been used for the products that are fast selling and do not require services of a sales person and meet small day-to-day needs of a customer.

CONCLUSION

The impact of technology on retailing is beyond doubt. Over the years, many applications of the technology have developed globally. These applications have a deep impact on the way retail business is conducted. While many factors like the scale and scope of operations, financial resources available to the organization, nature of business, availability of trained technological personnel etc. affect the use of technology in retailing, the creative deployment of technologies enable retailers save a great deal of time as well as precious resources which have been channelized to provide the best of services to the customers. (Information technology (IT) refers to the technology of the production, storage and communication of information using computers and micro electronics). This paper has provided a review and overview of various facets of IT in India's economy. The most obvious of these is the IT sector itself, including IT enabled services such as business process outsourcing. This sector has proved to be resilient and innovative, continuing to expand and upgrade its offerings. The export orientation of the sector has contributed to its competitive discipline and success, though that success has never been a foregone conclusion.

This paper also examined e-commerce, which is a conventional outgrowth of IT and the Internet. Indian e-commerce is in its nascent stages, and is again held back by the government's inability to catalyze a rapid deployment of broadband connectivity, especially in urban areas. Indian entrepreneurs are not lacking in their desire to innovate and succeed, and are often hindered by an unfriendly environment for doing business. This problem is most acute in the case of manufacturing, and here the paper marshaled qualitative and quantitative evidence for the benefits of the use of IT in manufacturing, and throughout the supply chain, as well as the fact of its under-adoption. While it has been suggested that the Indian IT industry is itself to blame, in not providing suitable products for domestic firms, the overall inefficiency and backwardness of much of Indian manufacturing must shoulder the most responsibility for this state of affairs. Again, one might argue that the government's failure to provide a policy environment in which business can function effectively is a major roadblock to development.

REFERENCES

1. Barry Berman Joel & R Evans, Retailing Management-A Strategic Approach, Pearson Education, 2009.
2. Gobson G Vedamani, Retail management, 2009, Jaico publications, New Delhi
3. Girdhar Joshi, Information Technology for Retail, Oxford University press 2009.
4. Michael Levy, Burton A Weitz, Ajay Pundit- Retailing Management, 6/e, The Mc Graw -Hill Companies, 2008.
5. Andrew J Newman & Petes Cullen, Cengage Learning, 2009.
6. Levy & Weitz, Retailing Management, TMH, 2009.
7. Swapna Pradhan, Retailing Management Texts & Cases, 3/e-McGraw Hill, 2009.

- 8.A. J. Lamba, The art of Retailing, TMH, 2009.
9. Sinha, P.K and Uniyal D.P, Managing Retail, 2/e, Oxford University Press, 2007
10. Chetan Bajaj, Rajnish Tuli, Srivastava, N.V, Retail Management, Oxford University Press, 2005
11. K V S Madan, Fundamentals of Retailing, TMH, 2009
12. Arora, Ashish and Suma Athreye (2002), The Software Industry and India's Economic Development, *Information Economics and Policy*, 14, 253-273.
13. Bajpai, Piyush and Mayank Singh (2005), The Death of Indian Languages on the Internet: The Case of Hindi, background paper, Indicus Analytics, New Delhi.
14. Bresnahan, Timothy and Manuel Trajtenberg (1995), General Purpose Technologies: "Engines of Growth", *Journal of Econometrics*, 65, 83-108.
15. Chandra, Pankaj (2009), "Competitiveness of Indian Manufacturing: Findings of the Third National Manufacturing Survey," IIMB Research Report No. RR-2009-01
16. Chandra, Pankaj and Trilochan Sastry (2002), "Competitiveness of Indian Manufacturing: Findings of the 2001 National Manufacturing Survey," Working Paper No. 2002-09-04, Indian Institute of Management, Ahmedabad
17. Ciccone, Antonio and Kiminori Matsuyama (1996), Start-up Costs and Pecuniary Externalities as Barriers to Economic Development, *Journal of Development Economics*, 49, 33-59.
18. Dossani, Rafiq, D.C. Mishra and Roma Jhaveri (2005), Enabling ICT for Rural India, Project Report, Stanford University and National Informatics Centre, India.