

**From Software to e-Commerce:
India's success in the digital economy-
Some lessons for the South**

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1. Introduction - Software to e-Commerce

In terms of *per capita*, India has one of the lowest levels of computers and internet connections in the world (less than 1 percent of the world's users), yet as a brand, India Inc. is today one of the hottest software and e-Commerce destinations - and growing.

India is a developing country that entered the Information Technology revolution several years ago. From low-end data entry type operations to Y2K solution providers, the expertise and business has converted itself into a 5 billion dollar industry. Bangalore, the leading software location in India, has become a buzz-word in the IT world. Today the country is seeking to emerge as a major eCommerce power-house in Asia. This experience with and in the digital economy is of considerable relevance to other developing countries. This is a study highlighting the conditions that led to this growth and transformation as well as analyse the role of principal stakeholders, especially government, in the process. It will also enumerate the hurdles that existed and still remain.

1.1 Defining e-commerce in India

E-Commerce has been simply defined as conducting business on-line. In the World Trade Organisation (WTO) Work Programme on Electronic Commerce, *it is understood to mean the production, distribution, marketing, sale or delivery of goods and services by electronic means*. Broadly defined, electronic commerce encompasses all kinds of commercial transactions that are concluded over an electronic medium or network, essentially, the Internet. From a business point of view, e-commerce is not limited to the purchase of a product. It includes, besides e-mail and other communication platforms, all information or services that a company may offer to its customers over the Net, from pre-purchase information to after-sale service and support¹. There are essentially two major uses of e-commerce. The first is to use it to reduce transaction costs by increasing efficiency in the use of time and procedures² and thus lowering costs. The other is to use it both as a marketing tool to increase sales (and customer services) as well as to create new business through it -- for example, IT enabled business³, call-centres⁴, software and maintenance services etc. as well as 'digital commerce'⁵. It is thus a tool for both existing businesses as well as an opportunity for new business, both for existing companies as well as for new entrants. It is necessary to relate this to the Indian context.

India's fame in the digital world is on account of its software exports and its software professionals (who themselves are often part of the service export!). In the last couple of years there has been a distinct shift in the Indian IT world - both external and internal - towards electronic commerce. For the purpose of this study therefore, e-commerce and its definition in India encompasses three areas.

¹ Dufour, A, 1999.

² This ranges from the use of email and instant chat on the net to EDI (Electronic Data Interchange) and automated supply chains. EDI has a role here both at the level of business to business as well as by governments in providing quicker and smoother trade transaction efficiencies for business by using EDI for customs clearance, trade procedures, etc.

³ Business that is based on information technology and linked through a network for digital transmission and exchange.

⁴ Network linked service centres that customers can access through the Internet for information, guidance, maintenance and services such as bookings, reservations, software support etc.

⁵ Digital commerce is the term used to describe goods, services and digitised transactions that are completed and supplied on-line

1. Software exports (as they are delivered digitally, mostly over the Internet)
2. Web-enabled services
3. e-business and e-trade

In order to trace this transition and the future growth of e-commerce in India this study, while outlining the developments in India in general and Bangalore in particular also traces the subtle shift and change in focus and direction that has been heralded by the emergence of Hyderabad or 'cyberabad' as it is popularly referred to. In many ways this represents Stage II of the digital revolution in India - both for the software industry as well as for the Indian economy and polity.

India's success in the new digital economy serves as a beacon for the South. This study will try to analyse how India succeeded in the first, i.e. software development and is well on the way to the second, i.e. e-commerce services. The lessons and best practises would then be listed for use by other countries of the South.

1.2 From software to e-commerce

As a symbol of globalisation and in many ways its leading feature, e-commerce also represents one of its distinguishing characteristics, i.e. where the extension of the international division of labour goes beyond international trade to geographic enclaves in different stages of the production chain⁶. The development of the software industry in India, and especially its initial concentration in Bangalore, represents this very unique feature of the new digital economy. It illustrates the impact of global value adding networks and supply chains as well as local development and growth – now beginning to occur at multiple levels and ways including state led initiatives as symbolised by the special steps seen in Hyderabad.

Out-sourced software development is one prominent example of the emerging “global commodity chains”⁷ where mainly production is distributed between two main parties at different locations linked through a network. E-commerce has the potential to extend those chains to multiple levels and locations and therefore company strategies now need to be analysed and prepared for these different stages and levels of the production and the service chain.

Software development goes through a series of steps, starting from the development of the idea and its design to programming, testing, installing and finally maintenance. The fact that this process could be distributed to different locations, for purposes of efficiency and cost, made it possible to set up a global chain in its production process. The following matrix elaborates these different steps in software development and how they are non-location-specific. It is this very feature that made for the success of the Indian story. It must be noted though that the real value addition in this process comes from the initial idea and design and countries like India were used mainly for the lower end of the value chain, however, with e-commerce that may change.

⁶ Lateef, A., 1997, *Linking up with the global economy: A case study of the Bangalore software industry*, International Institute for Labour Studies, ILO, Geneva.

⁷ Gereffi, G. and Koreniewicz, M (eds), 1994, *Commodity Chains and Global Capitalism*, Greenwood Press, Westport, Ct.

Despite these high growth rates, India's share in the world software product market is still very low, but India still enjoys an advantage over many other nations in software development, services and exports. This is partially due to the fact that India possesses the world's second largest pool of scientific manpower which is also English speaking. Coupled with the fact that the quality of Indian software is considered good with relatively low cost, it makes for a definitive competitive advantage in the global software economy.

2.1 The Indian advantage

The global talent crunch is real. ITAA estimates that 1 in 10 software positions do not get filled in the US and there are today 320,000 IT positions open in the US. In the Europe 1 million IT positions are needed and in Japan, by 2001 – there will be need for 1 million software professionals. Every body - from politicians to corporations - are turning to India for finding these professionals. Today the salaries offered are attractive and many leave for these opportunities. But this may not always be the case.

Compared to typical US loaded costs, India based software development delivers huge advantage. It is going to remain 3:1 for a long time. For web-enabled services like medical transcription and call centres where just English speaking graduates are required (as opposed to engineering graduates for software), the cost differential is nearer 5:1. Besides cost, more and more US and European companies are looking at talent lock-in as a competitive issue as availability is now in question.

The statement below is a rough guide comparing costs of the five most essential components in the software industry, between the US, Europe and India¹¹.

Software development costs	U.S.A (as base of 100)	Europe (and Japan)	India
a) Engineers	100	120 or so	33
b) Land/Rentals	100	100	80-100 (in metros)
c) Cost of connectivity	100	120 or so	200
d) Telephone	100	130 or so	200
e) Allied services (courier, air freight etc)	100	130 or so	150 and slower

Since manpower accounts for some 80% of the production cost in the software sector, overall development of software in India is 40 to 50% cheaper than the US or Europe/Japan. (If items c), d) and e) were brought on par with the US, as they will be in due course, then Indian salaries could be raised and the competitive advantage still retained.)

India has emerged to be a high quality destination. More than 50% of SEI Level4&5 companies¹² in the world are in India. At last count, more than 110 software companies in India were ISO 9000 certified. Indian software developers are also steadily moving up the value chain.

¹¹ Based on rough calculation and information culled from interviews with IT industry professionals.

¹² A standard certified by international software consultants for software competency and maturity, where 5 is the highest level.

India is moving up the value chain

1980	1990	1995	2000
On-site T&M based services	Off shore maintenance and feature development R&D centres of world leaders in IT	Off-shore development based on given specifications Y2K bonanza	Distributed development - software to eCommerce

As the above template shows, there is a distinct shift taking place in India today. This is the industry response to the digital economy. From the low end, back end software services that were mostly IBM main-frame software projects and body-shopping services provided to US companies, three major areas of IT services export have emerged in India. These are

- 1) Software exports
 - (from the earlier body shopping to e-commerce software and services)
- 2) Web-enabled services
 - medical transcription to call-centres
- 3) e-business and e-trade
 - dot.coms, portals, services
 - old economy global supply chains

In the first, can be seen a pronounced shift from the earlier mainly low-end software solutions to definitive sectoral software projects for businesses, as well as e-commerce software and services for mostly the external sector.

The second, i.e. Web-enabled services are really a result of the proliferation of the Internet globally on the one hand and the 'death of distance' for industry and services in the West that is leading companies to locate their call-centres and other services in far flung locations. Such services include medical transcription, insurance claim processing, call-centres, chat groups, web-services and a whole host of emerging opportunities.

The third is the hard core e-business and e-trade services and projects. These include new B2C and B2B websites and portals as well as the e-business that Indian domestic companies are now starting. On the e-trade side are the initiatives where Indian trade and industry is

beginning transactions for export and import as well as the digital processes being introduced in Indian regulatory bodies.

2.2 Where is India.com headed?

From the almost complete concentration on software, Indian exports are evolving into these three distinct growth areas. The present status and projections or targets (of the industry and government) are as follows:

<i>Year</i>	<i>External Sector</i>		<i>Internal Sector</i>
	Total Export	Software e-Commerce related software and business	e-Business
1999-2000	\$ 5.7 bn	\$ 0.5 bn	Rs 450cr (\$ 100m)
2000-2001		\$ 1.4 bn	Rs 15000cr (\$330m)
2004-2005		\$ 5 bn	
2007-2008	\$ 50 bn software and \$ 20 bn web-enabled services	\$ 10 bn	\$ 50 bn

The National Association of Software and Service Companies, the top industry lobby group, has recently carried out a survey that has given some interesting predictions for both software and e-commerce in India.

- India has a huge potential for Internet and Electronic Commerce, and Nasscom expects that by end of year 2000, there would be at least 1.5 million Internet subscribers and 5 million Internet users.
- A majority of respondents expect the real growth of Internet in India to take place through cable TV than there would be from PCs alone. India has 37 million cable connections but only 3.2 million PCs (as on 31 March 1999).
- More than 86% of top 100 corporate respondents endorsed electronic commerce and internet as being integral to their corporate strategic framework for the next year.
- Supply Chain Management optimisation is one of the strongest drivers of global E-Commerce solutions market, as it spurs Business-to-Business transactions. More than 68% of Indian software houses have informed of strong expertise in Supply Chain and Distribution Management solutions.
- Almost 32% of IT company respondents have identified web based consumer businesses as a major opportunity area, with expected paybacks beginning in 3-4 years.
- Some of the areas of E-Commerce services are - Legacy application integration; Internet Application Integration; EDI, Migration to Web based models; new IT frameworks and integration with business strategy (strategic IT consulting); E-Commerce training services; Business Web Site Development and Maintenance.
- With corporates planning to revive IT spending after the recently over Y2K problem, E-commerce solutions would emerge as a major technological and business opportunity for Indian software houses.

2.3 Some pending issues

However, there is a concern over the present state of affairs with regard to facilitating and supporting E-Commerce in India. The software industry in India as well as user industries are putting together their resources for adopting E-Business strategies. There continues to be a feeling amongst business that the present regulatory framework and infrastructure is still not conducive for proliferation of e-commerce in India. Towards this end Government of India have recently passed the IT Act, 2000 however the rules and procedures under it are still to be notified. Bandwidth also continues to be a major problem though here too the sector has been mostly opened up and with private sector investment in both satellite stations and fibre optic cables the problem is expected to be ease within 4 to 6 months. The issue of payment gateways also remains and though the legal provisions are now enacted, the actual providing of the service by Indian financial institutions is still to stabilise. Some three of them already have arrangements through foreign banks for providing these services and it is expected that public sector banks will also soon offer these services - presumably at a lower rate.

3. Ingredients of India's success

Success in the digital revolution is dependent on several key preconditions. A well functioning, modern telecommunication infrastructure and a satisfactory distribution of electricity, along with access to computer hardware, software and servers are the basic technical requirements for electronic transactions. For e-commerce to be successful and grow however, it is not just the hardware and physical infrastructure that is enough. What is required is an 'info-structure' meaning,

- the framework and environment for e-commerce that includes the appropriate legal and financial framework,
- the political and business environment conducive to its development and
- the capacity or human resource to deal in it.

a) Creating the environment -What the Indian government did

EDI to e-commerce

As part of its liberalisation and trade policy reform process begun in the early 90s, the Indian government took upon itself to actively introduce EDI (Electronic data interchange) as a trade support and facilitation measure. It soon became apparent however that the introduction of EDI was more of a management issue than a technology one. Government departments dealing with trade and the infrastructure for trade and computer network facilitation, would have to undergo process re-engineering of their procedures and themselves. Though this proved to be a daunting and rather slow task, the commitment and pursuit of it at various levels in the state and industry, led to the creation a favourable environment for eventual e-commerce framework creation.

Government took several steps for implementation of EDI which included setting up of a high-level EDI/ECommerce Council, liaison with UN bodies, separate working groups for legal, technology, banking and HRD issues etc. Things started taking shape, once the Government activated its machinery for implementation of EDI. In order to meet the new needs of the business community, two of India's major organizations viz., National Informatics Centre (NIC) and Videsh Sanchar Nigam Limited (VSNL) established EDI VAN services. Key areas where immediate attention was required were identified such as user awareness, human resource development and message development in line with UN/EDIFACT. An HRD group was formed to look into the needs of human resource development, training and other related needs of the EDI sector.

These EDI initiatives have now converted to e-commerce and e-governance initiatives and are serving the dual purpose of re-engineering government processes and attitudes as well providing digital services that facilitate e-trade.

Other initiatives

Besides the above, some of the other key initiatives have been –

- The STPI (Software Technology Parks of India) scheme set up by the then Electronics Ministry of the Government of India. This essentially provided two ingredients,
 - a) dedicated 24 hour satellite-based data communication link for software exports
 - b) a supportive export facilitation environment

This scheme proved to be one of the key factors for success, as STPI parks came up in key export and business oriented locations (5 to start with and now 11) where supporting incubator services evolved. This intermediate and focused approach that concentrated on a few chosen locations rather than awaiting Internet connectivity across the country, provided the required infrastructure for a very successful software export strategy.

- Setting up of and implementing recommendations of the National IT Task force. This high level body which brought together industry, scientists and bureaucrats provided both the strategy formulation as well as the detailed action plans on whose implementation has been the continued growth of this sector.
- A legal framework provided by the recently passed, IT Act making India only the 12th country world-wide to have such a comprehensive legislation for e-commerce in place.
- Opening up of the Internet Service Providers sector to the private sector
- Introducing competition in the whole Telecom sector, including mobile phone services
- Government is fully backing rapid growth by committing tax concessions and infrastructure for software and IT.
- Venture Capital and a favourable stock market have added speed. Indian companies are coming to NASDAQ, in the US and US companies are raising funds in India

b) Industry initiatives

Starting with the setting up of the first software R&D centre by Texas Instruments at Bangalore in the early 80s, the software industry grew by leaps and bounds. Scores of IT entrepreneurs set up software export services that over the years have captured both market opportunities as well as the attention of businesses and media across the globe. What has been the key component to this success is that these software export companies constantly upgraded their skills and sought to provide whatever services US and Europe business required. In that sense, the Y2K problem provided a unique opportunity for these Indian companies not only to generate large scale business but to establish credibility and contacts that are today converting to e-commerce opportunities. Supported by a strong business association lobby (through bodies like NASSCOM, ESC¹³ and CII¹⁴), this industry demanded and received support of government and its agencies from land, electric connections and satellite links to special tax incentives, fast-track clearances and supportive government policies. Their success and tremendous contribution not just to exports but also to employment and the local economy have resulted in IT, software and e-commerce today becoming the favoured darling of politicians across the country. From the famous 'laptop' Chief Minister of Andhra Pradesh (Chandrababu Naidu) to just about every state industry and chief minister, a totally politically supportive environment for IT exists in India today.

c) Providing the brain

Always referred to as the 'brain drain', it is today proving to be the 'brain gain'!

The world famous Indian Institutes of Technology (IITs) - just six of them - were the rocks on which India's software strength was initially built. Both in Indian software companies as well as in software jobs in the US, these and other Indian engineers coming from the scores of other engineering colleges, these brains have not only provided the software solutions but

¹³ Electronics and Software Export Promotion Council

¹⁴ Confederation Of Indian Industry

also the software ideas that has resulted in some 40% of all new dot.coms in California's silicon valley being set up by Indian ex-pats and hundreds of Indian software companies obtaining collaborations and business. Today countries across the globe (US, UK, Germany, France, Italy, Japan) are all offering special visas for attracting Indian software engineers. Though good for these individuals as well as for the country, serious plans are afoot in India to increase the output of skilled professionals to meet the growing demand. Even though education has traditionally been a state responsibility, hundreds of private software and e-commerce training institutes have mushroomed all across the country - and not just in the big metros. In fact training and education is itself emerging as a new e-commerce export activity with some of the big players¹⁵ in this computer education field now setting up branches abroad and portals on the Internet.

3.1 Analysing the response

In order to assess the role played at different levels by the major stakeholders and players in IT and e-commerce it may be useful to analyse their response in three key areas, i.e. Trade support technology, infrastructure and human resource availability. For this purpose, this study selected, EDI (electronic data interchange) being a key trade facilitation technology; connectivity for data transmission in the infrastructure area; and labour laws as a determinant of the business environment so far as the human resource availability and productivity is concerned. The matrix below highlights the response from the key players at different levels.

Issues as addressed by major stakeholders	EDI for trade facilitation	Connectivity	Labour laws
Central government	Ministry of Commerce initiated for exports and imports. Supported by Customs & Dept. and Banking.	Dept. of Electronics(now IT) established STPI (Software Technology Parks of India) Rivalry from Telecom dept. Biggest issue is ending state monopoly	IT industry sought to be given special status, especially for 100% export units. Govt. supported.
State governments	Marginal role in EDI but major role in e-governance projects, some of which will impact on improving general environment for business	Desired STPI earth stations once realised the potential and see it as more employment for their states State must provide and support intra state communication backbone by providing right of way to private sector.	STPI and export zones given special dispensations for 3 shift working, women working in late hours etc. Regulatory provisions of Factory Act being changed to limit labour unrest etc.
Municipalities and local bodies	No role	Supported establishment of STPIs and now private ISPs.	No role
Trade support organisations and trade associations	Fully supported in principle though marginally in action	Supported Though old organisations feel threatened as middle man supportive roles ending or changing	Pressing for changes on behalf of industry

¹⁵ NIIT one of the oldest of these computer education companies today has centres in 31 countries abroad besides some 1400 in India.

Enterprise/ entrepreneur standpoint	Reluctantly accepted the changes and only now realising the potential and benefits.	Enterprises in software exports greatly benefited and demanded better connectivity and more bandwidth	Existing labour laws serious problem for IT industry
Service providers and software professionals	Fully supported seeing it as business and professional opportunity	Totally new business opportunities emerged	Soft ware professionals stand to lose some traditional rights

The above matrix clearly brings out the differing responses as well as the traditional roles of some of the stakeholders that stand threatened and changed as the digital revolution evolves. In India, as IT and e-commerce become more and more common and popular, the supportive stand finds more acceptability, even though initially this may not have been either obvious or frequent.

3.2 Framework issues and their importance at distinctive stages of development

It would also be of interest to list out some of the major software and e-commerce services that have developed and see how important some of the key framework issues were or are in the context of their success and proliferation. For the purpose of this study, connectivity (via the Internet or even direct to the client), availability of qualified software professionals, the incubating built-up space or availability of reasonably priced land, the legal framework for e-commerce and the payment gateway for financial transactions have been taken as the key *info-structure* components.

Matrix to show the importance or necessity of some of the basic *info-structure* requirements for software and e-commerce services.

Software Services	Connectivity/ Bandwidth(BW)	Software professionals	Incubator or land	Legal Framework	Payment gateway
<i>Software exports</i>	Y/ BW not an issue	Y	Y	N	N
<i>Web enabled services</i>	Y	N	Y	N	N
<i>Info Portals</i>	Y	Y	N	N	N
<i>eMarketplaces</i>	Y	Y	N	Y	Y
<i>EComm Supply chains</i>	Y	N	N	Y	Y
<i>Display websites</i>	Y/ BW not an issue	N	N	N	N
<i>Digital products</i>	Y	Y	N	Y	Y

Legend: Y = Yes, it is important or an issue; N = No, it is not a key issue

The matrix above highlights some of the important considerations and possible explanation for why the Indian IT industry concentrated and developed more in some areas and less in others. For example, for software exports and web enabled services like medical transcription and call centres, which were and are directly to specific partners or clients in US or Europe, just basic connectivity (not even the Internet) was required and therefore bandwidth, legal e-Commerce framework and a payment gateway were not major issues. Bandwidth is today an issue as the number of companies and domestic Internet requirements have expanded. Legal framework and payment gateways were not needed as the transactions

possible but encouraged by the real support that government gave to this sector. The result was much higher levels of efficiency in delivery and production for the sector.

The hot dot.com.in factor

Dot.com start-ups are suddenly the rage in India too. And more than in the developed world, it is almost like a phobia that has caught the imagination of local business. With examples of success of Indian expatriates in Silicon Valley (where apparently over 30% of the 'hot.dot.coms' are run by persons of Indian origin), the fever has hit India in a big way. And the interesting fact is that it is no more just Bangalore. From Hyderabad in the South East to Mumbai in the West and from Chennai in the South to Chandigarh in the North, the IT business is booming.

4. The shift to e-commerce – From Bangalore to Hyderabad

It is difficult to say where software and IT stop and e-commerce starts. In fact the former are really part of the later. Yet there is a subtle shift, both in content and perspective and this is perhaps best symbolised in the *new* story of Hyderabad (or *Cyberabad* as it is referred to) as opposed to the *old* story of Bangalore (which still continues to succeed and evolve). In this sense, the Indian success story is now entering what can be referred to as Phase II of the digital revolution.

In analysing and outlining the ingredients of this success story it would be important to clarify that there is not such a clear cut distinction between the initiatives at Bangalore and Hyderabad. As the digital revolution has progressed over the years, from the earlier concentration of the software industry at Bangalore, there has been dispersal and large scale growth of the industry at the major centres of Delhi, Bombay (Mumbai) and Madras (Chennai) as well as to the new emerging centres at Pune, Bhubneshwar and Chandigarh. This growth itself represents a progression of the digital revolution aided on consistently by the Central Government through its key Ministries of IT and Foreign Trade (Commerce). However there is a certain ingenuity and innovativeness that was witnessed in the novel advancements at Hyderabad that are worth enumerating for the purpose of case record and lesson.

4.1 The Hyderabad story

If the three main pillars of the 1st stage of the development are seen to be a) the enabling environment, b) the business initiatives and c) the skilled manpower, then the next phase symbolised by Hyderabad represents further developments in each of these.

a) The enabling environment in Phase II

The larger than life image of the "laptop" Chief Minister of Andhra Pradesh (whose state capital is Hyderabad) Mr. Chandrababu Naidu, perhaps best represents the pro-active and aggressive push that Hyderabad gave to the IT industry in general and to government-private sector partnership in particular. So powerful has been the hype created that in his only visit to India a few months ago, President Bill Clinton chose to go to Hyderabad to meet with him and see the IT revolution first hand. The other Bill - Mr. Gates, also did the same and located in Hyderabad the only Microsoft development centre outside of the US.

From setting up HITECH-city, a massive IT incubating facility with in-built data-connectivity for the software and e-commerce companies located there, to establishing the first 'Indian Institute of Information Technology' with the assistance of major global IT players and introducing e-government in the State, Andhra has shown the power that state initiatives can wield for the sector.

Overall for the trade sector in particular, such partnership has been matched at the Central Government level by IT and Internet enabled on-line regulatory approvals for import and export. Today importers and exporters can obtain time bound clearances from the DGFT (Director General of Foreign Trade) and Customs as well as have their cargo movements facilitated digitally through Airports and Ports. This is the convergence of e-governance and e-commerce. From an organisation's perspective, e-commerce and e-governance can be viewed as the two layers sitting atop the computerised automated internal operations of the organisation which enable the interface with the outside world.

The experiment with e-governance

Within the next few years, e-governance will transform not only the way in which most public services are delivered, but also the fundamental relationship between government and citizens. After e-commerce and e-business, the next Internet revolution will be e-government. Though not the only in the country or even the first, initiatives at Hyderabad have shown not just Government seriousness and commitment but also the detailed and meticulous planning that needs to go into e-government introduction and promotion.

E- governance involves

- the application of Information Technology to the processes of Government functioning.
- The adopting of these technologies and all they involve in the matter of a completely new type of commitment, open systems and use of the medium of the Internet for government business, citizen interaction and most important, for development.
- the promotion of the information and communication technologies and especially e-commerce , and
- an extension of e-commerce to government procurement

In at least the first three, the steps taken at Hyderabad have shown that government initiatives backed by government spending for IT and e-government projects in its own departments, not only provides the right signals for private sector but also provides business opportunity for the private sector to be attracted by.

In Andhra Pradesh, the state government provides 18 services via the Internet already. These range from issuing of driving licences to payments such as for electricity, water, and poverty tax, to revenue records and property, birth and death registration services for both urban and rural areas. These are more services than even the government in the US provides, as President Clinton acknowledged after his recent visit there! In order to extend the benefits of such services to even the illiterate population, touch-screen kiosks are being planned. Rural areas are being linked through the AP Value Added Network and the setting up of Farmers Clubs in villages. In a unique experiment 82 Agricultural Marketing Committees have been linked to each other and head-quarters providing for prices and daily transactions.

Some constraints

There is however still a great deal of confusion among implementing agencies at various levels as to what exactly e-commerce and e-governance are and how to go about it. Part of the problem is that some of these organisations have inadequate internal computer personnel who have their own limitations in understanding and implementing e-governance schemes or in serving as a bridge between the organisation and professional external organisations. There is also the need for integration and convergence of services offered by different departments so that a truly single point service can evolve. Extensive coverage of rural areas is also going to take time.

b) Business initiatives – E-Commerce services

Though conceived of by government, the HITECH City project was executed by India's largest construction company. Its success was ensured when leading global IT players¹⁹ bought into it. Today phase two is under construction as are similar projects in several other

¹⁹ Such as Microsoft, Oracle and Metamor Worldwide Inc.

Indian cities. Similar complexes by individual IT companies also have come up attracting the best of IT professionals from India and even abroad.

For the digital revolution in general the Phase II shift also is seen in the shift in software services from low end data entry and IBM mainframe 'fixes' to e-commerce services and projects. There has also been a tremendous growth of web-enabled services. Though some phone and direct satellite link based call centres had come up in the 80's and early 90's, it is the last few years that have shown the mushrooming of web and IT enabled services like medical transcription, insurance processing, travel services, back-end services and so many more type of innovative facilities that are not necessarily based on high level IT expertise. Not only do they provide more employment but are more stable as businesses as they usually deal with permanent clients. It is this growth of e-commerce that is taking the digital revolution from the software centres of Bangalore and Hyderabad to the smaller cities across the country. From the earlier time or geographical advantage of software services offering solutions to the US by being open when the US companies were shut for the night, the norm and the claim today is '24/7 service' (i.e. 24 hours a day, all 7 days of the week).

c) Providing the knowledge workers

'Knowledge worker' in the new digital economy are both IT professionals as well as e-literate workers that can help e-enable existing businesses as well as man the new web-enabled services. Again Hyderabad (as well other cities too) have shown the way forward to provide the supply for the growing demand.

In order to take the software services to a higher level in the value chain, the Andhra Pradesh government came up with the innovative idea of going beyond the traditional IITs and establishing India's first IIIT²⁰ (Triple I T). This is an institute that is essentially run outside the state educational system (though its degree is a recognised one) and comprises of R & D centres set up by leading international IT players like IBM and Microsoft who besides training the students also run separate short-term courses for corporates and professionals. The next pioneering step being initiated it to start e-commerce based multi-university degree programmes for professionals like accountants, bankers and doctors for them to take mid-career degrees for becoming e-enabled. These programmes would be offered in several towns through various universities and run by 'mentors' not professors. Hyderabad is also venue of India's first international level business school as well as a school for e-commerce.

Across the country the growing shortfall of software engineers²¹ is also being addressed by plans to double the capacity in the state run university system on a two to three year programme on the one hand, and by the booming private sector educational services in IT and e-commerce that have proliferated across the country. These teaching shops provide training from software programmes to e-commerce practices and web-services like medical transcription. For the latter, just English speaking graduates with some basic computer training are required and therefore the manpower availability is almost insatiable.

²⁰ Indian Institute of Information Technology.

²¹ It is estimated that this year itself, against a requirement of 200, 000 there will be 180,000 available. The shortfall is not just on account of the booming IT sector in India but because of the very large demand of Indian software engineers in the developed countries - from the US to Europe and Japan (where in total some 150,000 go every year).

4.2 Internet and E-commerce - the growing success

During 1998-99, an interesting survey revealed that out of the top 25 E-Commerce companies in India, 18 were already making profits, besides growing annually by more than 500 percent. Many of them have been funded by venture capital and many of them are determined to go in for international IPOs²² over the next 3 years. This is representative of the steady inflow of international venture capitalists eager to invest in the innovative ideas being conceived by young software entrepreneurs in India.

Industry experts believe that the Internet, although has just about 1.4 million users strong today in India, has the potential to explode to 37 million by the year 2003, once internet connections are available on cable-spreads across India. This will position India as a global hub for content development and e-commerce. Now, more and more of Indian software houses have started providing web based applications and services. That the Internet is becoming an integral part of the Indian software business is also evident from its use alongside that of high-speed satellite connectivity for software development and delivery. The delivery through high-speed connectivity has been one of the key factors for globalisation of the Indian software industry and its success.

Some of the e-commerce success stories

In a short span of time, despite non-adequate proliferation of the Internet or online services, E-Commerce has taken off in an enthusiastic way in India. The spread and innovativeness in India is striking. Listed below are a sampling of some of the interesting services and Portals that have come up in the recent past:

- Rediff-on-the-Net is one of the most well known and visited portal E-Commerce web sites. The web site includes many sections that position it as a virtual gateway to India and its happenings. However, www.rediff.com has gone a step further by not only becoming a world-wide site but also enticing Indian customers by giving them the option of using Indian credit cards for shopping on their web site. It works by juggling with credit card information and not handling money directly. It has recently signed up with a majority of ISPs across the country in order to access their customer base.
- In another case, www.bababazaar.com is India's very own online grocery store. One can buy vegetables, fruits, packed materials, toiletries and other daily use goods. It has developed a unique and down-to-earth business model for facilitating e-commerce through its web site. It allows users to surf the web site, browse the range of goods, and keep adding the selected goods (and quantity) to the shopping cart. It continues to update the charge list. With the final click and your contact details, it promises to deliver goods on the same day. The payment is collected at the time of goods delivery. This is again a unique model of 'Indian' ingenuity.
- Hindustan Lever, the largest consumer goods mega-corporation of India, is in the process of setting up a mega-e-commerce network that will eventually cover its 1 million outlets in all towns and some 100,000 villages through its 7000 stockists. It aims at providing business connectivity to its suppliers, consumer connectivity to individual consumers and consumer commerce through e-tailing from its Portal. It is separately planning e-commerce for its export wing.

²² Initial public offering of shares.

- Arvind Textiles, a leading retailer of textiles in India is implementing plans to convert its very extensive distribution network into Internet kiosks.
- In a bid to free the apple farmers of the north Indian hill state of Himachal Pradesh from the clutches of the Delhi based middlemen, a Bangalore based Internet company has started organising 'farmers bazars' in the apple heartland and directly selling the apples via the Internet to buyers in far away locations in the south of India. The result - 30 to 40 percent higher prices for the growers.
- Claimed to be the first in the world, Dr. WAP an interactive service available via WAP cellular phones makes available the largest searchable database on Indian drugs. Doctors can now be assisted in their diagnosis and prescriptions with this as well as the medical history of their patients also available on the service.
- Quark Inc. a leading US publishing software company set up a software development centre at Chandigarh India two years ago. They have now moved to establishing an e-commerce site (bazardecor.com) that uses their own e-commerce back-office software (Mercury) and includes an AVS (Address Verification System) a tool for SMEs to verify e-commerce transactions on the Net.
- DW CRA (an organisation for the *development of women and children in rural areas*) based out of Hyderabad, has set up 'dwcrabazar.com' as an e-marketplace for handicrafts of rural artisans. This was one of the sites/initiatives that so impressed President Clinton when he visited Hyderabad earlier this year.
- eSecure, a Hyderabad based e-Commerce provider has developed 'e-mohar.com' which is a facility for authenticating legal transactions over the Net. ('Mohar' is the Indian term for the royal seal on legal documents). They expect to link this facility with the country wide banking network for e-payments that is coming up. This company is also setting up an infrastructure portal for pre- and post-bid activities for large infrastructure projects. They expect to sell their services to governments in developing countries.
- 'spinweave.com' is a textile industry integrated portal that hopes to link fashion forecasting, spinning and weaving, designers, raw material suppliers, importers and exporters in the yearly business cycle of garment and textile exports. It also offers total e-business services including web hosting, textile and cotton price data, consultancy services, finance etc.
- As a unique and successful 'free service' model, 'caltiger.com' is an ISP based in Calcutta that offers free Internet access. Its economic model is based on personalised advertisements²³ for its viewers as well as the offering of Internet games to viewers that they 'pay-per-play'. Within a few months it has acquired over 300,000 members and now is expanding to other cities.
- 'subhiska.com' is an e-Commerce venture at Madras that started out as a brick and mortar retailer, but with very efficient IT systems to manage low inventories and direct ordering. Today it has some 35 stores in Madras and a very lean supply chain. He thus passes on the benefits to the consumer and is hence cheaper than a normal retailer. It is now multi-media and a customer can now either order online or through the phone or on the computer at one of his outlets and pay on delivery.
- Amul one of the most successful cooperative marketing ventures in India went on to the net in 1996 and used it to further promote its basic co-operative philosophy of linking producers directly with consumers and eliminating the exploitative middlemen. Today it is major netbrand for both B2C and B2B operations - domestic and international.
- Autoindia.com is India's most popular auto portal providing the most extensive information for the auto industry and auto lovers. It was started in 1998 by a 21 year old

²³ Personalised or targeted advertisements as different from general advertisements are based on personality profiles of subscribers and come on as and when the users concerned log on to the Website.

'auto freak' as a pure hobby. Despite getting offers between \$ 2 - 5 million for a buy-out the site continues to essentially offer free information and services and is only now getting ready to establish its own business model.

These are only some of the instances of E-Businesses that have flourished in India even in the face of virtually non-existing regulatory framework, low quality telecom infrastructure, security concerns and a PC penetration of only about three PCs per thousand!

While Business-to-Retail E-Commerce has just begun in India, - the Business-to-Business E-Commerce has also started taking root. E-Commerce transactions being carried out by Auto giants Maruti Udyog Limited, Bajaj Auto and TELCO; multinationals like Procter & Gamble, drug majors and some textile mills clusters in Ahmedabad are cases in point.

5. Some Lessons and 'best practice' for developing countries

Developing countries (and their SMEs) lag far behind developed country markets in the availability of the technical pre-requisites for conducting electronic commerce. The gaps in the two main requirements for Internet i.e. telephone and computer availability highlight the difference. For example, 65 per cent of households in the world have no telephone, whereas 90 per cent of households in high income countries have a telephone²⁴. Developed countries today have 312 ISPs (Internet Service Providers) per 10,000 people compared to just six ISPs per 10,000 people in developing countries²⁵. In the United States, roughly one in three persons uses the Internet, compared to only one in every 10,000 in South Asia. Furthermore, in developing countries telecommunications services are often unreliable, high cost or both. There are also enormous differences in access to telecommunications both between and within developing countries. For instance, while in developing countries a considerable proportion and sometimes the majority of the population lives in rural areas, over 80 per cent of the main telephone lines are located in urban areas. The 'digital divide' (both between and within countries) is a real issue and yet the urgency for developing countries to catch up in the digital economy and use e-commerce as a tool for development is all the more important.

Attempts in developing countries to develop e-commerce are underway in nearly every economy, but e-commerce is still not considered a significant market driving force. Those currently involved are either entrepreneurial risk-takers or larger corporate entities dedicated to a long-term investment. They are also mostly targeted at western markets with little regard for regional harmonisation or interconnections between developing countries. They are mostly for business-to-business rather than business-to-consumer transactions and have generated only few success stories as yet and these too are not publicised much.

Although most developing countries are only now embracing the "new economy", its impact on their existing business empires may be even greater. The South is still far behind the US and Europe but once the Internet and e-commerce begins to set in, it may turn out to be the greatest of all the forces bearing down on traditional businesses and management practices, for three reasons. First, it undermines the established old business models, which are based on existing networks (for example the Asian 'tycoons'²⁶ and their connections with Chinese around the world) and on privileged information (usually backed by strong political and bureaucratic connections). Secondly, it allows the rapid rise of new competitors. Third, Internet businesses rely to a much greater extent than old-economy operations on equity funding by venture capitalists or market investors, as well as on stock options as compensation to employees, and these groups demand more transparency. In many parts of the developing world where businesses are family owned the shift is going to be slow but once the trend and reality hits home the change may even be faster than elsewhere. India is proving this to be true.

²⁴ Access to telecommunication is often measured by "teledensity" which gives the number of main telephone lines per 100 inhabitants. About a quarter of the world's countries have a teledensity of less than one and another 47 countries only have between 1.4 to 8.6 main telephone lines per 100 inhabitants. This should be compared with a teledensity of between 27.8 and 68.3 for a group of 46 countries with the highest number of main telephone lines per 100 inhabitants (Source, www.itu.org).

²⁵ Source: ITU, Geneva

²⁶ Leading business giants, mostly of Chinese origin in several Asian countries other than the Indian sub-continent.

5.1 Some myths and dilemmas²⁷

Based on the Indian experience it would be of use to address some of the myths and dilemma of e-commerce and the new digital economy. First, some of the myths about the ICT (Information and Communication Technology) industry.

The myth	The reality
1. That one needs to have total country-wide internet access before the benefits can accrue in developing countries.	In fact for most developing countries, resources will determine that intermediate partial and focused strategies would be required and such initiatives have proved successful in India (The STPI scheme).
2. That privatisation is the only key to telecom growth	Competition not privatisation necessarily is the key to better service and growth.
3. That you need the latest of technology in your telecom systems.	Technology changes so fast that in any case this may not be feasible so adapting existing infrastructure may be more practical as is being done in India.
4. That computer literacy is essential to use the Internet.	It is useful but not essential. IT services on government networks, like land-records, licences, weather and agricultural information etc., can be utilised even by illiterate peoples in developing countries. As is being done in e-gov at India (Hyderabad example).
5. That you need software engineering graduates to start any web based services.	For web-designing and network management yes, but not for web-enabled services like call centres, medical transcription etc.
6. That you must be proficient in the local language to be able to offer e-commerce and IT services in that country.	Whereas web-sites and other web-services may have their front-end designed in the local language, the back-end services like maintenance, software, technical support do not need to be and are in fact in computer language or English based-medium. Indian engineers are in demand in Europe despite lack of local language knowledge.
7. That the choice is between either the market or a government controlled programme, for promoting and spreading e-commerce in developing countries.	In fact there is no choice between the two. For its success in developing countries, both the government and the private sector need pro-active involvement, as happened in India.

Some dilemmas

In the area of policy research and new technologies such as the ICTs there can be dysfunction and issues of controversy that could have a bearing on the strategies of governance. Some dilemmas are enumerated here more as examples rather than a priority listing of the major issues. Future strategies in the area of e-commerce and its impact in developing countries need to be seen in such perspective.

²⁷ Adapted to the Indian context from Singh, A. D., 2000, (Under publication) *Electronic Commerce: Some implications for firms and workers in developing countries*, International Institute for Labour Studies, Geneva.

The supply-chain dilemma

Most organisations and studies are of the view that the principle beneficiaries of e-commerce will be the small and medium enterprises (SMEs). The reasons for this include the attractiveness of a relatively inexpensive medium (the Internet) for reducing transition costs which the larger firms have already been doing with IT and EDI; flexibility of the SMEs in adapting to the new emerging business models of e-commerce; and most of all being able to join the global e-commerce based supply chains. As B2B already is and in future too, is expected to be the main area of growth for e-commerce, the last is probably the most significant of factors. The dilemma is that this very benefit could make the SMEs ever more dependants on larger firms and multinationals thus limiting the other benefits of the new opportunities for them. In the software development at India this was apparent in the lower end work given out to the Bangalore based companies. It was also apparent in the 'body-shopping' phenomenon. Today the second has reduced by several percentage points²⁸ and several Indian software companies are beginning to offer their own e-commerce services.

The cultural dilemma

All firms and workers across the globe have a sense of their own societal and organisational culture. Individually our cultural values provide an unconscious world view into which we are socialized and which we use to socialize others²⁹. Organisational culture determines impacts on how companies perform and behave in the market place. Most importantly therefore, communication styles vary across the globe and have a bearing on successful trade relations between firms³⁰. With e-commerce and the Web, a new global digital culture and new forms of communication are emerging. Firms, especially SMEs will therefore need to suddenly adapt to this new culture and yet attempt to retain their own special styles and culture that make for their uniqueness and innovativeness. This will impact on the whole issue of 'content', in the web and multi-media services and products of the future. Interestingly in India, even though 'English' communication and thought processes have never proved much of a problem in business dealings, yet a unique 'Hinglish' (Hindustani and English mix) has emerged and is reflected in both content and style in the new Indian web-sites.

Dilemma of democracy: control vs. freedom on the net

Democracies are founded on the principle of freedom of expression and choice. In fact it is this very special recognition of the individuals right to free expression, free choice of employment and business that is the basis of individual enterprise and entrepreneurship that is the backbone of free-market enterprise and innovation. It has also been the hallmark of success of e-commerce. Yet the same Internet that provides the highway for the new economy can also be the high-road for new crime, new cyber terrorism and what are referred to as the 'gigabyte guerrillas'. Where do governments draw the line between freedom and control on the Internet? And if they try to, will it stifle the new economy? In the developing countries for example, India stands out as a very successful example in the digital economy. As the world's largest democracy it does not police the Internet. There are some countries that still have very strict censorship laws in place. Will these effect future growth?

²⁸ Estimated by Industry experts to have reduced by 20 to 30% from the earlier 70%. (Interview with A. Parthasarthy former Secretary Science and Technology India).

²⁹ ITC, 1999.

³⁰ Trompenaars, F., 1993.

Dilemma of Technology vs Management

E-Commerce is more than just electronics and commerce added together. It represents an entirely new way of doing business over a medium that changes the very rules of doing that business. It is therefore far more about strategy and business management than it is about technology. In order to understand e-commerce and its implications for developing countries, it is important therefore to see it from the perspective of the transactional aspects of e-commerce, those that represent the business between the different players, as well as the framework aspects, those basic requirements that are needed in developing countries for it to develop. It is therefore important to take e-commerce development and promotion away from mere science and technology initiatives to those of hard-core business. In many ways this represents a shift not very easy for state initiatives.

5.2 Enabling conditions to fuel growth – ‘Best Practice’ and lessons

Conceptually, best practice is a static concept and in a fast emerging area such as e-commerce it would be presumptuous to think that strategy and practices in one country could be replicated in another. Having stated that up-front as a caution and philosophy, this paper will attempt to list out some strategic initiatives as well as lessons learnt from the Indian experience that may be of interest for strategy makers in other developing countries.

- **Distinguish between IT and e-commerce:** For developing country governments to address these issues, it is important to distinguish between IT policy and promotion and e-commerce strategies. Many state initiatives seem to blur and confuse this issue. Whereas promotion of the Information Technology industry fundamentally refers to developing both the hardware and software IT industry, it is important to note that e-commerce is by no means limited to only that industry. E-commerce, besides IT and digital commerce, in fact encompasses all trade and commerce and therefore impacts the entire economy³¹. As e-commerce expands across the global economy, it will become more and more necessary for existing industry and trade to switch to and use the potential of this medium to not just grow but even to survive. For this developing countries need to work out appropriate strategies to engage in and promote e-commerce in their economies.
- **Intermediate Strategies are useful:** Many developing countries may not be able to generate or attract the large investments needed for the telecom infrastructure in their entire country. Therefore, a more strategic option would be to formulate and implement appropriate policies by concentrating on the areas in which electronic commerce is most likely to bring the highest benefits to their respective national economies; business-to-business, business-to-consumer and business-to-government transactions. This can be both geographic as well as sectoral.
- **Re-engineer existing networks and use global services:** Massive investments and flawless technological solutions are not always necessary or possible. Even existing networks can be reengineered and global services for the Internet and e-commerce sites can be utilized. Till recently, all data connectivity was through state run telecom services and even now, 80% of Indian sites are based out of servers in the US.
- **Focus strategies:** It is advisable to avoid the 'volume of IT/E-commerce' approach in attempting to promote e-commerce everywhere and for all purposes and instead focus

³¹ Singh, A. D., 1999, *Electronic Commerce: Issues for the South*, South Centre, Geneva.

and trained manpower. Some countries will have this in abundance, and some will not. Even in India shortage of trained software professionals is beginning to emerge as an issue. It is thus important to plan for this right from the start. Venture Capital and a dynamic stock market add the necessary push.

- **IT education is crucial:** Initiatives in the education and HRD area are needed at all levels - from primary to technical education and from formal education structures to private sector teaching shops and industry. The Indian experience shows that lack of resources in the state sector and the seizing of a business opportunity brought about a country wide private sector wave of IT education.
- **Government's commitment is essential:** Government must show its backing by committing tax concessions and resources for infra-structure. This alone can lead to growth in this area.
- **Transforming information systems is the key:** Promoting e-governance or e-business within organisations is not about putting PCs on all desks (as Govt. in India did in the 80's and failed), it is about transforming the information systems within the organisation to make it more efficient and profitable.
- **E-trade needs integrated links:** E-enabling trade and commerce requires not just websites and trade data bases but providing for the integrated links with each stakeholder - regulatory bodies, shippers, bankers, storage facilities etc. India's example shows that this is happening slowly.
- **E-commerce as a non-tariff barrier:** E-commerce could become a 'non-tariff barrier' in the future or at least an additional cost that could reduce a country's competitiveness if companies abroad that are e-enabled cut out those of their suppliers that are not or add a charge for supplies that are not part of digital value chains. Some department store suppliers from India have already been warned of this by their buyers.
- **E-commerce for development is both prudent and expedient:** Embracing e-commerce and IT as a means of assimilating with the digital economy is indispensable today. Yet using it for development is also essential for making it politically acceptable as well as fundamental to its integration with the domestic economy. India's strategy and experience with e-governance, for example, is proving this to be true.

















5.3 Corporate Lessons of success from India³³

There are also some 'best practice' lessons for business and industry that the Indian example has shown. Some of these are enumerated below:

- Whether you are an SME or large corporation the future e-trade paradigm is the merging of IT, management and trade.
- So far as e-business and e-commerce are concerned the bottom line for all business is - 'lots to lose and lots to gain'

³³ Lessons that Indian corporates themselves learnt from best practise in the IT world. (These are based on interviews held with Indian software and e-Commerce companies in Bangalore, Hyderabad, Delhi and Chandigarh, India, during the course of this study.)

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