information technology for {mission-oriented information} society

W H I T E P A P E R

Goa Agenda 2002

Contents

"The task is not so much to see what no one has yet seen, but to think what nobody has yet thought about that which everyone sees."

Arthur Schopenhauer

Goa Agenda 2002:
IT for Society

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1. Executive Summary

Information required by society to operate, manage and govern processes that provide its material and emotional needs determine the Information Technology requirement of society.

Traditional Indian IT markets have catered to specific industry classes in remote geographies with foreign technologies and limited service offerings. Emerging markets are expected to be *3-6 fold* the traditional market and offer to focus on societal processes within India.

The IT industry and government's best step forward will be to align to the vision of creating a *mission oriented* information society. To this end the industry would pursue the mission of *enabling societal missions* with information.

Homegrown solutions have to be bred with indigenous R&D and applications have to focus on the operation-clerical users, the managers and the governors of processes delivering the products and services for society.

Goa offers the ideal locale for co-locating R&D at a national technology park to generate homegrown technologies. Annual venture funding fairs, technology fairs could catalyse the creation of the new emerging Indian IT markets.

2. Traditional Markets

2.1. Segments

The size of the revenue streams are regarded as the best criteria to asses the success of revenue models. Revenue models themselves address the market segments they expect to service. Revenue stream classification is therefore a good surrogate to identify market segments that generate them.

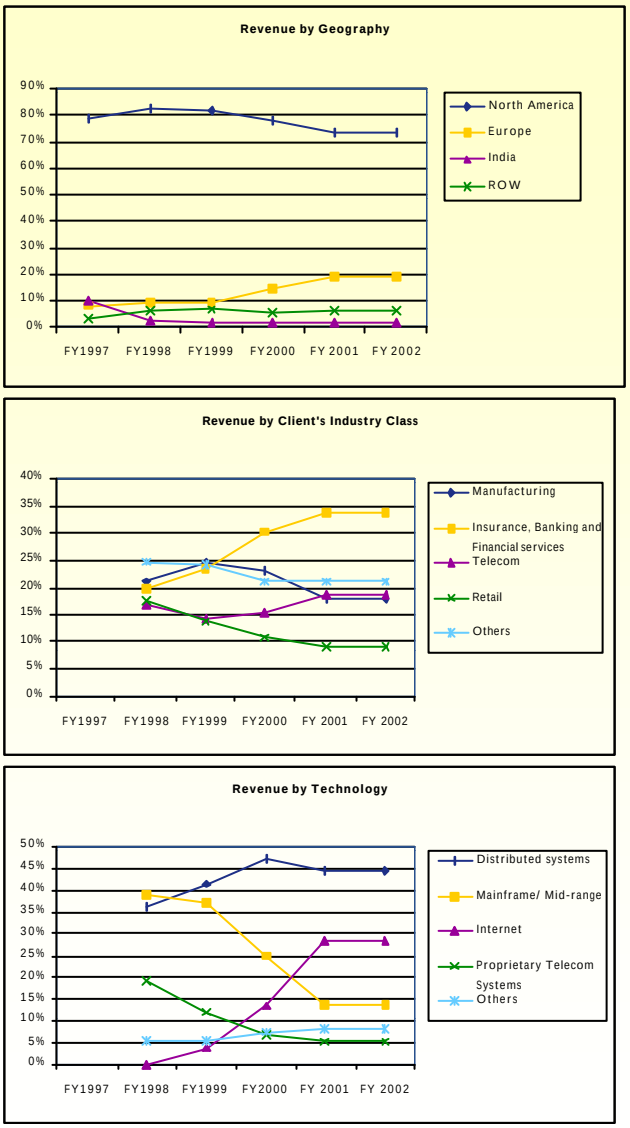
Most IT majors report revenue streams in more ways than one. Typically the client's industry class or vertical domain identifies the market segment by industry. The

Figure 2: Traditional Segments

Geographies	Industry Classes
USA	Manufacturing
Europe	Banking and Finance
India	Insurance
Rest of the World	Telecom
	Retail

Technologies	Service Offerings
Distributed systems	Development
Mainframes	Maintenance
Internet	Y2K
Telecom systems	Re-engineering

Figure 1: IT Revenue Streams



(Source Annual Report of an IT major from 1997-2002)

service offering identifies the market segment by type of service provided. The revenue streams are also classified by geographies. Technology is also used to segment revenue streams.

Traditionally the Indian IT industry has provided on-site manpower requirements that evolved into offshore development centres as the gap of cost between the two narrowed. Most of the business has come from the USA, Europe and rest of the world. Manufacturing, banking, finance and insurance, telecom, and retail have been the major industry classes' serviced by the Indian IT industry.

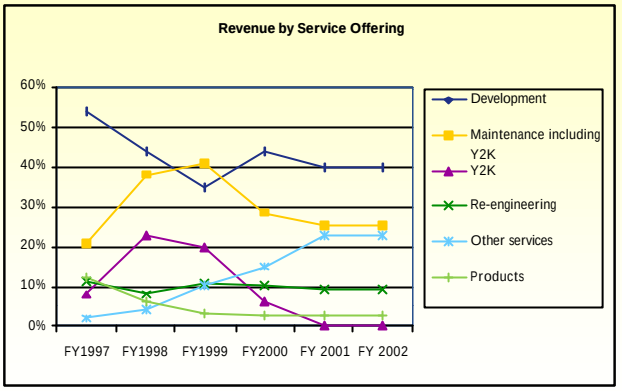
The Indian IT industry has provided development, maintenance, Y2K, and re-engineering services to these clients. The Indian IT industry has been supporting their clients on distributed systems, mainframes, internet, and proprietary telecom systems.

2.2. Size

The size of the Indian IT market has grown through its focus on geographic segments servicing the USA, Europe and the rest of the world. Offshore development centres servicing more of the same industry classes has driven the growth.

Historical evidence suggests radical shifts in technologies and offerings had to happen to enable the Indian IT industry to its phenomenal growth rates. These technologies, developed and promoted by the geographical segments IT industry

Figure 2 (cont.): IT Revenue Streams



(Source Annual Report of an IT major from 1997-2002)

serviced, have always created significant costs and posed high risks to the Indian IT industry.

A consequence of centring the industry around technologies from other geographical segments has been the gaps in skills between those needed and those provided for by the IT manpower training industry.

2.3. Structure

The Indian IT industry's size is heavily skewed to the small. Although they successfully emulate the revenue models of their larger counterparts, these smaller units have been unsuccessful in emulating their growth strategies.

Less than 4 percent of the Indian IT industry makes for the bulk of its revenues. Together the traditional IT markets contribute to less than 2 percent of the Gross Domestic Product of India. Of this less than 0.5 percent contribution is from servicing traditional domestic IT markets and 1.5 percent from traditional exports.

2.4. New Segments

Since the mid '90's the units providing business support enabled by IT were included in the IT industry as IT enabled services (ITES).

The ITES in India has been offering to its overseas clients customer interaction

Table **1 Size of Indian IT Industry Units**

Annual turnover	Number of Companies	Percent of Companies
Above Rs.1000 crore	5	1%
Rs.500 crore - Rs.1000 crore	7	1%
Rs.250 crore - Rs.500 crore	14	2%
Rs.100 crore - Rs.250 crore	28	3%
Rs.50 crore - Rs.100 crore	25	3%
Rs.10 crore - Rs.50 crore	193	24%
Below Rs.10 crore	544	67%

(Source: http://www.nasscom.org/artdisplay.asp?cat_id=310)

services (including call centres), back office operations/revenue accounting/ data entry/data conversion (including finance and accounting/HR services, transcription/ translation services), content development, and other services including research.

The ITES has grown through American companies outsourcing their routine operations to cheaper service providers. Most ITES is as yet at the lower end of the business value chain as indicated by table 2.

Table 2 Units in different ITES Segments

ITES	No of Companies	Percent of Companies
Customer Care	103	13%
Web Sales	100	13%
Billing services	81	11%
Database marketing	80	10%
Accounting Transactions	76	10%
Document Management	75	10%
Transcription	75	10%
Telesales	70	9%
Benefits Administration	32	4%
Tax Processing	30	4%
HR Admin	26	3%
Biotech Research	15	2%

(Source: http://www.nasscom.org/artdisplay.asp?cat_id=310)

2.5. Strengths

The Indian IT industry's biggest strength is its large and mobilised manpower produced by an organised technology education industry.

2.6. Weakness

Indian IT industry has been developing manpower based on technology skills that has short lifetimes. This places a high cost to have a rapid and continuous turnover or upgradation of human skills deployed in the industry.

Indian IT industry is centred on technology that is not indigenous. This means that its human resource and technology industry is extremely vulnerable to the changes in technologies and standards as well as the costs to access these technologies or standards. Access, costs, and experience with technology limit the rapid deployment of new technology solutions and leave the industry to make offerings that are at the lower end of the technology spectrum.

The Indian IT industry is focused on industry classes that have had traditional IT spending. Many of these have questioned or begun to question the return on investment (ROI) on IT spending. This threatens to slow down the growth of the Indian IT industry.

The Indian IT industry is also very service offering focused. It has focused on development, maintenance, Y2K and to a very small extent re-engineering. These service offerings are firstly at the low end of the value chain. Secondly most of the service offerings in these categories are time-bound or of a fixed-volume. The offerings are therefore very vulnerable to changes with time.

2.7. Opportunity

The Indian IT industry has an enormous opportunity to discover needs based IT markets. Focusing on the information needs of the Indian society, the Indian IT industry can leverage itself and boost the entire Indian economy in the process.

The Open Source and Free Software movements offer enormous opportunity to the Indian IT industry to develop address the societal needs. These movements not being centred on revenues for a product have greater potential to address and create research, development, products and services around the needs of society.

Table 3 Case Study: The Chinese Lead

From a mere 0.4 computers per 1000 people in 1990 China has moved upto 19 computers per 1000 people in 2000. During the same period India has moved up from 0.3 computers per 1000 people to a mere 6.0 computers per 1000 people.

In 2001 China had 5 million computers against 6 million in India. China therefore has a much higher computer penetration of 19.3 computers per 1000 against 5.8 computers per 1000 in India, a drop from the 2000 numbers. In 2001 8.9 million computers were sold in China against 1.8 million in India.

China also boasts of higher teledensities: moving from 6 phones per 1000 people in 1990 to 111 phones per 1000 people. India moved from 6 phones per 1000 in 1990 to a mere 32 phones per 1000 in 2000.

Although a late entrant China has already surpassed India in its information technology, especially computer and telecommunications initiatives.

Chinese IT spending is 1.1 percent of its GDP: more than twice the Indian figure of 0.5 percent. China's per capita GDP is 854$ in comparison to 450$ of India putting the per capita IT spending of China at 8.9$ more than thrice that of India's 2.4$.

China's success is attributed to its focus on homegrown technology for home use. The Chinese software exports were traditionally very small in comparison to its Indian counterparts. China focused on local solutions to the extent that it used local language for computing from the outset. The Chinese have experimented with technology, reduced development costs and innovated every product cycle. The Chinese were able to grow their per capita GDP faster, perhaps as a result of the use of IT for Chinese society rather than the rest of the world.

(Source: Based on presentation by Dr. F.C. Kohli)

2.8. Threats

The Indian IT industry is largely servicing markets outside India. In a post September 11 scenario the global economies are even less resilient than before. Not only are similar scenarios likely to disrupt new contracts but also disrupt operations.

Even without terrorism or wars the bulk of the industry depends on the US and Europe. socio-economic or political crisis in these locations makes the entire Indian IT industry extremely vulnerable.

The comfort of established revenue models place a huge threat in the ability of the Indian IT industry to chart new grounds, take new opportunities and undertake good business risks in building new revenue models.

3. Emerging Markets

3.1. Segments

The single largest reason for use of Information Technology is to generate or deliver information. The single largest direct and indirect consumer of information is the society. Information is consumed to enable a material need, not just for the sake of information consumption.

Material needs of society include society's need for food, energy, land, water, goods, mobility, communication and coordination, entertainment and learning. These needs of society are satisfied through processes that are driven by information. Different organisations service processes that deliver the material needs of society. Processes delivering material needs enable or disable

Table 5 Segments of Emerging Markets
Segment by process satisfying societal need
Food and Agriculture
Energy
Land and Housing
Water
Waste management
Industry and Goods
Mobility
Communication and coordination
Entertainment and learning
(Source: Goa Agenda Direction Paper and Discussions)

vibrancy, liveability, resilience, stability, and sustainability of society.

3.2. Size

The revenue streams contributing to the processes delivering societal need make up the GDP. Almost 60 percent of these revenue streams are estimated to involve services for processing information. Since the use of Information Technology in the emerging areas directly increases the revenue streams of the processes that contribute to the GDP, it produces a double effect and increases the size of the market itself.

3.3. Strengths

The biggest strength of the emerging market is perhaps that it is based on the information needs of society. This makes it a sustainable, stable and clear requirement that will be demanded by society in good times or tough times.

Emerging markets distinguish operational, management and governance users and uses. They therefore offer information about here and now, then and there and in the future over the regions of interest.

The emerging markets contribute to directly enhancing the quality of life. This makes it immensely attractive to pursue as it changes the very society one lives in. It also makes the emerging market work in unison with

Table 4 Offerings of Emerging Segments
Segment by service offering
Operational Information
Management Information
Governance Information
(Source: Goa Agenda Direction Paper and Discussions)

aspirations and not in contradiction as a compromise in life.

The emerging markets contribute to enhancing the GDP directly by being much larger than the traditional market and indirectly by increasing the value of the contributions made by other societal processes.

3.4. Weakness

The biggest weakness of the emerging markets is perhaps it's addressing the local and not foreign exchange economy. The emerging markets are also in their nascent state and therefore prove to be higher risks than traditional established markets.

3.5. Opportunity

By modest estimates the IT needs of emerging market is at least 3-6 times the size of the entire traditional Indian IT market. Unlike traditional markets which have little impact beyond their own contribution to GDP, the emerging markets boost the GDP the through their contribution as well as through the increased activity facilitated by its intervention. This double impact will actually increase the size of the emerging market as it grows.

IT markets servicing Indian societal needs are estimated to be 3-6 fold the current size of the entire Indian IT markets

Table **6 Traditional and Emerging Solutions**

Traditional	Emerging
Water Utility Water connections online to enable apply and pay online for water connections	Water Processes Real-time water supply position to ensure water security. Periodic water security breach information for the managers. Water supply and demand scenarios to create projects, programs, strategies and structures for ensuring sustained water security.
Power Utility Power connections online to enable apply and receive bill or pay online for electricity consumption.	Electricity Processes Real-time electricity transmission and distribution position to ensure electricity security. Periodic electricity security breach information for the managers. Electricity supply and demand scenarios to create projects, programs, strategies, mechanisms and infrastructure for ensuring sustained electricity security.
Road Traffic Authority RTO online to enable apply and receive licenses or pay taxes and fees online.	Traffic Processes Real-time vehicle routing and scheduling to ensure safety and smooth flow. Periodic assessment and monitoring of the time available to reroute or reschedule and the time taken to reroute or reschedule. Travel mode supply and demand scenarios to create projects, programs, strategies, mechanisms and infrastructure for ensuring sustained mobility.

(Source: Goa Agenda Direction Paper and Discussions)

3.6. Threats

Since the existing traditional market is largely an export market, revenue streams are considered as multiple streams due to the exchange rate. This is a big barrier to shifting over to revenue streams in Indian Rupees.

Culturally India is risk averse. It has been a follower, not a leader. Most Indian innovation and entrepreneurship succeeds outside India. This can be a major inertia for shifting to alternate revenue streams.

Continued quick fix markets (like Y2K) can serve as rapid earners and prevent focus on sustainable revenue streams.

3.7. Cost of Ignoring the Need

If India ignores the emerging IT markets it faces the risk of disenfranchising more than 60 percent of its population.

Processes that deliver the material and emotional needs of Indian's will become unstable, unsustainable or lack resilience. The respite time, or the time before which the societal needs must be met, may become smaller in comparison to the response times, the time in which the societal needs can be met. This will not only stress the disenfranchised, but also those who continue to benefit from the traditional IT markets.

The failure to improve the country's ability to address its societal needs with IT will result in greater economic divide. Those who are part of the traditional IT markets and those who are not will show a marked difference in their purchasing power as well as quality of life. Not only will more and more people continue to be deprived of basic needs but also the costs of providing to the few who can afford become ever higher.

In the absence of addressing the emerging markets the traditional IT industry will continue to look and feel different, and require ever increasing benefits that resemble the developed world whose needs it will continue to service.

Finally, by ignoring the emerging markets India will continue to depend on technology from the west and not be able to create homegrown solutions to address home problems.

The growing costs and security barriers at obtaining technologies will restrict the players who can access technologies for home or export solutions. This will bring about a greater opportunity, economy, and technology divide between India and the rest of the world. The development of skills to apply technology for the west will reduce or eliminate skills capable of understanding and addressing local needs making it difficult to address home problems.

4. Directions for the IT Industry

4.1. Homegrown solutions

To build homegrown technology for home needs is the clear need of the hour. To create homegrown technology India will need to step up research and development that can generate homegrown technology. To catalyse such research, several research and development laboratories will need to be collocated to enable an R&D culture and synergy through convergence of technologies.

The Goa Government announced its plans to set up a National Technology Park to collocate R&D units and provide single window coordination. The government announced its policy to have annual VC and R&D fairs.

In order to make the market grow and service societal needs applications will have to focus on need. Developers will need to serve the distinct requirements of the operator or clerks, managers and governors.

4.2. Visions

The IT industry can work to creating a fast world or a world that can process trillions of transactions per second. It can work to create an efficient society, business or process. It can work to build a net-enabled world. It can work to build a huge automaton or work to build a world of connected automated processes.

At the end of the day every transaction or every process enable a societal mission: the reason for the processes being. For example the development of water harvesting projects, the processes of collection, purification, distribution of water all work to enable the societal mission of providing water security.

Information of the transactions or processes or the processes or transactions are not an end in themselves and do not need to be speeded, increased in volume or be made efficient unless they enable the societal mission.

The vision of the IT industry, working to provide IT for society, would therefore be to create a *mission oriented* information society.

4.3. Missions

To realise its vision the IT industry requires a mission that can focus its efforts and select programs, activities and technology creation to realise the vision.

To create a mission-oriented society requires society to be able to identify missions for its processes. This is not possible without information about the processes. Only when there is information that the water department can provide tap connections however people actually want 24 hours clean water can the mission of providing water security evolve.

To create a mission-oriented society also requires society to be able to provide the mission operators, managers and governors with information to enable the mission.

An appropriate mission for the IT industry providing IT for society could therefore be to *enable societal missions with information.*

4.4. Recommendations

The *Goa-Agenda* recommended that users of IT for society, especially governments must create comprehensive Information Technology plans rather than implement adhoc solutions or automation of existing processes. It was pointed out that there is a heavy cost of adhoc solutions and does not further societal missions.

The *Goa Agenda* underlined the different information needs of different users of societal information: the citizens, clerks, managers and supervisors, and governors. Each user has a distinct role to play facilitating societal transactions, supervision or governance.

The *Goa Agenda* felt that Goa was an ideal location to adapt and follow these standards, clearly providing mission directed information to those enabling the missions by segmenting the users of information into operational, managerial and governance, and recommended the adaptation of this nomenclature by the Government of Goa to become competitive through the promotion of *mission* oriented information society.

The *Goa Agenda* also recommended the creation of intermediate institutions that would bridge the gap between technology on one hand and societal need on the other. These institutions, perhaps not-for-profit NGO's as their motive in using technology would not be profit oriented but rather apply to it as appropriate, could work on a franchise formula for replication to apply IT for society.

The *Goa Agenda* also urged the government to play the role of a facilitator, not a regulator. The government should especially facilitate the creation of local intermediate institutions through venture funding, and catalysing infrastructure for societal applications.

The *Goa Agenda* urged that homegrown technology be catalysed and promoted for home use. It underlined the relevance and appropriateness of the Goa Government's plan to set up a national technology park to collocate R&D units to create homegrown technology for home use.

The *Goa Agenda* also recommended the government to catalyse a research culture through annual research and venture-capital fairs, as well as enabling R&D labs to be autonomous departments of the university and through seed funding projects involving research for societal applications.

Vision

Create a *mission oriented* information society.

Mission

Enable *societal missions* with information.

5. Acknowledgements

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