Information Technology as a locomotive of massive evolution in India

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ABSTRACT

In this paper, review about the progress in India's IT sector, and forecasts for massive evolution led by this segment is studied. It emphasis on conversing the part of software vs. hardware, the development outline of the software business and software exports, and the embryonic problems in IT labor supply to support future growth. We come through some of the developments in India's IT sector, and scenarios for broad-based growth led by this sector. It tries to categorize some areas where dogma changes and existing innovations can together lead to consciousness of the more optimistic situation, and prevention of some of the consequences that analysts have acknowledged. It also examine the policy environment more closely, arguing that government strategy is better engrossed on eradicating labor market biases and infrastructure restraints, rather than providing output or export grants to the software industry.

Introduction

Nothing has captured the imagination of India's policymakers relatively like information technology (IT). Indians have substantiated themselves to be world class in IT. Indians (or people of Indian origin) are becoming not just contributors but giants of the IT revolution in the United States. India's software industry seemed to be growing so rapidly that it would always solve India's balance of payments hitches, and make India an IT "super power". At the same time, some have criticized India's IT boom as just another version of global place of work production, with lines of code substituting garments. A related anxiety is that the growth will diminish as these software tasks reach their limits, or even become computerized. More worrying, possibly, is the anxiety that IT in India will become a reserve similar to natural resource enclaves, controlled directly or indirectly by multinationals, with small elite of workers, no dynamic spillovers to the local economy, and greatly increased discrimination. In this paper, we come across some of the developments in India's IT sector, and prospects for broad-based growth led by this sector. The fig .1 represents the factors for massive Evolution
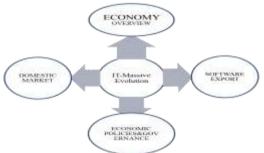

Fig 1: Massive Evolution Aspects

Economy Overview:

India has made substantial economic advancement since independence, but it has not grown as quickly as the East Asian "miracle" economies. The contemporary sectorial dissemination of GDP is shown in Table 1, which also illustrates that the level of GDP rests quite low, at about $300 per capita. Poverty rates have tumbled gradually over time, and somewhat more hastily in the last decade, but they persist quite high, at close to 30% of the population. Human development signs such as literacy and life anticipation have also inclined to lag behind targets, with adult literacy being only 65% according to the latest census (even with a very minimal criterion being applied).Table 1 demonstrates that agriculture ruins a vital part of the economy, providing close to 30% of GDP, and still in advance of manufacturing. Agriculture's share of engagement is considerably higher. Amenities of all kinds and the public segment are the other two subdivisions of the economy. While the public segment is, by its nature, "systematized", much of the service sector, like agriculture, is "unceremonious". Thus India conserves the typical "dual" nature of an emerging economy

The IT Sector:

Information technology basically denotes to the cardinal dispensation, storage and communication of statistics of all classes. Consequently, information technology (IT) can possibly be used in all segment of the economy. The true sway of IT on progression and efficiency continues to be a matter of dispute, even in the United States, which have been the lead and largest adopter of IT. Yet, there is no distrust that the IT sector has been a vibrant one in many developed countries, and India has mounted out as an emerging country where IT, in the semblance of software exports, has grown intensely, in spite of the country's relatively low level revenue and progress.

Software vs. Hardware:

The basic discrepancy in IT is between hardware and software. The first refers, of course to the physical modules of processors, storage devices and communications devices. The second denotes to the guidelines that govern the flow and processing of information in digital form, within and between hardware devices and components. The production of hardware is classified within the manufacturing sector. Lucratively manufacturing semiconductors and other refined hardware

components typically requires infrastructure, large-scale reserves in capacity, and added experience that India does not hold, and is not in a situation to acquire easily. India development path, in spite of its emphasis on import-substituting industrialization, has not sustained the growth of a robust, world-class manufacturing industry, such as has arisen in many East Asian countries. India's software industry is more robust than its hardware industry, at least in certain areas. The software development and use life cycle includes analysis and specification of requirements, design, coding, testing, installation, maintenance and support. Many of these accomplishments, mostly coding and testing, involve relatively routine IT skills that India's workforce has in large absolute numbers. Despite the even faster growth of software exports, domestic software revenue still represents close to one third of software industry gross receipts. The National Association of Software and Services Companies (NASSCOM) projects domestic sales to grow substantially faster than export sales in the next decade, enough to make domestic sales over 50% of the industry's sales, but the basis for this projection is unclear.

Software Exports:

India's software exports, in specific, are what have captured the headlines. A growth rate in software exports of over 50% for several years, and consulting firm McKinsey's projection that software export revenue would reach $87 billion in a decade, are two of the most striking statistics in this regard. More conservative export growth projections used by NASSCOM would still imply that software exports would account for over a third of payments for visible and invisible imports. It must be borne in mind that the current figure for software exports is closer to $6 billion. The concerns expressed by analysts are that the Indian software industry is "programmer heavy", and therefore unable to move up to higher value-added segments of software. Related issues that reinforce these concerns are the brain drain of the most talented or experienced IT people, the lack of sufficient managerial skills for more sophisticated contract work, and the lack of domestic spillovers from the "body shopping" of programmers for onsite work in developed countries. Much of this body shopping takes place in the largest market for India's software exports, the United States.

IT-Enabled Services:

As the term suggests, IT-enabled services are not necessarily related to the production of software or IT in general, but use IT to make the provision of services possible. The figures for the software industry in India typically include these IT-enabled services, though they are not strictly part of the IT sector. Customer call centers are one example, where Indians have been training to speak with American accents, in order to deal with customer queries from the US. Accounting services are a second example. Yet another, more long-standing market segment is that of medical transcription. Good communications links are obviously important for the success of IT-enabled services such as medical transcription provided to foreign clients. The severest bottleneck in India, however, may not be telecoms, but the lack of managerial and marketing skills, and of reputations for quality. Recent developments suggest that this may be changing. It's seen that IT enabled services exports growing from $264 million in 2000 to over $14 billion in 2012.

Supply of Information Technology Skills:

The reason for the success of India's software industry is the large supply of labor with some IT skills. India graduates perhaps about 125,000 engineers a year, second only to the US

worldwide. However, not all these engineers go into the IT stream, and not all IT experts have engineering or computer science qualifications - this being true of the US as well. India's stock of IT professionals is estimated at 300,000, so that software industry revenues per IT professional (assuming that all of them work in the software industry) are about $30,000. Government targets and others' optimistic projections imply software industry revenues will increase by a factor of 15. The breakdown of this growth could be something like a doubling in revenue per IT professional, and therefore almost an eightfold increase in numbers. Both growth components have implications for IT training. Increasing returns per IT professional entails improvements in managerial and marketing skills, but it also requires the production of more highly trained IT people. Training more persons in IT necessitates investments to increase the capacity of this component of the higher education sector. A further problem besides sheer numbers is the issue of level of training, increasing the level of IT education in India may simply exacerbate the brain drain, as the most qualified continue to be attracted to developed countries. Which route is most profitable is best left up to the players, with the government's role being to avoid excessive policy distortions that create imbalances across different segments within the IT sector. In any case, the supply of skilled labor is an important consideration for the growth of the sector, both domestic and export-oriented.

Policy Environment:

Since 1991, India has pursued policies of economic liberalization. Policy transformation has been irregular. Controls on private industry and non-tariff trade barriers have been removed or substantially reduced. Liberalization has been slower in areas where there is clear interest group opposition, such as labor laws and privatization. Reform has also been slow in areas where new regulatory institutions needed to be created: there is still a substantial amount of learning by doing that is taking place. Finally, government revenue considerations also affect policy decisions in areas such as import tariffs and telecoms privatization. The IT sector in India is important not just because of its performance and potential, but because these factors have influenced the policy environment in India.

IT as Growth Engine:

Ultimately, the case for IT as an engine of evolution rests on standard economic criteria, such as relative advantage, complementarities, and global dynamics. Briefly, the IT sector can be an important source of development for India if the country has a proportional advantage in providing certain kinds of IT-related products and services, if the global demand for these products and amenities is likely to grow hastily, and if the growth of the sector has positive reimbursements to the rest of the internal economy. Furthermore, these conditions are not purely exogenous, but are partly functions of economic policy. We examine these considerations in this section.

The Domestic Market:

The domestic market for IT products and services is certainly not independent of the export market. To the extent that Indian software firms can compete successfully abroad, they can also succeed in their own backyard.

Broad-Based Growth:

Are a software industry that serves the domestic market as well as exporting, a hardware industry that can produce low-cost access devices, and IT-enabled services for foreign markets, together enough for broad-based economic growth? Clearly the

IT industry alone can only contribute one or two percentage points to India's growth rate. The concern is that it will remain an enclave, exacerbating inequality, and doing little for long-run growth. Even in the US, tall claims for the benefits of IT for the broader economy, through enhanced productivity growth, are met with skepticism, and the evidence from varied studies is mixed. The usual concern with IT-adoption is job loss, and there is certainly the potential that certain kinds of clerical jobs will be eliminated or reduced in numbers. Unions in Indian industries such as banking have opposed "computerization" for this reason. However, the evidence suggests that increases in other kinds of jobs as a result of IT use more than make up for job loss, so that total employment is not a significant issue. This leaves the issue of adjustment costs, and here severance pay rules or government job adjustment assistance can be more effective and efficient than the current morass of detailed restrictions embodied in India's labor laws. We have focused implicitly so far on the formal, organized or "large-scale" sector in assessing the impact of IT. Even if the growth of the IT has positive spillovers for other industries, this leaves out a substantial portion of the economy. We postpone a discussion of government use of IT to a separate section, but now turn to issues of truly broad-based impacts of IT. There are two related, but separate areas of impact. First, information processing may enhance efficiency in agriculture as well as in manufacturing. While individual farmers cannot make IT investments, agricultural cooperatives can provide the institutional framework that allows farmers to benefit. This allows faster and safer testing, better quality control, quicker and more accurate disbursements to farmers and time savings for farmers in their distributions. The deteriorating cost of information processing means that such success stories can possibly be widely simulated. The second impact is in the statement of information. Farmers and fishermen can collect weather predictions, market price estimates, guidance on farming practices, and explicit training. Suggestions to buy or sell steers, or other two-way communications are also potential.

Economic Policies:

The issue of economic policy is obviously much larger than we can adequately tackle here. However, we will briefly comment on general microeconomic and macroeconomic policy issues, and then address specific policies for the IT sector. The two areas may, of course, overlap. For example, the growth of the IT sector and of software exports in particular, may make certain kinds of general policy questions more salient. Given that there is plenty that remains to be done in terms of overall economic policy reform, are there areas where the IT sector deserves special attention? The answer we give here, with one partial exception, is "no". Special grants or export inducements are likely to be inefficient ways of thought-provoking the growth of the IT sector, or of positive spillovers for the rest of the economy.

Governance:

One area where government can provide indirect support for the IT sector is by boosting the domestic market though its own purchases. Of course purchases of sophisticated equipment and software that sits unused in high-level bureaucrats' offices will have little positive impact. However, there are reasons to be more optimistic about the use of IT in government. There are two broad uses of IT for improved government functioning. Initially back-office processes can be made more effective, so that internal record keeping flows of information, and tracing of decisions and performance can be amended. Subsequently, when

some simple information is deposited in digital form, it affords the chance for easier access to that information by citizens. Given the poor quality of governance in India, one is therefore inclined to strongly favor e-governance initiatives that provide direct benefits to citizens, particularly those who are less well off (the rich in any case hire intermediaries to collect information, make payments, etc.). Here we suggest that in addition to the direct benefits, there may be advantages through support of the growth of the domestic market. Increasing the size of the market, while encouraging competition, may be more cost-effective for the government than any direct subsidies or incentives to the IT industry.

Conclusion:

Our goal in this paper has been to assess the possible role of India's IT industry as a driver of higher economic growth in India, without exacerbation of inequalities or creation of instability. Our conclusion is cautiously positive. While projections for software exports may be over optimistic, complementarities or spillovers in the domestic market, including increased government use of IT, are likely to be strong. For this rosy scenario to play out, however, continued broad economic reforms will be important, in providing last-mile access. These reforms include reductions of licensing barriers to entry and high interconnection charges for higher levels of the network. Such enabling reforms are more likely to support broad-based, sustainable growth than narrowly targeted incentive schemes.

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Table 1: India's GDP (Rs. billion) at Factor Cost by Industry of Origin at 2004-2005 prices

YEAR	Agriculture	Engineering sector	Transport, telecom	GDP
2000-01	487992	438372	415650	1864301
2001-02	516584	450723	453847	1972606
2002-03	415650	481758	496691	2048286
2003-04	531302	519322	556370	2048286
2004-05	650454	744755	727720	2222758
2005-06	680628	824256	816696	2971464
2006-07	711768	928592	911553	3254216
2007-08	751077	1023866	1011812	3566011
2008-09	751362	1071676	706712	4162509
2009-10	760974	1158000	7 71763	4493743
2010-2011	2975181	4182134	2630077	15476479

Source: http://www.indiabudget.in.