

Year 2025: Two Scenarios For the Indian IT Industry

Shyam Sankar S.
University of Kerala
India

Manoj Changat
University of Kerala
India

Abstract

The Indian IT industry has been an important pillar of the Indian economy for the last 2 decades. The IT sector has provided employment opportunities to millions, provided them with fairly high incomes in the context of the prevailing economic conditions in India, and has also been contributing handsomely to the country's GDP. Successive governments have realized the importance of the Indian IT sector to further India's economic advancement and have facilitated the growth of the sector, depending on it for employment generation and for bringing in foreign exchange. The Indian IT sector has grown from strength to strength from 1996, when the total revenue was USD 1.25 billion, and is now in very good health with its total revenues amounting to an estimated USD 143 billion in 2016. The official future, on which National Policy on Information Technology is developed, envisions the continuing growth of the Indian IT industry. But, will this ideal growth continue? Can anything go wrong? This paper identifies the one core segment that has driven the growth of the Indian IT sector and develops two scenarios for the core segment.

Keywords: Indian IT industry, India, Scenario, Horizon Scanning.

Introduction

A quarter century has passed since India opened up its economy (Guru, 2016, p.16). Indian economy has grown tremendously since. The Indian software industry has played a very important role in the growth of the economy - playing the dual role of a job generator and that of a sector bringing in valuable foreign exchange. For a population that had struggled to rise above poverty for four decades since Independence, the software industry, offering mind boggling salaries against the backdrop of the economic conditions prevailing in India, had presented a beacon of hope. During this time period, in the context of the peculiar cultural milieu of India, the dream of every Indian parent changed from seeing the child being employed in a government office, safe in the security provided by a government job, to seeing the child as a software engineer earning high salaries. For

the last two decades, nothing has changed on that front. The Indian software industry still continues to hold sway as the preferred employment sector for youngsters. The government too looks upon the software industry as a sector that can generate jobs (Department of Electronics and Information Technology, 2012). That is the niche that the Indian IT sector has been able to carve for itself in the economic, social, and psychological space of India in a span of two decades.

From the setting of the Indian society described above, it is evident that the good health of the Indian IT industry is of prime importance for the sustenance of the economic growth of India. The official future scenario for the Indian IT sector is its continuing growth, especially the software services sector, resulting in employment opportunities for the many engineering graduates that India produces every year. The question that has to be asked is: Is the software services industry, in the future too, bankable as a default job generating sector that acts as a driver for economic growth?

This paper attempts to: (a) identify the prominent drivers that will have an impact on the Indian IT sector in the future by looking at the current situation, and also by using the Horizon/Environment scanning methodology to identify weak signals; and (b) draw up two scenarios for the Indian software services sector for the year 2025 using the scenario development methodology.

The aim of this paper is to stimulate the thinking of the policy and decision makers beyond the official scenario of a rosy future.

Structure of the Paper

This paper is divided into the following major sections: The next section is a brief look at the origin and growth of the Indian IT Industry. The subsequent two sections identify the segments of the Indian IT industry that have acted as the engines of its growth. The section after that looks at some of the relevant studies in the Futures journal related to the future of Indian IT industry. In the next section, the paper deals with the various factors that nurtured the growth of the sector. This is followed by an explanation of the methodologies used in this paper. In the section after that, the external drivers used for the scenario development are explained. The scenarios that are developed are then presented. The paper ends with a concluding section.

The Indian IT Industry – A Peek Into Its Origin and Growth

India became a democratic republic in 1950. The national government introduced computers in to the country as early as 1955-56 (Rajaraman, 2015). IBM was the prominent player in the computerization efforts of India. But even after 2 decades thereafter, financially, the country was struggling to find its feet as the vision for the financial growth of the nation had still not stabilized. Restrictive economic policies were prevalent then. A handful of local software companies had cropped up to cater to a few government offices and departments, but domestic software market was miniscule and scope to export software was limited due to the prevailing economic policies. But along the way, another opportunity opened up for the Indian software companies. A few companies in the US were facing shortage of skilled engineers, and Indian companies filled the breach by exporting skilled manpower to augment the staff of software development teams in the US. One of the first Indian IT companies to utilize this business model of placing engineers abroad was TCS, set up in 1968. The US was facing shortage of skilled manpower to meet the demand of their computer industries. India was producing engineering graduates who were faced with lack of job opportunities. This situation made for a perfect business opportunity as the Indian skilled manpower was available at extremely low costs compared to those in the US. The Indian engineering graduates had a fair grasp of the English language, and this created a great opportunity for the handful of Indian IT companies, with such a workforce, to cater to this demand for staff augmentation (Rajaraman, 2015). This business model continued for a few years. 1991 was a seminal year in the economic history of India (Guru, 2016).

The government of the day introduced game changing reforms in the economic sector that opened up the economy. For the IT industry, the economic conditions became favorable for executing projects in India, and the business strategy started to shift from providing manpower to providing software services from India. Slowly, many IT companies started mushrooming and IT projects started getting outsourced to India. TCS, Infosys, CTS, Wipro, and HCL were some of the pioneering software service providers. The Indian IT industry embarked on a path of growth, becoming a major job provider as well as becoming a major contributor to the nation’s economy. The total revenues of the Indian IT industry now stands at USD 140 billion plus. India is now the most preferred destination for IT outsourcing, with a share of more than 50% of the global IT sourcing market (NASSCOM, 2016). For a nation that is often grouped with poor third-world countries, to be considered now as the most preferred IT services provider is a remarkable growth story.

The Indian IT industry – Today

This section makes an attempt at painting the picture of the state of the Indian IT industry as it stands today. For this purpose, data is gathered from ‘National Policy on Information Technology 2012 [NPIT 2012]’ released by Department of Information Technology, Government of India; ‘Report of the Working Group on Information Technology Sector, Twelfth Five Year Plan (2012 – 17)’, Department of Information Technology; ‘Survey on Computer Software & Information Technology Enabled Services Exports: 2014-15’, Reserve Bank of India; and ‘The IT-BPM Sector in India: Annual Strategic Review’ - 2004 to 2016, NASSCOM. The following section titled ‘The Growth Engines’ too uses the data gathered from the above mentioned sources.

India has a population of 1.25 billion. Out of this, 66% of the population is below 35 years of age. Further drilling down, 0.21 billion, or approximately 17% of the population is in the age group 20-30 (Office of the Registrar General & Census Commissioner, 2011). India produces between 0.6 to 0.7 million engineering graduates every year (AICTE Dashboard, 2016). For the Indian economy to grow and, politically, for any democratically elected government to survive, generating enough employment opportunities for this young, aspirational population segment is of utmost importance. It is on this front that the Indian IT industry has been, for the last decade and half, a default pillar of support that every government could lean on. The Indian IT sector now employs 3.7 million persons (NASSCOM, 2016), making it the largest private sector employer in the country (NASSCOM, 2015). Figure 1 shows how the employment figures in the Indian IT industry have grown from the year 2000 when the number of persons employed was 0.28 million to the present figure.

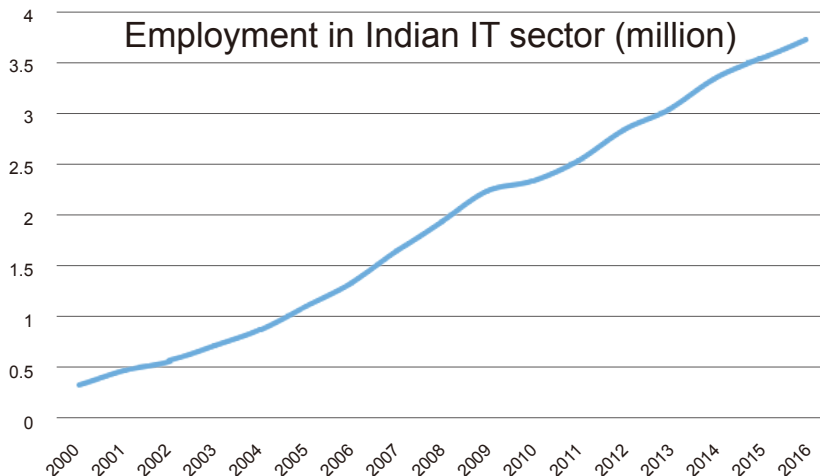


Figure 1. Employment in Indian IT industry - 2000 to 2016

According to the ‘Working Group Report on Information Technology’, the average age of those working in the Indian IT industry is between 25 and 28, and this is expected to be 29 by 2020 (Twelfth Plan Working Group on Information Technology, 2012).

In addition to being an employment generator, another area in which the Indian IT industry has played a prominent part in the economic growth story of India is in its contribution towards the nation’s GDP. The contribution of the Indian IT industry to the GDP has also been steadily growing - from 4.8% in 2006 to 9.5% in 2016. This is a remarkable achievement for a young industry in a country where the economy used to be predominantly agrarian and the primary contributor to the GDP was agriculture till the 1980s. Figure 2 shows how the Indian IT sector’s contribution to India’s GDP has grown over the years.

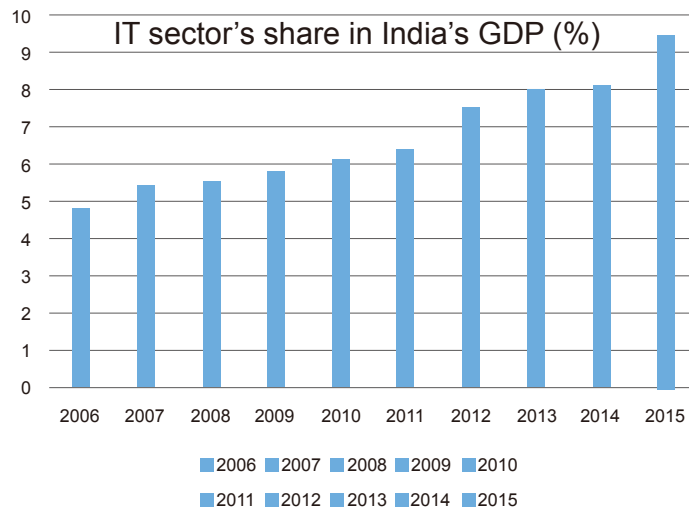


Figure 2. Contribution of Indian IT sector to nation’s GDP

One of the indicators of the strength of IT industry in India is its total revenues. According to the National Policy on Information Technology released by the Government of India, the Indian IT sector became a USD 100 billion industry in 2012. The total revenue of the Indian IT industry in 2016 stands at an estimated USD 143 billion (NASSCOM, 2016). The revenues of the Indian IT industry have grown tremendously from USD 1.25 billion in 1996 to USD 100 billion plus. The opening up of the Indian economy in 1991 created favorable conditions for the knowledge industry to thrive.

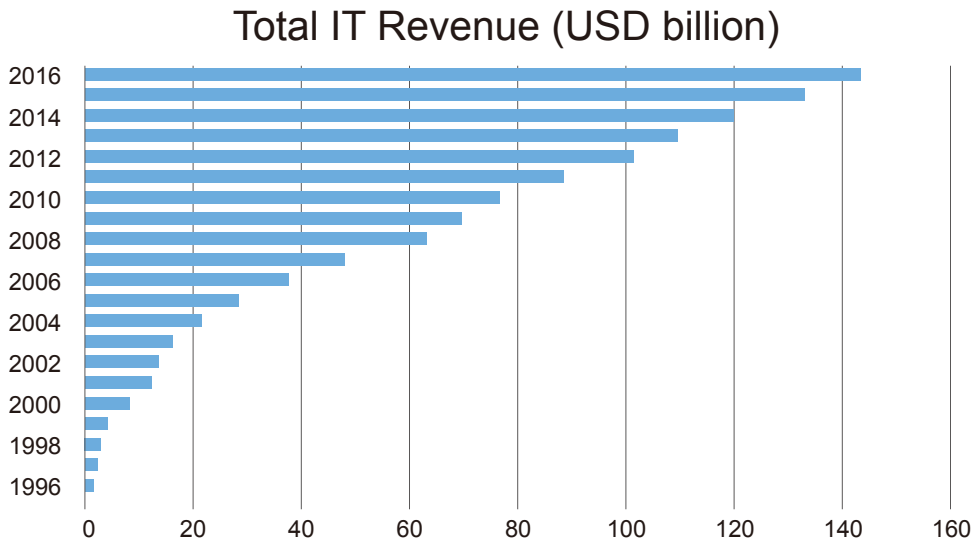


Figure 3. Indian IT Sector Revenues

Not only has the Indian IT sector become an important player in the Indian economic scene, it has also made its presence felt in the global arena. India has been consistently dominating the global sourcing market for IT. India’s share in the global sourcing market in 2015 is 56%. For the past many years, India has managed to garner more than 50% of the IT global sourcing market, thus claiming the title of the most preferred IT outsourcing destination.

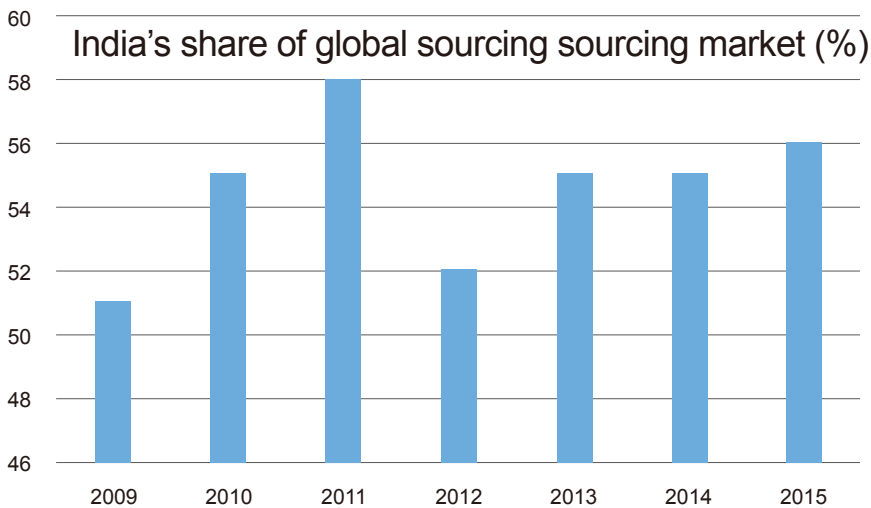


Figure 4. India's share of global IT sourcing market

The Growth Engines

The above discussion establishes the fact that the Indian IT industry is in fairly good health and has been growing tremendously over the last two decades. This section attempts to identify the major segments that have been acting as the engines driving this phenomenal growth.

Indian IT industry – The Segments

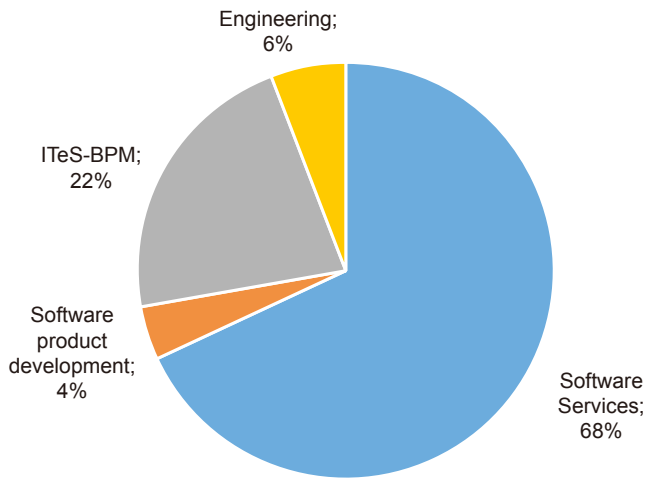
The Indian IT industry caters to the overseas as well as domestic markets. The Indian IT sector is made up of IT services, ITeS/BPM, Software product development, and Engineering services (Reserve Bank of India, 2016). In the following two sections, this paper looks at the annual revenues and share of each of the major segments in the revenues to single out the one segment that has been critical to the long term good health of the Indian IT industry.

IT Exports

The major contributing sectors are arrived at by scrutinizing the break up data of the IT industry revenues from the recent past in terms of export and domestic revenues. In 2016, when the total IT revenues is estimated to rise to USD 143 billion, the exports revenues are estimated at USD 108 billion and domestic revenues at USD 35 billion. In 2015, out of the total revenues of USD 132 billion of the Indian IT industry, exports accounted for USD 98 billion and domestic revenues USD 34 billion. In 2014, the contribution of exports was USD 88 billion and that of domestic USD 32 billion, adding up to a total revenue of USD 120. In the time period of three years that has been considered here, exports have been contributing almost 75% of the total IT revenues. Data from years prior to this period show that the share of the export revenue has been increasing steadily – 70.37% in 2013, 69.2% in 2012, and 67.19% in 2011. While the export revenues share has been steadily increasing, during the same period the domestic revenues seem to have stagnated at around USD 30 billion. The domestic revenue figures for 2016 is estimated at USD 35 billion. In 2015, it was USD 34 billion; in 2014, it was USD 32 billion; in 2013, it was USD 32 billion; and in 2012 and 2011, they were USD 31.67 billion and USD 29.02 respectively (NASSCOM, 2014a; NASSCOM, 2014b). From this discussion, it is clear that the Indian IT industry is propped up by the export business.

IT Services Export

Now that the primacy of exports in the success of the Indian IT sector has been established, this paper tries to answer the question - how much contribution does each of the major segments of the Indian IT sector, namely IT services, ITeS/BPM, Software product development and Engineering R&D, make to the IT exports revenues? In 2014-15, IT Services contributed 68%, Software product development 4%, ITeS/BPM 22%, and Engineering services 6% to the total IT export revenues. In 2013-14, IT services contributed 68%, Software product development 5.7%, ITeS/BPM 21.6%, and Engineering services 4.8% respectively. In 2010-11, the corresponding figures were 68.8%, 4.9%, 21.6%, and 4.7% respectively. With an almost consistent share of around 68%, the IT services segment is the major contributor in Indian IT sector's export revenues.



% Share of IT Industry segments: 2014-15

Figure 5. Indian IT Industry - % Share of Each Segment

In the global market for IT services sourcing, India held 70% of the share in 2010. In 2014, India's share in the IT services global sourcing market was 67%. In 2015 too, India managed to garner the same share. An almost consistent 70% share of the IT services sourcing global market is an even more impressive figure than the total share of 55% that Indian IT sector as a whole has in the global IT sourcing market.

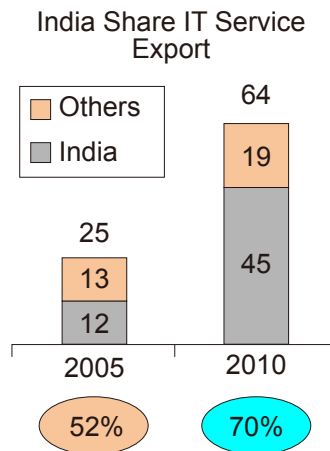


Figure 6. India's Share of the Global IT Sourcing Market Over the Years

Note. From 'Report of the Working Group on Information Technology Sector, Twelfth Five Year Plan (2012 – 17), Government of India'

IT services export segment is also the major employment provider in the Indian IT sector. As of 2016, the Indian IT services export segment employs 1.3 million persons. The corresponding figure in 2015 was 1.2 million. This is the segment where a large number of jobs have been available for fresh engineering graduates.

The One Most Critical Segment

It is clear from the above discussion that the export oriented IT services segment contributes the major chunk of India's IT industry revenues; is a major employment provider for engineering graduates; and also dominates the global IT services sourcing market space. And it has been the case for many years now. The Indian IT industry's growth has been spurred by the IT services segment. Conclusion can be drawn from these discussions that the good health of the export oriented IT services segment is essential for the good run of the Indian IT industry to continue.

Future of Indian IT Industry – Other Relevant Studies

Two papers, published in the Futures journal, have discussed the future of the Indian IT industry previously (Sharma, 2014; Bhattacharjee & Chakrabarti, 2015). The authors of these two papers have argued about the effect of the following factors that may affect the future of the Indian IT outsourcing industry:

- Quality of Human Resources
- Ability of industry to move up the value chain
- Domestic market
- Industry's readiness for Disruptive technologies

These two papers put forth contrasting arguments over the capability of the Indian IT industry to overcome the challenges posed by the above factors. This paper attempts to scan the horizon for a different set of drivers that might influence the Indian software services segment.

Before proceeding with the discussion on various drivers that might influence the future scenarios, this paper looks at the factors that facilitated the growth of the Indian IT industry.

Factors that Drove the IT Industry Growth

Many factors might be considered to have come together in a fortunate coincidence to nurture the growth of the IT sector in India and catapult it to the top league of IT providers. The first and foremost among these factors was the cost arbitrage advantage. The devalued Indian Rupee against the US Dollar meant that any job could be executed in India for a fraction of the cost that would have been incurred in the US. At the same time, India was producing a large number of engineering graduates who were facing a shortage of employment opportunities. The fact that most of these engineering graduates had a fairly good grasp of English language contributed to the mix. And this was further nurtured by the government who provided the necessary fertilizers, in the form of infrastructure, and financial and tax incentives, for the IT industry to take roots. The government setup Software Technology Parks of India to promote software exports (Bhatnagar, 2006; Rajaraman, 2015).

Of all the factors that have contributed to the rise of the Indian IT industry, two of them – the ability of the software services sector to evolve and the government's role in the growth of the software sector in India have to be highlighted.

The Evolution of the Indian Software Services industry

The 1970s can be considered as the germinal period for the software industry in India when the industry began to take root with a business model that is infamously known as body shopping. This involved providing skilled manpower as part of augmenting staff for companies overseas. While,

this was the initial model of operation, from that point on, Indian software services companies have steadily evolved and moved up the value chain. As the next step in the evolution, the Indian software companies started handling software maintenance projects. Now, Indian IT companies provide the full range of end-to-end services for software development projects including requirements engineering, design, application development, independent testing services, system integration, and process consulting (Bhatnagar, 2006). The Indian software services industry has shown that it is capable of evolving when faced with challenges. But the question that this paper asks is: Is there scope for further evolution? Or is the lifecycle of the Indian software services segment approaching its end?

The Government's Supporting Hand

Since 1991, every political party that has come to power in India has recognized the importance of the IT sector in India's economic growth, and has implemented measures for facilitating the growth of the sector. In fact, the growth of the Indian IT industry can be said to have been facilitated by a major government initiative. In 1991, the Indian government set up the Software Technology Parks of India (STPI). This also coincided with the unveiling of economic reforms as mentioned earlier in this paper (Guru, 2016). The STPI was set up to promote the development and export of software from the country. The establishment of STPI and its various centers across India was a major catalyst in India's growth in the IT services sector. To facilitate the setting up of export-oriented software units, STPI provided infrastructural facilities such as High Speed Data Communication (HSDC) links, data centers, and data hosting facilities. STPI also offered financial and tax benefits to the units. As of 2013-14, there were 53 STPI centers operational across India. There were 3676 software export units operating out of these centers. The overall exports from the STP units stood at USD 42.13 billion as of 2013-14 (Software Technology Parks of India, 2014). Thus, STPI, promoted by the government has contributed immensely towards the growth of the Indian IT industry. In the Indian context, the role of the government is critical for the good health of the IT sector.

A good indicator of the intentions of a Government are its policies. Government of India's National Policy on Information Technology 2012, the last released policy, gives a lot of emphasis on further strengthening the IT/ITES industry. The NPIT 2012 starts with the mission statement: 'To consolidate India's position as the global IT & ITES hub and leverage IT to contribute significantly to GDP and employment.' One of the objectives of NPIT 2012 is to spread the roots of the industry to Tier II and Tier III cities to surmount the cost escalation and infrastructural challenges that have started to plague the major IT hubs such as Bengaluru, Chennai, Hyderabad, Mumbai, and Pune (Department of Electronics & Information Technology, 2012). This gives a clear indication of the government's intent to enable the further growth of the Indian IT services sector.

Approach and Methodology

The aim of this paper is to study the future of the Indian IT industry. From the discussions in the previous sections, as it is clear that the critical section in the Indian IT sector is the export-oriented IT services segment this paper narrows down the futures exploration to the afore-mentioned area. For the purpose, it uses two Futures Studies methodologies: Horizon/Environmental Scanning and Scenario Development.

The methodology followed in this paper is as follows:

1. The Environmental Scanning technique is used to identify signals of change.
2. The weak signals and wild cards that are thus identified are then used as drivers for developing scenarios.
3. Two scenarios are developed in which the identified drivers intertwine and take the plot forward.

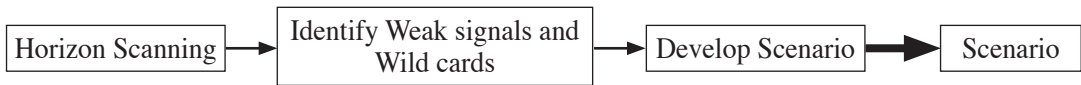


Figure 7. Methodology Used in this Paper

Horizon/Environment Scanning

Environmental scanning is the scanning of the horizon for detecting weak signals and early warning signals about possible future developments. This technique helps in the identification of hints of future challenges and opportunities. Most of the times, these hints are weak signals. So as to not confuse it with the scanning of the natural environment alone, this methodology is also known by other names such as ‘Futures Scanning’ and ‘Early Warning Scanning’ (Glenn & Gordon, 2009). Systematic scanning involves scanning the sources on a periodic basis using certain conditions to identify trends that may have an impact on the future. Sources are identified and scanned for identifying any signs of possible change. Sources can include newspapers, magazines, websites, journals, and seminars. Expert opinion studies can also be carried out for identifying the signals of change. Most of the time, the signals of changes that may be impactful in the future maybe weak. The scanning process should be systematic and meticulous to identify the weak signals. In some cases, Environmental Scanning helps in identifying Wild Cards. Wild cards are totally unexpected events that will have an influence in the future (Sardar, 2013).

Scenario Development

Scenarios are not predictions. They are postulated sequence of future developments (Sardar, 2013) that are used for perceiving the future. Pierre Wack termed the use of scenario technique as the ‘gentle art of re-perceiving’ (Wack, 1985a; Wack, 1985b). Scenarios have been successfully used by governments such as the South African government and by corporates such as Shell.

There is no one right methodology for scenario development. As long as the future scenarios that are developed prods the decision makers to think about alternate futures outside of the official future, the scenario development process has succeeded. According to Peter Schwartz, scenario development should not become a reductionist process and should not be boxed into any definitions as it is an art (Schwartz, 1996; Schwartz, 2011).

The ideal number of scenarios to be developed in a scenario development exercise is still a matter of debate. Anything more than four scenarios is considered as being too many. Three is generally ruled out as the scenarios generally tend to be optimistic, middle path, and pessimistic and the middle path scenario would be considered as ideal and the most preferred scenario. Two scenarios are generally acceptable. This paper is an exercise to develop two scenarios for the Indian software industry.

Identifying the Signals - Horizon Scanning

As explained in this section, this paper uses the Horizon Scanning technique to identify weak signals and wild cards that might affect the future of the subject under study – the Indian IT services industry. The sources that were scanned for the purpose of this paper include national newspapers – general as well as business, and internet resources.

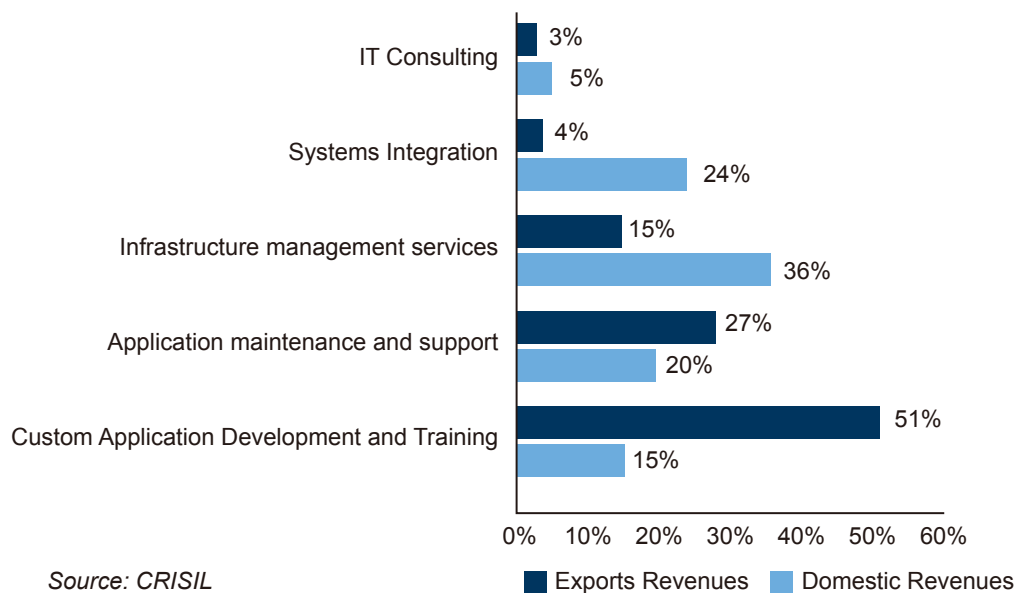
Signals

The weak signals and wild cards that have been identified using the Horizon Scanning technique and are used as drivers for the scenario process in this paper are presented in this section.

Technological

Adidas, in May-June 2016, announced that it is bringing its shoe production back to Europe. After its shoe production was outsourced to China during the mid-to-late 80s, the shoe production is now making a comeback to Germany in a fully automated factory that will be manned by robots. From outsourcing, to bringing back the production to Germany in almost 30 years time, it has come a full circle (Cooper, 2016). Advances in automation have facilitated this reversing of the outsourcing of production, and this in turn is bound to accelerate research, and also similar endeavors in other fields. What is even more alarming to countries that thrive as outsourcing destinations is the fact that even in factories that have been set up in these countries, wide-scale automation is leading to job losses, as recently witnessed in China (Andrei, 2017).

Can the software development field remain untouched by the automation wave? Already, project management and project tracking are getting automated. The programming languages are evolving too. With the advancement in scripting languages and configuration based programming, such as Ruby and frameworks such as Ruby on Rails, a simple website application can be put together very easily. Mobile apps will also follow the same pattern where putting together an app will take only a fraction of the effort that is required now. Though the middle layer of an enterprise application still requires hard core programming, there could be surprises in store as the code generation tools are getting more and more advanced. Artificial Intelligence and Machine Learning will accelerate the automation of most of the transactional jobs.



Source: CRISIL

Figure 8. Break Up of Indian IT Services Revenues

Note. From “Indian IT / ITeS industry – Evolving Business Models for Sustained Growth” - CII - PWC report

Application development and maintenance form the major share of the Indian IT services. As can be seen in figure 8 above, application development and maintenance together contribute 78% of the total IT export revenue. This is mostly done using CASE (Computer-Aided Software Engineering) tools. As the CASE tools and the programming languages become more and more advanced, the complexities and underlying workings of these tools and the technologies involved are hidden from the application developers. One of the authors of this paper has experienced how

the arrival of IDEs (Integrated Development Environment) made programming easier by taking care of the process of setting up the programming environment. Though not meant as sweeping statement, a majority of the software developers in India develop their skills based on usage of the various CASE tools and other tools without knowledge of the underlying technologies and associated complexities.

Automatic code generation is a dream that is always chased in the software industry. Many attempts have been made to create code generation tools. Though total success has not been achieved yet, many tools now generate code snippets or skeletons. Many UML tools and IDEs offer partial code generation capabilities. Research is ongoing in this area to develop tools that can achieve complete code generation. With the development of new scripting languages, configuration based programming, IDEs, and the advancements in AI and Machine Learning, the march towards increased automation in software development will gather speed resulting in rapid shrinkage of entry level job opportunities.

Signal: Rapid automation in all sectors

Economic

After many years of disappointing performance, the growth of the Indian economy looks to be on an upward curve. In 2015-16, India was the fastest growing economy in the world (Dhasmana, 2016). And the growth is expected to continue next year too (Pandey, 2016). With many factors favorable such as a reformist government with a strong mandate, a young population, fall in oil prices, and good rains, the upward curve is not expected to change direction anytime soon. If the Indian economy continues to grow against the backdrop of general global economic stagnation or even negative growth, there is a likelihood of the value of the Indian Rupee appreciating. The salaries paid to the software professionals have been increasing every year, and the operational costs have also been increasing. All this would slowly wipe off the cost arbitrage advantage.

The data for the Indian IT industry already indicates a trend. While the average value per deal has increased, the number of deals have decreased by 19% (NASSCOM, 2016). If this trend continues, it will be a matter of huge concern for the Indian software companies.

Signal: Decline of the cost arbitrage advantage

Environmental

In this section, the domestic Business Environment of the Indian IT industry is considered.

Since 1991, successive Indian governments, irrespective of the political party in power, have supported and nurtured the Indian IT industry. They realized very early the immense potential of the IT industry to generate jobs and to bring in valuable foreign exchange through software exports. Government support for the IT sector will continue.

The present government, to revive the economy, has launched a number of initiatives such as 'Make in India', 'Digital India', and 'Start-Up India' that will have a bearing on the IT sector – directly or indirectly.

The 'Make in India' initiative is aimed at giving a boost to the manufacturing sector in India as the sector has the capability of being a huge job creator. Mushrooming of manufacturing companies will create a domestic market for the IT sector allied to the manufacturing sector. As part of the 'Digital India' initiative, digital infrastructure will be built to enable governance and services on demand. This again has the potential to create a huge domestic market for the software industry, driven by large investments from the government. These two initiatives can act as catalysts for the growth of the domestic software market. The 'Start-Up India' initiative will create an ecosystem for

supporting start-ups in any industry sector. This will encourage start-ups in the software sector too (Zore, 2016).

These schemes are not directly aimed at the software sector, but all the three schemes have the potential to influence the domestic market for the IT sector favorably.

Signal: Growth of domestic IT market aided by government initiatives

Political

Recent events around the world could lead to consequences which have a common thread. The terror attacks in Europe, the Brexit, and many other political happenings around the world could lead to the rise of Nationalism all over the world. Already conservative and nationalistic politics have been gaining popularity in many countries and parties with such philosophies have been voted to power. There is a distinct possibility that Nationalism could lead to a protective economy. A drastic decline in outsourcing could be the outcome of such Protectionism. The policies outlined by the recently elected President of the United States, Donald Trump, to bring back the jobs to USA also point to this trend. News about changes to H1B Visa for high-skilled jobs have already sent shivers down the spines of the Indian IT service companies. If the proposed Visa regulations are brought into force, it will mean a body blow to the body shopping business model as well (Mukherjee, 2017).

Signal: Rise of nationalistic politics leading to protectionism

Drivers

The drivers move the plot of the scenario, and determine the outcome of the story (Schwartz, 1996). In this paper, the weak signals that were identified in the previous section are used as drivers for developing the scenarios. The drivers identified are:

- Rapid automation in all sectors
- Decline of the cost arbitrage advantage
- Growth of domestic IT market aided by government initiatives
- Rise of nationalistic politics leading to protectionism

The Scenarios

The next step is the development of the scenarios. This section presents the two scenarios for the Indian IT services industry for the year 2025 that are developed based on the drivers that were identified in the previous section. The scenarios are titled ‘Collapse of the Colossus – Year 2025’ and ‘From ITeS to ITeS – A journey of transfiguration’.

Scenario 1: Collapse of the Colossus – Year 2025

There is much commotion and activity in front of the gates of the sprawling IT complex with many vehicles parked in front. A swanky mall has just been thrown open to the public. A once buzzing-with-activity software technology park in a city that used to be known as the cybercity in India has been given a make over and turned into a Residential Complex and a Shopping Mall. The software park used to be occupied by large, medium, and small software services providers. This is a scene that is being played out in all the erstwhile software cities in India. The built-up office spaces of software services companies across India is huge and most of them are now empty. The story of India’s Textile Mills in 1990s and 2000s seem to be repeating, only with a change of protagonist. In the IT sourcing global market where India once commanded more than 50% of the market share, other players have now left it far behind. India’s software industry, once towering over the other players in the global IT sourcing market is struggling for survival. The Indian government has recently announced a revival package amounting to many billions of rupees for the IT industry.

Indian software services as an industry has almost ceased to exist. The government announced revival package for the Indian IT industry includes measures to re-skill the engineers and also incentives for software product development and innovation. But the general feeling is that India has already missed the bus. Once a thriving sector, which the government could blindly depend upon for generating employment opportunities for the many graduate engineers in the country, it is now a symbol of past glory.

The entry-level programming jobs are now history as automation and configuration-based scripting languages have made building software applications more an assembling job than a coding job. Building a software application is now an activity that takes only a matter of minutes. Droplets, functional and technical modules, are available which can be dragged and dropped on to an application canvas and they generate code and integrate. The integration happens based on the options that are chosen. The customization for integration can be done by assemblers, and does not require the expertise of engineers. Application Software Developers have been replaced by Application Software Assemblers.

Whatever is left of the software services outsourcing projects, legacy system and specialized non-customizable requirements based projects, seems to have slipped away from India. Over the last decade, Indian economy has grown immensely, and consequently there has been a steady appreciation of the Indian Rupee against the US Dollar. One of the major attractions of the IT offshoring model, the cost arbitrage, no longer holds, and India is no longer the low-cost offshoring IT services destination.

The Bodyshopping business, which was the seed from which the shoots of the Indian IT services industry steadily grew, has met with a sad end. Growth of nationalistic politics has resulted in protectionist economic policies the world over. This sounded the death knell for the Indian IT services industry with the Bodyshopping business model getting totally wiped out and the flow of outsourcing projects going from a flood to a trickle.

Skillwise too, Indian engineers are no longer in demand. India, for long, had dominated the application development chunk of the software services market pie. With the availability of low-cost skilled engineers, India had proved to be the most favored destination for entry level programming and application development. Innumerable engineering colleges had cropped up all over India, government run as well as private, churning out thousands of engineering graduates every year. The demand for fresh engineering graduates had ensured that engineering was the most preferred education for many students. Now, most of the engineering colleges have closed down. India still produces many engineers, but it is a very small percentage when compared to the numbers during Indian IT industry's heyday. The breakdown of the Indian IT services sector resulting in the inability of the IT industry to provide employment opportunities to fresh engineering graduates has resulted in an alarming growth of unemployment. This could apply the brakes to India's decade-long economic growth.

Almost all of the software development activity has shifted from software services to the product development of functional and technical configurable droplets, requiring much more in-depth technical skills. The Indian IT industry, heavily dependent on software services, had been caught napping.

Other than focusing more on geographical areas that had not been properly tapped for software outsourcing, there had been no effort to evolve and move away from the over-dependence on the software services business. Growth of the domestic market driven by the various initiatives of the government was never able to match the revenues of the export market.

Scenario 2: From ITeS to ITeS – A Journey of Transfiguration

It is 2025. The Indian IT sector has survived yet another crisis, but this time, only just. Though not in the pink of health, it seems to have recovered fairly well. But it has also undergone a make-

over. It looks different. The export oriented IT companies boasting the who's who of international corporates as their clientele, and operating out of futuristic office spaces are no more the face of the Indian IT sector. They have been replaced by IT companies that have a client list occupied mainly by domestic company names, and operate out of matter-of-fact bare offices. Export oriented IT companies, though, have not become a thing of past. But, they have been outnumbered by the number of IT companies catering to the domestic market. The political stability offered by the continuation of the same government for the last 10 years has meant that the momentum was not lost in the implementation and follow-up of the various schemes and initiatives that were introduced in 2014-15 such as Digital India and Start-up India. The continued focus on the implementation of these schemes helped in the creation of a huge domestic market for the Indian IT sector. At the same time, the protectionist governments that had come to power in what used to be the major markets for the Indian IT industry introduced policies that discouraged outsourcing to overseas companies. As a result, the Indian IT sector was forced to look for opportunities elsewhere. Also, rapid automation in the software development process brought along with it a grim picture of an impending catastrophe in terms of job losses. Re-skilling a workforce that was used to developing software applications based on client requirements with an objective to equip them to innovate was a mammoth task that the Indian IT companies were not willing to tackle. With the rising value of the Indian Rupee, the cost arbitrage advantage had almost vanished. Under such circumstances, the vast prospects and opportunities that were cropping up in the domestic scene could not be ignored for long. Many of the bigger companies set up subsidiaries to tap these opportunities in the domestic market. Slowly, these subsidiaries have become the major revenue churners for the Indian IT companies. The opportunities presented by the domestic market proved to be a life saver for a drowning industry. The IT companies redeployed their workforce to the domestic market catering subsidiaries. The revenues took a hit, and along with it, the salaries of the IT professionals. The Indian IT industry survived, but lost its sheen. But it changed the face of the Indian society. The plethora of IT projects focused on the domestic scene went a long way in making the Indian society almost completely IT enabled.

The adversities forced India on a journey of transfiguration - from providing ITeS (IT enabled Services) to becoming an ITeS (IT enabled Society).

And along this journey, the IT industry managed to get on the innovation train too, as it tried to cater to the peculiar needs of the domestic market. It finally reached its destination, albeit more than half a decade late. By that time, the world had moved on to the next station. If the stakeholders had demonstrated a bit of futures thinking a decade back, it would have been the Indian IT industry at one of the next stations, leaving the rest of the world to play catch up.

Conclusion

In June 2016, the news making waves in India was that of the Indian government's announcement of a package for the Textile industry. The Indian government announced a package of INR 60 billion for the revival of the textile industry. Once, India was the world's largest exporter of textiles. Now it has been overtaken by Bangladesh and Vietnam (Arun, 2016). The Indian textile industry didn't adapt and evolve and didn't foresee the technological changes. This resulted in the closure of a large number of textile mills. The present government has realized the importance of the sector as a job creator and wants to recapture India's Numero Uno position in the Textile export market. The textile sector could still be revived, but it is still a story of lost opportunities - the Textile industry could have been the engine that drove the growth of the Indian economy. Not thinking about the future and not being ready to adapt and evolve almost sounded the death-knell for the industry. Therein lies a warning for India's IT sector and for the Indian government. The IT services segment is the goose that is laying the golden eggs as of now, but before it dies a natural death, other golden egg laying geese need to be identified.

Correspondence

Shyam Sankar S.
Department of Futures Studies,
University of Kerala,
Thiruvananthapuram - 695581
India
Email: shyam.sankars@gmail.com

Manoj Changat
Department of Futures Studies,
University of Kerala,
Thiruvananthapuram - 695581
India
Email: mchangat@gmail.com

References

- AICTE Dashboard. (2016). *All India Council for Technical Education*. Retrieved September 1, 2016, from <http://www.aicte-india.org/dashboard/pages/dashboardaicte.php>
- Andrei, M. (2017). Chinese factory replaces 90% of human workers with robots. Production rises by 250%, defects drop by 80%. *ZME Science*. Retrieved February 9, 2017, from <http://www.zmescience.com/other/economics/china-factory-robots-03022017/>
- Arun, S. (2016, June 22). Rs. 6,000 crore special package for textiles. *The Hindu*. Retrieved from <http://www.thehindu.com/news/national/Rs.-6000-crore-special-package-for-textiles/article14395226.ece>
- Bhatnagar, S. (2006). India's Software Industry. In V. Chandra (Ed.), *Technology, Adaptation, and Exports: How some developing countries got it right* (pp.54-56). Washington DC: World Bank. Retrieved from <https://openknowledge.worldbank.org/handle/10986/7118>
- Bhattacharjee, S., & Chakrabarti, D. (2015). Indian IT outsourcing industry: Future threats and challenges – A reassessment. *Futures*, 67, 11-21.
- Cooper, D. (2016). Adidas uses robots to bring shoe production back to Germany. *engadget*. Retrieved September 1, 2016, from <https://www.engadget.com/2016/06/08/adidas-robot-factory/>
- Department of Electronics & Information Technology, G. of I. (2012). *National Policy on Information Technology, 2012 (NPIT 2012)*.
- Dhasmana, I. (2016, June 1). At 7.6% in FY16, India is now the fastest growing economy. *Business Standard*. New Delhi. Retrieved from http://www.business-standard.com/article/economy-policy/at-7-6-in-fy16-india-is-now-the-fastest-growing-economy-116053101080_1.html
- Glenn, J. C., & Gordon, T. J. (2009). *Futures Research Methodology -V3.0*. The Millennium Project.
- Guru, S. (2016, January 12). 25 Years of Reforms: How India Changed Forever In 1991. *Business World*. Retrieved from <http://businessworld.in/article/25-Years-of-Reforms-How-India-Changed-Forever-In-1991/12-01-2016-90165/>
- Mukherjee, A. (2017). Indian IT firms were reeling even before Trump's H1B visa jolt. *live mint e-paper*. Retrieved March 1, 2017, from <http://www.livemint.com/Opinion/pyYnRLZj82s1G6foIvqObM/Indian-IT-firms-like-TCS-Infosys-were-reeling-even-beforeTr.html>
- NASSCOM. (2004). *Indian Software and Services Exports clock revenues of USD 12.5 billion, registering growth of 30.5% in FY 2003-04*. New Delhi. Retrieved from www.nasscom.in

- NASSCOM. (2006). *The IT Industry in India: Strategic Review 2006*. New Delhi. Retrieved from www.nasscom.in
- NASSCOM. (2008). *Indian IT-BPO Industry: NASSCOM Analysis*. New Delhi. Retrieved from <http://www.nasscom.in>
- NASSCOM. (2010a). *India Inc. - An Overview of the Indian IT-BPO Industry*. New Delhi. Retrieved from www.nasscom.in
- NASSCOM. (2010b). *Global Sourcing Trends in 2010*. New Delhi. Retrieved from <http://www.nasscom.in>
- NASSCOM. (2011). *The IT-BPO Sector in India: Strategic Review 2011*. New Delhi.
- NASSCOM. (2012). *The IT-BPO Sector in India: Strategic Review 2012*. New Delhi.
- NASSCOM. (2013a). *The IT-BPM Sector in India: Strategic Review 2013*. New Delhi.
- NASSCOM. (2013b). *Indian IT-BPM Industry - FY2013 Performance Review, FY2014 Outlook*. New Delhi. Retrieved from www.nasscom.in
- NASSCOM. (2014a). *The IT-BPM Sector in India: Strategic Review 2014*. New Delhi.
- NASSCOM. (2014b). *Indian IT-BPM Industry Overview*. New Delhi. Retrieved from <http://www.nasscom.in>
- NASSCOM. (2015). *The IT-BPM Sector in India: Strategic Review 2015*. New Delhi.
- NASSCOM. (2016). *The IT_BPM Sector in India: Strategic Review 2016*. New Delhi.
- NASSCOM-McKinsey. (2005). *NASSCOM-McKinsey Report 2005: Extending India's Leadership of the Global IT and BPO Industries*.
- Office of the Registrar General & Census Commissioner. (2011). Population Enumeration Data. *Census of India*. Retrieved August 1, 2016, from http://www.censusindia.gov.in/2011census/population_enumeration.html
- Pandey, V. (2016, August 1). Acche din ahead for Modi: The news on economy is good and can also get better. *The Economic Times*. New Delhi. Retrieved from <http://economictimes.indiatimes.com/news/economy/policy/achhe-din-ahead-for-modi-the-news-on-economy-is-good-and-can-also-get-better/articleshow/53482203.cms?from=mdr>
- Rajaraman, V. (2015). History of Computing in India: 1955-2010. *IEEE Annals of the History of Computing*, 37(1), 24-35.
- Reserve Bank of India. (2016). *Survey on Computer Software & Information Technology Enabled Services Exports: 2014-15*. Mumbai.
- Sardar, Z. (2013). *Future: All That Matters*. Kindle edition.
- Schwartz, P. (1996). *The Art of the Long View*. New York: Crown Business.
- Schwartz, P. (2011). *Learnings from the Long View*. Global Business Network.
- Sharma, D. C. (2014). Indian IT outsourcing industry: Future threats and challenges. *Futures*, 56, 73-80.
- Software Technology Parks of India. (2014). *Annual Report 2013-14*. Retrieved from www.stpi.in
- Twelfth Plan Working Group on Information Technology. (2012). *Report of the Working Group on Information Technology Sector Twelfth Five Year Plan (2012-17)*.
- Wack, P. (1985a, September). Scenarios: Uncharted Waters Ahead. *Harvard Business Review*. Retrieved from <https://hbr.org/1985/09/scenarios-uncharted-waters-ahead>
- Wack, P. (1985b, November). Scenarios: Shooting the Rapids. *Harvard Business Review*. Retrieved from <https://hbr.org/1985/11/scenarios-shooting-the-rapids>
- Zore, P. D. (2016). India's dominance in IT will continue. *rediff.com*. Retrieved September 1, 2016, from <http://www.rediff.com/business/interview/indias-dominance-in-it-will-continue/20160830.htm>

