"Indian Software Industry - Moving up the Value Chain and Managing Non-linear Growth"

The Indian Software Industry

We are in the fifth decade of the Indian software industry. The industry's growth has been phenomenal. But it is also time to take stock and consider how we want to move forward. [1]

Let us consider the paradoxes the Indian software industry is struggling with: It is growing in size and creating wealth for a nation; at the same time making little headway up the value chain. Analysts have it that if the software industry grows at the same rate that it has grown in the past decade each of the top 3 IT companies will need to employ close to one million people; however, it is also perceived that India produces coders, and not Software Engineers or Architects. Even from an employee perspective, the paradox persists: IT continues to be an aspirational industry for young graduates. But in a great percentage of cases, after about a decade of employment, the employee becomes jaded, loses creativity and any joy at work.

As quoted in a recent research, the average revenue per employee at large Indian software services firm has largely stayed flat over the past decade.   An employee at a top IT services firm – such as TCS, Infosys and Wipro - brought in about Rs 2.5 million per year in FY 2000-01. This figure stood at around Rs 2.0

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[1] It is commendable that this premier institution is providing a platform for this discussion which is so relevant at this point

million in FY 2007-08.[2] So even though, revenue at these firms has grown constantly over these years, it has been linearly accompanied by an increase in headcount.

The Indian software service industry has traditionally been driven by a mindset of abundant availability of talent and the opportunity for cost arbitrage. That mindset has served the industry well in the past. This competitive advantage has been slowly eroded, as global IT firms set up centers in India, and alternate destinations of low-cost educated youth spring up in other countries.

The industry is also at a tipping point in a manner that this growth of human resources will make organizations unstable, and the law of diminishing marginal utility from resources will ensure that it becomes more and more inefficient.

Therefore to remain competitive, the industry needs to identify ways to increase their revenue without a proportionate increase in their headcount - a non-linear approach.

Approach

We approach this paper with the intimate knowledge of the IT industry – having worked in both IT customer organizations as well as IT in services provider organisations. This paper distils our understanding of ground realities in terms of: business pressures, customer demands, inherent difficulties of software creation or service delivery, the quality of the "talent" pool in the country, market size and the competition from other nations, as we posit our suggestions towards creating non-linear growth.

Before we look at the software industry itself, we step back a bit and look at evolution in any successful industry. We quote two examples where industries have moved from linear to non linear. Then we look

2 http://www.iimb.ernet.in/newsletter/issues/96

at the contributing factors for non linear growth in these industries; in this context, we review the baby steps we are taking towards nonlinearity; finally we present what we think are the measures that hold promise in bringing non-linearity and value to the software industry.

We also present a case study that gives us the confidence that we can metamorphose into a more vibrant industry – not just non-linear but making a qualitative difference to Indian society.

Linear to Non linear – Some Industry Models

Back then we did not say "non-linear" we called it, quite dramatically, "revolution" – the industrial revolution or the green revolution. Tools replaced the work done by human hands, science brought processes and technologies to make the end-product cheaper and abundant.   In recent times the more dramatic examples of non linear growth have been in textile and banking.

Let us look at one of our core industries: the textile industry

Independent India emulated the British and we saw large mills being set-up, which provided large scale employment. At that point the attractive model was to have composite mills which would take care of spinning yarn, weaving and even designing fabric with in-house designers: Bombay Dyeing is a very good example of such a mill.

But the profitability of such mills was particularly affected by growing trade unionism, and related labour problems, restrictive trade practises. Textile exports declined from 10.9 percent in 1955 to 3.23 percent in 1996. More significantly, during the same period, the share of China in global textile trade was 13.24 percent, up from 4.36 percent in 1980.[3]

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[3] www.gfe.de/Publication/Indian%20Textile%20Industry.doc

We were losing ground because of:

a. Use of outmoded machinery

b. Faster pace of automation in competing countries

c. Labour shortages

d. Low level of labour productivity

e. Lack of formal training facilities for unskilled labour

But in the early 80s the industry started to restructure itself and began to focus inward to assess its own strengths. Some of the highly specialised weaving and dyeing methods were revived and focus shifted to artisans' skills; traditional designs and motifs were also revived.   Domestic market also started appreciating the use of cotton more than imported synthetic fibres. From the mid-90s, the textile industry started showing signs of revival.

Today the industry has transformed around the following strategies:

1. Creations of smaller specialized units – Both weaving industry and apparel establishments are functioning in smaller scale with small batch production. This shift gives them the required flexibility to serve different markets, both domestic and the export markets

2. Value-added products - Forward-looking large mills are scaling up to produce value-added products, like apparel or home furnishing, while smaller mills and power looms scale up by backward integration with yarn manufacturers.

3. Operational Efficiencies –

   a. There has been a gradual shift of the labour in the traditional sense to a part stakeholder in the value creation process. Coupled with the generalist management and production skills, labour cost has ceased to be the focus area.

b. Outsourcing non-core work (e.g.in the apparel industry button stitching and finishing)

4. Customised Mass production – A ready market of large retail brands organised and marketed by the larger companies has spawned large scale customised mass production.

Non-linear growth in Banking Industry

Consider the following facts: [4]Indian banking industry employed 944620 people in 2010, an increase of a mere 0.76% over 2009 compared to a business growth of 17% for the same period. The banking industry employed over 10lac people in 1996-97. Taking statistical anomalies into account, at a worst case this figure stands at the same level even today and yet business and transactions have been steadily rising during the same period. The business per employee stands at a healthy Rs. 873 lakhs and has nearly doubled in the last decade.

Interestingly the same period [5]saw a compound annual growth of 8% in the volume of electronic transactions processed since the time they were tracked. Not only was the industry able to withstand the large exodus of people from VRS, it was also able to demonstrate a healthy growth on all parameters of business, customers and transactions.

So what is it that the banking sector has done which has made it a successful service-oriented non-linear model? The key transforming dimensions are:

1. Technology innovation & adoption – If one were to ask a banker in the 60s or 70s to draw the organization structure of a bank in future, the IT/technology department would not have featured as a unit, leave alone the fact that today product & process innovations are in the realm of technology departments. Undoubtedly the single biggest game changer in banks over

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[4] Source : BSR and Bank profile, Reserve Bank of India

[5] Source : Electronic transactions statistics, Reserve Bank of India

the last 2 decades is the arrival of technology in the areas of core banking, treasury, credit management, accounting systems. This has enabled banks to improve backend processing times, volumes and accuracy with minimal human intervention

2. Business process changes – Banks have taken a long hard look at their processes to reorganize themselves into core & non-core processes. Furthermore they have taken options of outsourcing, centralizing or replacement with technology depending on their individual strategies and competencies. These have brought efficiencies in their service & process delivery a good example of 'more with less'

3. Retooling the ENTIRE workforce- Coming back to our banker of 60s/70s, the typical job description of such a person was one who was proficient in book keeping, could do interest calculations, had a good knowledge of banking regulations & processes. More than 90% did not know computer or banking applications. The entire process of unlearning and learning made the workforce in banking adept at IT enabled service and product delivery.

4. Policy related modifications (so critical to a regulated industry)- Regulators played their part in this transformation of the sector by providing an enabling policy environment without which a heavily regulated industry such as this would not have been able to transform itself in this manner. Some of the key policies are the outsourcing of banking services, conduct of electronic transactions, directives on direct banking channels.

5. Customer behaviour changes – No change in service industry is successful without widespread adoption by the customers. Customers were gradually weaned away from their habit of walking into the branch and shifted towards electronic banking channels -self-service ATMs & kiosks - via both push & pull mechanisms. This is probably the largest exercise in changed customer behaviour in the country similar to the telecom revolution.

These then are the transformations our banking industry has been through, and a fairly rapid rate, at that.

Now looking back at both the banking and the textile industry we tried to identify patterns that led to non-linear transformations. And we tried to check if these would work for the IT industry.

Dimensions of Non-linear Growth for the IT Industry

Here are some common contributing factors that we extrapolated:

- Widespread adoption of innovations beyond industry

- Structural changes to facilitate flexibility & agility to adapt to changing customer preferences

- Enabling ecosystem consisting of government, regulation etc. facilitating adoption of available supporting technology

- Innovative business models

- Re-engineering business processes towards value-based contributions

- Increased focus on operational efficiency

- Availability of key generalist skill-sets much required in the middle management level for any expansion

- Retention of core value-added activities with human input while use of technology to conduct low-level high volume actions

- Comprehensive reskilling & retooling of the workforce in the industry

You will understand that most of these contributing factors are ALREADY available in the IT industry today as given below:

Automation led approach to low-value add activities - Remote infrastructure management (RIM) is leading the brigade of non-linearity today. It is incorporating the innovations in virtualization, cloud computing, telecom, infrastructure security as well as IS management tools into its service delivery. No longer is there the same number of requirement of physically dedicated resources as before. RIM is already on the path of non-linearity [6]where a NASSCOM report states that the revenue growth has been 5 times compared to 4 times growth in employees.

Innovative business models - Significantly, it is in RIM that Indian IT companies have realized the need for moving away from the conventional business model and many of them have started sporadic initiatives with their limited view of the elephant.   Some are increasing their focus on a platform-based approach; global companies have also started looking at benefit-based pricing with customers as well.

With the availability of Cloud Computing, Software as a Service and Platform as a Service, the infrastructure set-up requirements have reduced the entry barriers for first time users of technology. It has significantly transformed the capital intensive setup into a ready pay per use setup, that can be easily adopted by Small and Medium sized businesses. For a Small Software firm focusing on niche services also, the same technology becomes a key enabler to scale up to larger customers without a significant increase in the capital required.

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[6] Remote Infrastructure Management To Contribute More Than A Third Of IT Services Revenues For India By 2020 : Nasscom

Re-engineering processes - Some are looking at other industries like manufacturing to incorporate their production models in the software delivery process while others are already moving into a fixed price approach which is more SLA driven rather than a time & material approach.

All these are what we would call still in an 'experiment/pilot mode' and at best address one or two dimensions of this transformation. Why are some of these apparently good strategies not taking off in a big way? At a subconscious level we all know the prime factor:

Indians don't do the thinking - customers do - India executes. What is worse is, the customer himself is under great pressure – owing to compliances, political issues on outsourcing, post recession financial crises that the customer is leaning on the industry hard, giving us less and less freedom to negotiate.

So our great promise to ourselves that we will move up the value chain and capture the customer's thinking cap remains a dream.

Let us not also forget that we have inherent weaknesses.

As a culture we have lost the ability to innovate radically; true we may be good at a "jugaad" kind of innovation, as a matter of necessity. But our education system systematically dumbs down creativity and our frugal and precarious economy gives us very little room for failure.

Now we state this lack of creativity as a fact, without being defensive or critical. It is only when we are able to look at our weaknesses impersonally, without emotional or cultural overload, will we be able to deal with it.

Non-linear Options

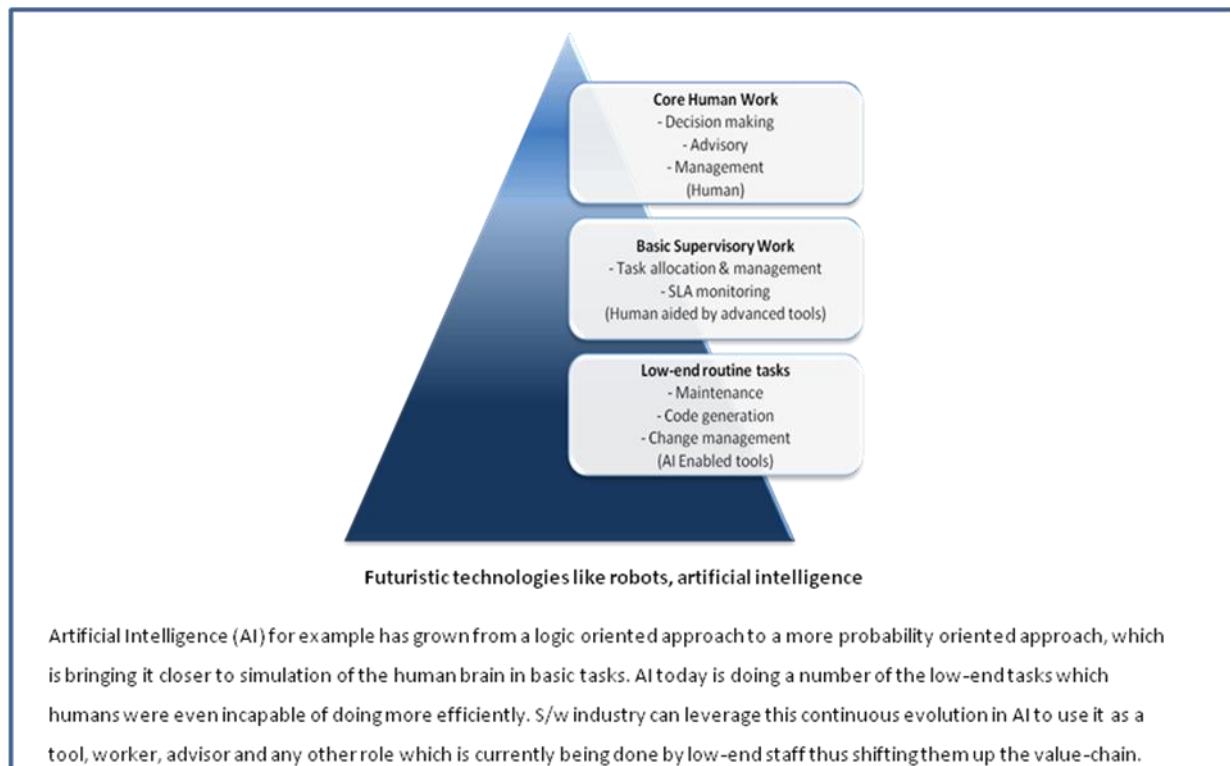In this context we further explore the most commonly considered options:

Outsourcing low-value adding jobs – Taking a cue from telecom or banking who have been the front runners in outsourcing of their non-core business, software industry needs to evaluate what part of its functioning is non-core for it to be able to outsource certain activities outside of its own e.g. HR, recruitment, admin. In addition to this there will be some low-value add jobs which could either be replaced with next gen technologies or further outsourced. Some of the core contiguous activities can be spun-off into a separate entity to make them more efficient: e.g. Infrastructure Management.

Product-based approach – While productisation is the most established non-linear model across the globe, this approach needs to be analyzed in the context of our ability current and future to build world-class products. The story over the last 3 decades does not seem to warrant well along this approach. Large investments are required for creating products and taking them to market. The shrinking useful life of products makes this investment riskier for Indian industry.

Moving up the value-chain - Indian software industry has to bear in mind the very real threat of China, Russia, Philippines replacing India as the cost-effective IT resource pool . While the current reality is that over 70% of the industry revenues still come from these resource-based linear model jobs, by moving up the value-chain is it ready to forgo this sizeable chunk of its revenue to its competition. The answer we suspect would be a negative in this case. Hence the strategy of creating a non-linear model needs to address both ends of the spectrum of moving up the value chain while retaining competitive advantage of managing the business as usual during this period of transformation.

Technology for technology industry - We have seen earlier how automation & technology were drivers for other industries to graduate to non-linearity, so what will be the so called 'game changer' for the technology industry. IT in the past has demonstrated capability of taking over several inventions like internet, sensors, mobiles from other domains and imbibing them into its offerings. Disruptive

technologies like robotics, artificial intelligence, nano technology hold promise in their adoption to industries. One such potential is detailed in the box.

Core Human Work
- Decision making
- Advisory
- Management
(Human)

Basic Supervisory Work
- Task allocation & management
- SLA monitoring
(Human aided by advanced tools)

Low-end routine tasks
- Maintenance
- Code generation
- Change management
(AI Enabled tools)

Futuristic technologies like robots, artificial intelligence

Artificial Intelligence (AI) for example has grown from a logic oriented approach to a more probability oriented approach, which is bringing it closer to simulation of the human brain in basic tasks. AI today is doing a number of the low-end tasks which humans were even incapable of doing more efficiently. S/w industry can leverage this continuous evolution in AI to use it as a tool, worker, advisor and any other role which is currently being done by low-end staff thus shifting them up the value-chain.

Cost - Revenue Models – If one looks at the conventional commercial models in the software industry whether they are on a fixed price (turnkey), a time & material mode or any other mode they currently have inputs (estimates, manpower, infrastructure cost etc.) as the basic tenet. In other words one is typically looking at a cost-plus model. Non-linearity in our view is not only de-linking revenue with headcount but also with the input costs.

The Indian IT industry software pricing has conventionally focussed on the marketer's internal business aims of covering costs, attaining specified margins, and meeting competition. Pricing approaches such as flat price, tiered pricing, usage-based, per user, are easily matched by competitors. Such pricing methods also tend to weaken profitability by transforming the market into one based on undifferentiated price competition.

On the other hand, value based pricing methods charge a price based on the customer's perceived value of the value received. But that leads us to the more basic problem –

- Will the value be measurable?

- If so, how do we measure the business risk for the IT industry and the business value to the customer?

- Are there proven methods which will help us measure the advantage gained?

- Can we design contractual agreements and Project Management methodologies around such measured advantages?

A lot of research is happening in this area of pricing for software products and services. One new model among them is - Hedonistic Pricing – which is being suggested to measure various environmental assets and offers many clues on the approach that can be taken to a value-based pricing method.

The basic premise of the hedonistic pricing method is that the price of a marketed good is related to its characteristics, or the services it provides. So, if we change an individual characteristic, the change in the price that people are willing to pay for the car, can be taken as the value of that individual characteristic. The software industry needs to reposition itself as a creator of knowledge assets for the customer and has to move towards measuring the value of such assets created.

Value-based pricing not only delinks the revenue from input resources, it also motivates companies to innovate internally on delivery efficiencies to increase margins as depicted below.
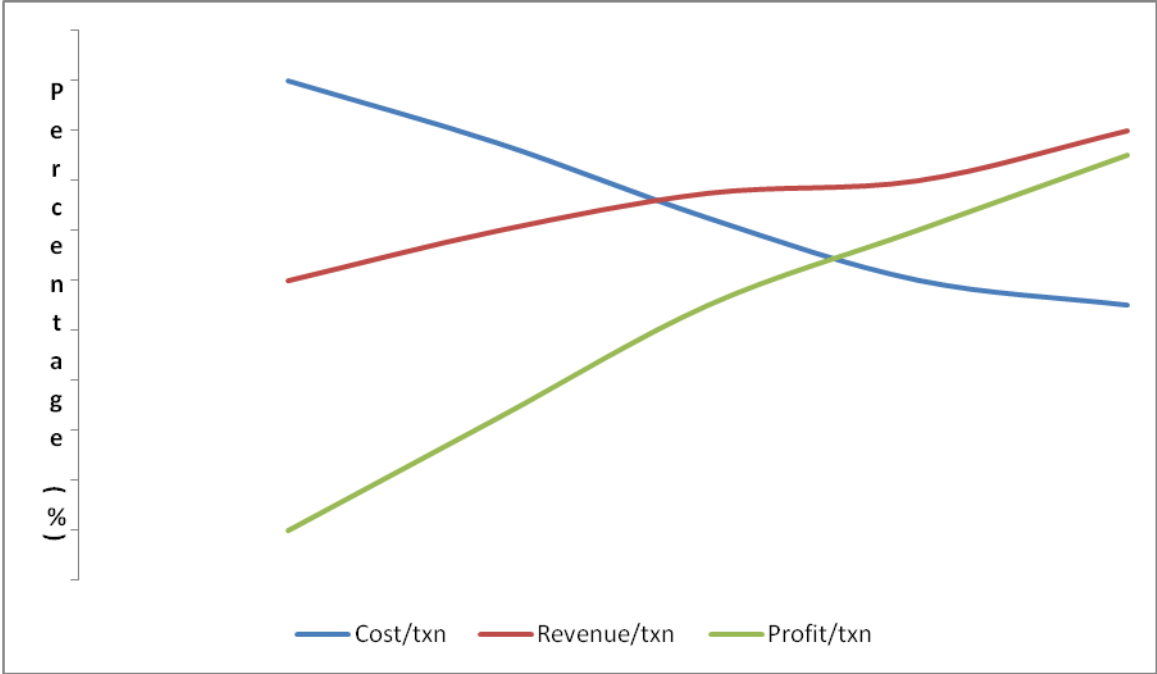
Non-linear Margin Equation

Way Forward

Considering the learnings from cases we presented as well as the options relevant to IT, we feel there are certain initiatives that the Industry can take to create non linearity:

1. **Creation of an industry ecosystem** that looks beyond the boundaries of individual organizations.

   This force should not be just a lobbying body but a hotbed for next gen IT, it should:

   a. Re-positioning the Indian IT industry as a trustworthy IT partner

   b. Lobby not just for new markets but also to change customer behaviour towards treating IT as a value creator, rather than as a support service vendor

   c. Create cross technology workshops and studies that help IT, riding on its success as a ubiquitous technology, adapt to other technologies

   d. Enable companies to invest in R&D in both technology and business process innovations,

   e. Create a confluence of venture funds, start-ups, established companies and academic research wings.

2. **Identify and develop excellence in niche areas -** This is not a new concept but has to be taken more seriously now. No single strategy can possibly work for the entire "software industry", for though to IT professionals and industry watchers "IT" is a single entity, it is in reality an enabling technology that is a seamless part of almost every industry and domain, each with its own business and delivery models. The strategies have to be different for the different verticals and horizontals (Industry and Technologies). Growing specialized expertise is the beginning of moving up the value chain. Thirty years ago, the best brains in India joined the software industry; today it is the realm of the mediocre. Let us build cells of excellence in niche areas where we must be world class.

3. **Automation of non-value adding services**, like searching the Internet for market data, resume searches, helpdesks etc. Human brain should be focussed on delivering high-value jobs and either automating non-value adding activities with AI/Fuzzy Logic or simply outsourcing these.

4. **Facilitating customer adoption –** Most customers embarked on IT outsourcing as ways of cost-reduction while ensuring efficiency of operations. This has matured to an extent that returns of this investment have tapered off. Customers are now looking for value additions which IT vendors can bring to their business by leveraging learnings over the last couple of decades. While this is an apparent expectation of the customer, very few have modified their engagement policies to move a vendor into a partner role. IT firms on their part also, have consistently focused on selling their technological abilities rather than comprehensive business knowledge.   Maintenance services on legacy systems, small module level developments still rule the roost today. Hence it is imperative for the IT industry to work with customers in changing their mindset towards value creation from defect/effort tracking and be prepared to co-partner with the IT vendor on this front.

5. **Reskilling/ changed working style (HR) –** While it's easier to setup a new venture with the non-linear ideologies, it is a gargantuan effort to change the mindset of hundreds and thousands of employees, many of them comprising the middle & senior management of organizations who see value in traditional service delivery models. There needs to be a large scale retooling of the existing workforce to align their goals & thinking with the radical change required to become non-linear.

6. **Commoditization of service lines -** Cloud Computing based technologies like SAAS, IAAS, PAAS enable commoditisation of entire service lines to make it repeatable and more cost-effective. As an example, the ERP process for an SMB operating in Automotive-spares will have a standard

process and this can be easily commoditised into a service offering. Although this commoditisation might be possible in limited areas, yet these could be the tools that let IT industry demonstrate its business knowledge and also showcase real and probable innovations in the customer's industry.

7. **Delivering for our own markets -** We may not create the next 3M or Apple Inc. But we understand scale and frugality like no one else, and that is what the markets of this century will need. [7]It is projected that the IT spend in Asia Pacific countries' will rise nearly 8% next year to $312 billion with India and China seeing remarkable growth. Gartner's outlook for IT spending in India is very positive overall IT spending in India is expected to be over $70 billion in 2011.

Coupled with the mature technology adoption by customers in these markets, as is evident from the value-based pricing case itself, it may make sense for IT companies to devise their non-linear models around these markets. Let us look at riding on the success of the mobile phone and let us look at IT for health, IT for agriculture and IT for manufacturing. Let us innovate on business models and make it meaningful to Asia, just as we have discussed in IT for Financial Inclusion

We rely too often on an IBM or a Microsoft or a Nokia to take the first steps in our own backyards. When we take a novel and low cost innovation to our own markets, we will inevitably create non-linear models around these service deliveries, as the "Chindia"scales we will be looking at are humungous.

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[7] http://www.hardware.com/news/transceivers/it-spending-to-grow-in-2011

8. **Value-based pricing -** IT over the last few decades has developed sufficient maturity to take this shift without which it may improve profitability and margins, but may well not still be non-linear. Some of the pricing models being talked about in this context are:

    a. Outcome based Pricing - This model can be targeted by BPOs. Comprehensively defining outcome itself is the largest challenge with outcome based pricing and this needs to be stated clearly at the contract negotiation stage itself.

    b. Value based Pricing - In an outcome based pricing model if the outcome is linked to a metric that is an indicator of added business value to the customer, this becomes value based pricing model. Infrastructure based services can look at reduced business risk as a business driver which links reduced security malfunction to reduced operational risk and hence operational excellence.

9. **Recasting business processes -** This involves innovating delivery models and re-inventing IT's role in the growing of a business. In conjunction with the above, current estimation methods, SDLC approaches & project delivery processes require a revamp to a value-based approach. Structural changes from the traditional matrix-based structures would be required to value-chain based structures.

10. **Sensitivity to serendipity -** We have seen how technology has been a key driving force for many industries in their transformation to non-linear growth models. This makes the challenge all the more critical in how will it enable its own transformation. Will there be another industry which will play a key role in its transformation? If yes, which is that disruptive industry who can play the part of an enabler? IT has to scour distant horizons for possibilities.

Conclusion

While these are short term or middle term options there are two long term initiatives we advocate;

Significant investments in scientific research - software design and development as a science is very young. Indian software industries are great sources of live data that can be studied. Our companies are too focused on bottom lines and short term gains that they are not realizing their own potential strength as hotbeds of R&D.

Creativity in education - Let us encourage parallel streams in education. How many creative thinking papers are included in Computer Science courses? How many of our students submit dummy research papers, because hardly any original research is underway and no one wants to offer a genuine researcher a chance to try, accepting risk of failure.

Let us learn to work with passion, and on what we are best at.

Industry has to structurally change to embrace non-linearity.

While the drive and passion has to come from within, it has to collaborate outside the industry to seek game changing developments

It has to be a joint effort of the leading companies in this industry who have the wherewithal to invest, to move the ecosystem players and to change customer behaviours. The larger organizations should focus on moving up the value chain even though there may be an initial loss of revenue to competition or smaller companies. Competitive advantage has to be retained by spawning off multiple smaller companies working on the same set of standards and philosophy.

Given the stickiness in changing technologies by customers, achieving non-linearity at least for the next decade is not a matter of survival of the IT industry. However if the industry aspires to continue to grow

at healthy level for a couple of decades, then it is imperative to start the efforts today to reap the

benefits in the next decade. That is the long-term approach which this demands.

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