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NEED OF FLEXIBILITY IN IT POLICY AT INDUSTRY LEVEL

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ABSTRACT

Information Technology (IT) industry of India plays a very vital role in the growth of economy in the country. Everywhere starting from the child's play to all the functional areas of complex business activities, it dominates. It has drawn the attention as being one of the most dynamic industry and a key contributor to the national economy growth. Although a number of IT companies had started around 20 years back, all could not survive till date due to lack of proper planning, vision, strategic management and their limitations with the dynamic market behavior. In this situation, so many questions automatically strike the mind of many researchers like what are the situations that influence the IT industry? Is there any change required in the existing IT policy of the country? If so, what are the changes required in the current IT policy to boost the economic growth of the country? How can the Industry adapt the flexibility? In order to discuss various issues coming out of the questions, an in-depth analysis of the IT industry of the country is very much essential. Since IT industry covers a very wide area with respect to hardware, software, services etc, it may be very complex for analysis if we consider the IT industry as a whole, which may lead to confusion. Hence thought has been given for the conceptualization of the IT software and services industry giving emphasis on the current level of IT in operation and Research and Development etc.

Keywords: *Flexibility, IT Policy, Software and Services Industry*

Introduction

Information Technology (IT) industry of India plays a very vital role in the growth of economy in the country. Everywhere starting from the child's play to all the functional areas of complex business activities, it dominates. It has drawn the attention as being one of the most dynamic industry and a key contributor to the national economy growth. Although a number of IT companies had started around 20 years back, all could not survive till date due to lack of proper planning, vision, strategic management and their limitations with the dynamic market behavior. In this situation, so many questions automatically strike the mind of many researchers like what are the situations that influence the IT industry? Is there any change required in the existing IT policy of the country? If so, what are the changes required in the current IT policy to boost the economic growth of the country? How can the Industry adapt the flexibility?

In order to discuss various issues coming out of the questions, an in-depth analysis of the IT industry of the country is very much essential. Since IT industry covers a very wide area with respect to hardware, software, services etc, it may be very complex for analysis if we consider the IT industry as a whole, which may lead to confusion. Hence thought has been given for the conceptualization of the IT software and services industry giving emphasis on the

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current level of IT in operation and Research and Development etc.

Indian IT Industry in Global Market

There is no doubt that the industry has brought many laurels to the country. The contribution of the industry to GDP will increase from 1.4 per cent (2001) to ~7 per cent (2008). More importantly, it will contribute nearly 20 per cent of incremental GDP growth between 2001 and 2008. The industry, which employed 0.8 million people in 2001, will employ over 2 million people directly and create direct employment opportunities for at least an additional 2 million people by 2008 (Nasscom, 2002). The industry's contribution to the India's total exports has been rising (Table 1).

Table 1: India's Total Exports and Share of Software and Services

Year	India's Total Export (US $m)	Software and Services (S&S) (US $m)	per centage of S&S in Total Exports (per cent)	Domestic Sales (US $m)	Software Imports (US $m)
2001	50999	7043	13.81		
2000	39043	4500	11.52		
1999	33958	3326	9.79	49.5	500
1998	30183	2043	6.76	35.8	
1997	26777	1269	4.74	25.0	
1996	23595	864	3.66	16.7	133
1995	18126	500	2.76	10.7	100

Source: (ESC, 2002) and (HBS, 2001)

Realizing the potential of the industry, the captains of the industry speak very high about the firms. Many professionals and policy makers have called India the software superpower of the world.

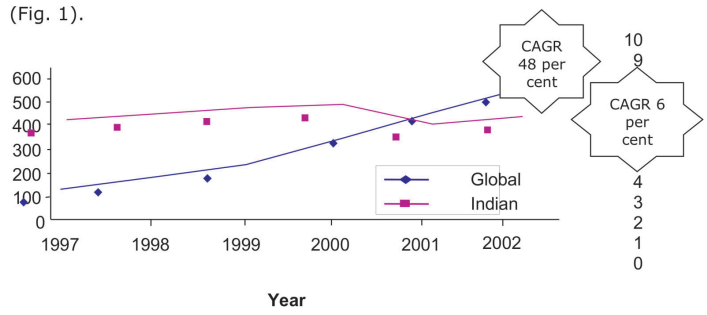

Figure 1: The Global IT Services Market and Indian IT Services Exports (US $ Billion) Source: Wipro, 2003

A lot of enthusiasm about the industry is understandable as hardly any other industry of the Indian economy compares with software in growth rates in the last decade. Yet, it's useful to put a little global perspective on the India's ambitions in this area. The global software market was about $550 billion (2002), and has been growing at about fifteen per cent per annum (five-year, trend rate) (ESC Data, 2003). India's share in this market is one and a half per cent (2000) and will rise to less than five per cent (2010) (Table 2). This may look good in comparison with India's overall share in the world trade, which is less than one per cent.

Seen in this light the claim to the title of super power in software services is clearly exaggerated. Still, India can and should hope to play in the IT big league (EC 2003). Few authors believe that India has the potential to grab global market share of ten per cent (Sadagopan, 2002).

Table 2: Global Software and Services Market Size in US$ billion and India's Share (per cent)–Macro Picture

	World		India		India's Share (per cent)	
	1998	2010*	1998	2010*	1998	2010*
IT Services #	138	730	2.0	44	1.4	6
Software Products	124	1100	0.7	23	0.6	2.1
IT-Enabled Services	10	200	0.6	36	6.0	18.0
Total	272	2030	3.3	103	1.2	5.1

Includes application development and integration, software maintenance, consulting and training and education

* Estimates for 2010 *(Source: Nasscom, 1999)*

The total world market for software services was US $559 million (2002). The global industry is segmented into four groups: large system integrators (Accenture, Cap Gemeni, Ernst and Young, IBM), large outsourcers (EDS, IBM), Offshore service providers (TCS, Infosys), and hardware and software providers (HP, SAP, Oracle) (Mehta, 2003). Out of this, the share of Indian firms (and industry) in different countries and regions of the world are shown in Figure 2.

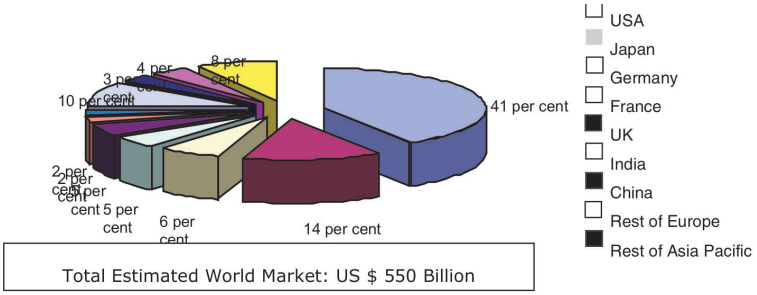

Figure 2: World Market of Computer Software and Services (2001-02)Source: ESC DATA, 2003

It is worth noting that the share of USA is largest (41 per cent) followed by the second largest economy of the world, Japan, with 14 per cent, Europe (except UK, France and Germany) 14 per cent and so on.

Table 3 shows the growth in revenue productivity in average firms in India. The average revenue productivity has been computed by total revenue with the average number of employees during the year. This measure takes into account the rates charged to the clients, the manpower utilized and also overheads in terms of support staff carried by the company. Most Indian software services firms are operating in the lower revenue productivity range.

Table 3: Growth in Revenue Productivity for Indian Software Industry (ISI)

Year	Manpower (No.)	Revenue/Employees/Year	Growth rate (per cent)
1993-94	90,000	6198	-
1994-95	1,18,000	6998	12.8
1995-96	1,40,000	8924	27.5
1996-97	1,60,000	11,036	23.6
1997-98	1,80,000	15,000	35.9
2001-02		16,600	10.6

Source: Adapted from (Nasscom, 1999)

Comparison between global and Indian firms on factors such as revenue productivity gives interesting facts that there is a large difference in figures. The productivity of average firm in the Indian software industry is very low ($16,600) vis-à-vis global firms whose productivity are 14 to 41 times more than that of the Indian average (Table 4). The table also shows that there is a wide gap in the revenue productivity figures.

Table 4:Global Comparison of Revenue Productivity with Indian Software Industry

Company/Industry	Revenue ($) billion	No.of Employees	Revenue Productivity ($)
Microsoft	26.7	39,100	6,82,864
Adobe System	1.2	3,007	3,99,069
Veritas Software	1.5	4,784	3,13,545
Siebel System	2.1	7,389	2,84,206
SAP	6.9	24,480	2,81,863
PeopleSoft	2.0	8,019	2,49,408
Oracle	10.5	42,927	2,44,601
Indian Software Industry	8.3	5,00,000	16,600

Source: (Nasscom, 2002; BW, 2002)

The IT Policy

Information Technology is one of the greatest boons of science to humanity. It is revolutionizing life on this planet like no other technology has impacted in human history. It has been impacting on the economy, communication, culture, education systems and social interaction in all the countries, bringing them closer in a world transformed into a 'Global Village' and laying the foundation for a new civilization. IT is used to 'informate' employees rather than 'automate' the processes in an organization (Shoshana, 1988). It is informating the business by communicating mission, objectives and market philosophy, combined into a unifying focus world wide leading to common processes and systems. Most process innovations are enabled by IT (Davenport, 1993), and IT has been viewed as a catalyst for change (Senn, 1992). IT became embedded in firm's core business processes, contributing to the firm's high performance (Yetton et al., 1994). Davenport and Short (1990) describes the analysis and design of workflow and processes within and between organizations. For achieving the business goals, radically overhauling the business by using IT as a central lever is suggested (Venkatraman, 1991). Hammer (1990) has dealt with the fundamental analysis and radical redesign of business processes to achieve dramatic improvements. IT initiates major changes and supports the subsequent changes (Grover et al., 1993) thereby IT lays foundation for new business processes (Goodhue et al., 1992).

The dynamic character of the current business environment has forced firms to thrive for strategic flexibility, to examine their business model continuously, and to find ways to incorporate the Internet into business processes (Bettis and Hitt 1995, D'Aveni and Gunther 1995, Simerly and Li 2000). The Internet opens a new set of strategic opportunities for organizations (Evans and Wurster, 1997), including unprecedented opportunities to rethink and flexibly evolve their operations, marketing, and services strategies (Feeny, 2001). The industry operates in multifaceted segments. The IT industry, as compared to other industries, is best characterized for its fast changing nature of technology. If one goes back to sixties and seventies, the status of computer technology can be best experienced and compared with the present status of sophisticated high-end multimedia computers. The rate of change of this technology during the last four decades is really noteworthy. The emergence and convergence of networking technologies with the computer has changed the business processes ever before. Characteristics of an industry can have major impact on the dynamics of competitiveness. The IT industry characteristics is unique in regards to its hardware, software, networking and IT-enabled services. The rapid advancements in the field of Information, Communication and Entertainment Technologies and the resultant explosive growth of the information intensive services sector have radically changed

the world economic landscape. These changes have given rise to a new society based on knowledge, which has shown the new avenues of development, employment, productivity, efficiency and enhanced factors of economic growth. The progress, prospects and problems of the IT industry of India have been widely recognized and documented (NASSCOM Report 1999, NASSCOM-McKinsey Study 1999, Das 2000, Mehta 2000, IDC 2000).

The IT policy of the Government of Delhi (http://delhigovt.nic.in) emphasizes on the e-governance, equality, education, employment, entrepreneurship and economy. It states that the private sector is in the forefront of developments of IT sector. As the government seeks to translate its vision into reality, it expects the private sector to continue to play its pivotal role. It highlights that the growth in IT in the country depends on the IT growth of the companies with in it. And the growth of the company depends how IT is used for the better management of the company in the competitive world. The government intends to use IT as a major instrument to provide new opportunities to improve the quality of life. It discusses on the training of citizens, upgrade the skills of IT professionals, the use of IT in schools and colleges, and in industries. It also discusses for setting up training centers for the unemployed educated youths. It highlights on the policy for improving the internal efficiency, which is based on two main areas, viz. internal communication and data handling. Here it discusses on the integration of departments through networking.

While Indian IT companies have built strong domain knowledge, achieved global exposure and also brand equity worldwide in the software services sector, there is a need to establish expertise in higher levels of innovation and have focused R&D exercise for the better management (http://nasscom.org). The strong domain knowledge and global exposure provides a good stepping-stone for Indian IT companies to look at developing software products. The Indian software and service companies are acknowledging the clarion call and are evolving a pragmatic roadmap in the product space. This is evident from the fact that Indian IT industry export revenues from the product and technology services have grown from Rs. 5100 crores (US$ 1.08 billion) in 2001-02 to Rs. 6600 crores (US$ 1.40 billion) in 2002-03 registering a growth of 29.4 per cent. Ajitabh (2000) suggests that Indian software companies should invest more in R&D, have flexible productive environment for encouraging creativity. The NASSCOM report also highlights that the product and technology services would grow in the coming years. It discusses about the emergence of new technologies, global majors keenness to offshore elements of the product development lifecycle, demand for components or product-lets that contribute to speedy product development. A number of Indian Software and services companies have managed to make a niche for them in the global packaged software market. They have done so in the face of intense competition, by creating innovative and cost competitive solutions that found ready customers across the globe.

Industries differ widely in their economic characteristics, competitive situations, attractiveness and future potentials. The economic characters of an industry depends on factors such as overall market size, the pace of technological change, geographical destinations, size and sophistication of sellers and buyers, identical or differentiated products or services and economics of scale or costs. An in-depth study of an industry also provides the information about the extent of competition, drivers and key success factors, industry profits outlook and potential. The Government of India, recognizing that the impressive growth the country has achieved since the mid-Eighties in information technology is still a small proportion of the potential to achieve, has resolved to make India a Global IT Superpower and a front-runner in the age of information revolution. The Government of India considers IT as an agent of transformation of every facet of human life, which will bring about a knowledge based society in the twenty-first

century.

The IT policy have been formulated in different areas like strategic policy for IT industry, IT Research, Design and Development, IT Human Resource Development, Financing the IT sector etc. It is a very wide subject and covers a very vast area. It may not be a wise thinking to cover all the areas while giving emphasis on conceptualization on IT Policy as it may lead to a complex situation due to the dynamic change in policy. Hence only two areas viz. 'Research and Development', 'Current Level of IT in Operation' have been taken into consideration for the system conceptualization which are discussed below.

Research and Development (R&D)

India is fast emerging as a hot spot for global research and R&D as well as the development of software products and packages. Most of the leading homegrown companies are investing more than 10-20 per cent of their profits in R&D. The R&D spending by Indian software houses touched around 3.4 per cent of the total revenue in 1999-2000. This signifies the involvement of increased resources in creating IPR, developing practices and domain knowledge for the growth in R&D. Many multinationals are shifting their global R&D center to India recognizing the immense power of local talent. Although, the number of scientists and engineers in India are reasonably good, India is far behind other countries in technology leadership, quality of research institute, corporate R&D spending and openness to new technology. In order to have better R&D facilities, followings are some points to be taken into consideration.

- To set up a high level Institutional framework to coordinate and focus R&D efforts in India which will help in facilitating the formulation and implementation of policy framework on on-going basis for R&D in IT.
- To establish an Indian IT Design Council as a non-governmental, autonomous body for giving awards in R&D in IT; for providing patenting assistance to developers; for giving a trade-mark to the IT products designed and developed in India.
- To set up an IT Development Board (ITDB) as a non-governmental, autonomous body for identifying major mission mode projects in the country; for building close links to encourage collaborative activities between academia, R&D organizations and Indian IT industry; for funding projects to help develop technology in high-risk areas; for keeping a watch on global IT technology trends and India's competitiveness in the field; for establishing an appropriate funding mechanism for IT industry to draw support for R&D.
- To take various measures for the development of cutting edge manpower for R&D such as to ensure that all undergraduate and postgraduate colleges offer a 'minor' in IT in various streams like medicine, commerce, economics etc. so that the migration to basic programming field would be minimized; to institute fellowships and special faculty positions schemes with attractive remuneration to ensure that high quality manpower joins academics; to create R&D manpower and infrastructure facilities; to provide research positions in selected institutions and also provide fellowships for short and long durations in various academic institutions.
- To create an appropriate funding mechanism to encourage basic and applied research in Academia and research organizations to sustain R&D programs; to support open-ended research in IT-related areas.
- To design a set of measures to attract high quality students and faculty into IT-related areas such as to encourage industry to set up attractive fellowships programs for postgraduate studies in IT-related areas; to encourage enhancement of qualifications and acquisition of R&D qualifications by R&D staff from the industry.

- To institute a national level collaboration programme (exchange programme and collaborative activities) among the academia and between the academia and the industry.
- To establish an Institute of System-Level Integration (SLI) to carry out leading-edge research in SLI; to offer postgraduate degree course(s) in SLI; to help create an Intellectual Property (IP) Bank in India to become a major source of IP.
- To set up an agency to evolve framework of standards like CMM, SPICE, ISO9000 which will work for assessment and certification for compliance to standards and processes at affordable cost.
- To set up easily accessible Patenting Cells to provide consultancy and copyrighting services to IT professionals.
- To set up Tool rooms and design support centers for providing modern tools to the developer community at a reasonable cost, which will also ensure development of Indian tool sets for this purpose.
- To institute specific R&D projects for IT interface and IT development tools in Indian languages.

  To boost growth of IT R&D, following steps should be considered.

  - o Courier Services should be allowed for imports with customs clearance at the addresses location and customs duty exemption should be allowed.
  - o All IT products designed indigenously should be exempted from all duties like CED, CST, State ST, Octroi, Custom duty etc.
  - o Unsold exported goods/software should be permitted to return through distribution network or it should be sold on discount price in the exported country.
  - o Export revenues from royalty on Indian R&D must be made tax-free to encourage intellectual capital creation.
  - o Easy Loan for R&D activities to lead IT product development should be facilitated by RBI.
  - o Intellectual Property should be capitalized at par with goods and services.
  - o Import components should be allowed to keep in stock.
- To encourage National Technology Park (NTP) for R&D and promotion of key technologies to support establishment of National Information Infrastructure.
- All PSUs, R&D institutions and technology support agencies should apply techniques of resource planning and initiate time bound programs to enhance the velocity of business and quality of products to enable India to be global competitor.
- The govt. should amend laws to enable relocation, reorganization and retraining in the IT industry in view of the demand of rapid change. Also the govt. should revise the procedure for fast clearance of IT projects.

Current Level of IT in Operation

Followings are some of the observations about the level of IT Policy in operation in the IT industry in India.

- Although a huge number of software are developed and implemented, India imports software productivity tools, as many software productivity tools are not available in India.

- Companies and software development organizations spend a very little amount for the purchase of software productivity and quality tools. In order to keep pace with the fast changing trends in software technology, the organizations should be encouraged to spend at least one-fourth of their total software budget for the same purpose.
- The number of companies getting the international quality certification SEI-CMM level-5 standards/ISO9000 for maintaining the high quality software services and software products, are very few. Compulsory insistence should be given to increase this number.
- Usually there is delay in the delivery schedule of software companies in international as well as domestic market. In order to increase the international credibility, the software companies should be allowed to utilize a part if their export earnings for putting in place all necessary means for meeting strict delivery schedules and customer satisfaction.
- The fast growth rate in software is making a large number of project managers to become entrepreneurs, thus creating a gap in demand and supply of project management skills. Special funds should be enabled for commensurately increasing the supply of project management skills.
- Presently most of the software are developed in English language. Efforts would be made to develop the software in other Indian languages for internal spread of IT culture and in other foreign languages like European, Russian, Japanese and Chinese for increasing software export.
- The existing copyright law has to be enforced to create confidence among the recipient organizations in developed countries for Indian software export.
- The govt. of India provides the facilities and support to the national companies to set up local R&D units as it has one of the largest scientific and technical manpower talent pools. It should also extend its support to the MNCs to set up global R&D units in India.
- Although many offshore software developments are done in India, there is no dedicated linkage of high-speed satellite and fibre optic links for the fast export of software and services from India.
- There should be an increase in the number of companies having out-sourced their software to companies in India as compared to the current number by working out a crash program for awareness building.
- The quality employment at the grass root level in the IT field is very less. A govt. and industry funded consortium would be established that would scout for suitable business opportunity globally, and subcontract such projects to 'Grameen Data Processing Centres' that would be run and managed as profit centers by various enterprises, thereby enhancing quality employment at grass root level.
- Although there are a number of vocational courses under various schemes of govt. of India, there is no vocational course on IT-enabled services. Efforts should be made to open such course to enhance the existing facilities.

Methodology

The concept of Flexible System Dynamics Methodology has been used in the present case. Flexibility Dynamics models are goal seeking and are based on the 'learning' paradigm. The main emphasis of flexibility dynamics is on learning, reasoning and adaptation. In flexibility dynamics modeling, the mapping of decision functions of a model complements the rule of information feedback theory and uses the knowledge based virtual reality techniques making

the model adaptive and principally helping the modeler to map organizational systems accurately by forcing them to pay close attention to the information sources available and also making the decision-makers aware of information deficiencies, biases and errors.

In order to conceptualize the need of flexibility in the IT Policy at Industry level, in addition to the causal loop diagrams, the SAP-LAP (Situation-Actor-Processes and Learning-Action-Performance) analysis and FIDs (Flexibility Influence Diagrams) have been used for better understanding about the linkages of one variable with the other used in the model.

Conceptualization of the Modules

As per the earlier discussions, the researcher has tried to represent the modules in a pictorial form through the causal loop diagram. Here special emphasis has been given on the variables that influence other variables in the model. The policy structure is conceptualized with respect to the feedback of information. The over all performance of a system depends on the behavior of each subsystem and their linkages with other subsystem with in the system. It may be observed from the discussion that 'R&D' module is influenced by the Product demand, which influences the HR policy. The HR policy influences the current level of IT in operation, which in turn, influences the System Flexibility. Similarly, the R&D module influences the current level of IT and also to the System Flexibility. The conceptualized modules may be represented through causal loop diagram as depicted below.

Research and Development

As discussed earlier, product improvement and innovation is required to meet the global demand. Various factors that influence this are time, money and effort. Also other factors like to accomplish the R&D goals through a proper selection of projects, acquisition, and development of required facilities and execution of efforts for successful completion with in time and budget schedules; to finalize new product possibilities through a selection of relevant projects and an estimation of their cost and duration; to facilitate continuing progress of work by developing solutions to any technical difficulties encountered during the development of the projects; to deuce any discrepancy between scheduled and actual pace of work by adjusting the company's commitment of resources, their utilization, the acquisition and development of R&D facilities; to establish consistency between the appraisal of work progress on the selected projects, and the perceived value of the improved/new products and technology sought to be realized through these projects. The causal loop diagram for R&D module is depicted in Figure 3.

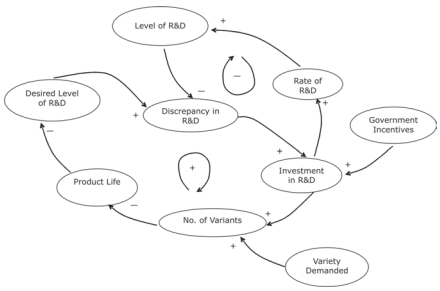

Figure 3: Causal Loop Diagram for Research and Development

Current Level of IT in Operation

As discussed in the earlier section, it is observed that more flexibility is required for meeting the global demand. The changes to which an IT software and services system has to respond are:

- Change in software products
- Change in delivery dates
- Change to cope with disturbances while developing the product such as hardware failure, operating system failure, networking failure etc.
- Design modification etc.

The key factors that force an IT system to increase the level of flexibility are:

- Market requirements
- Competitor's flexibility levels.

Various factors that influence the current level of IT system are investment, training of manpower, profits, sales, competitive edge, R&D, investment in R&D, availability of flexible tools of IT etc.

The causal loop diagram for 'Current Level of IT in Operation' module is depicted in Figure 4.

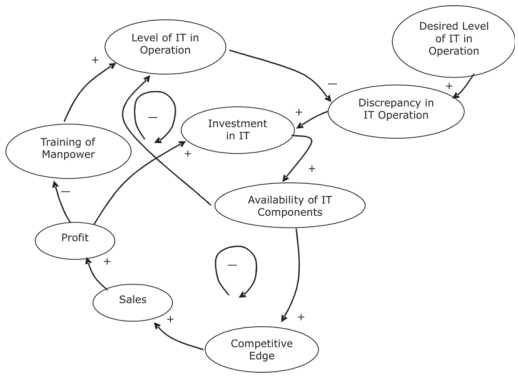

Figure 4: Causal Loop Diagram for Current Level of IT in Operation

Need of Flexibility

Sushil (1997) has discussed an evolving paradigm of flexible system management, which revolves round the concepts of continuum and freedom of choice. It contemplates the dynamic interplay on the continuum by exercising freedom of choice exhibiting 'systemic flexibility'. Flexible system management has three components– situation, actor and process. The situation is to be managed by an actor through a flexibly evolved self-organizing management process. The actor understands the situation and exercises the freedom of choice to flexibly and systemically evolve a management process. The process if flexible and a self-organizing system of management, is to be evolved by actor using its flexibility for managing situation. The Flexible System Management for the IT Industry is described below through the SAP-LAP analysis.

SAP-LAP Analysis of IT Industry

The SAP–LAP framework, as it name suggests (Situation-Actor-Processes and Learning-Action-Performance), when used, is very helpful in the analysis of external and internal situations of an organization. The interplay of situation, actor and process in the SAP framework results in the evolution of learning, action and performance (LAP) framework.

The researcher has used this model in the case of IT software and services industry in India and could find out the followings for each component.

Situation

- The mission of IT software industry of India is to work to become global super power.
- IT literacy all over India.
- IT literacy has been progressing and IT for all by 2008.
- Massive requirement for IT talent in a world moving into information based economy.
- Globalization in the age of Internet; distance doesn't matter.
- Growth in software solution business and IT education.
- Competition in global market.
- New emerging opportunities like process integration, e-business, knowledge management in software product space.
- Global outsourcing growing.
- Interplay of vast range of related services in software and learning business.

Actor

- Ministry of IT as motivating force and NASSCOM.
- GM from business and IT organizations.
- Employees of IT departments in putting united effort.
- Global companies entering Indian market.
- Companies adapting IT as a growth tool.
- Competitors in global and Indian market.

Process

- Focus of IT application is to survive in competitive world.
- Business managers and IS planners interact before finalizing IS plans.
- IS planning is done in-house and significant part of all other related IT support is outsourced.
- Fair documentation practices for IS plans.
- Evaluation studies are conducted by outside agency and help to learn from past.
- Maintaining the standard in products (SEI-CMM 5).
- Innovation and quality solutions.
- Operational excellence.
- Standardized processes.
- Strong project management and commitment to develop software and knowledge solutions.
- Global reach and delivery model.
- Practical and integrated solution.
- Investment in people.
- Acquisitions.
- Clear focus.
- Growth strategy.

- Inbuilt motivation to stay at the cutting edge of technology.
- Companies focus on what the customers want rather than what they should have.

Learning

- Individual commitment and industrial relations.
- Productivity per employee to rise.
- Urban areas have more IT literacy compared to rural and remote areas.
- Very few organizations are fully computerized, i.e. paperless work.
- Grow in international markets diversity.
- Innovative offerings to customers.
- Constantly renew the self to anticipate future technology needs.
- Any company with global aspiration cannot do it on the strength of somebody else's technology alone.
- Become creator of technology.
- Best services to customer.
- Capitalize on emerging markets.
- Sharp focus.
- Leverage brand image.
- Co-option strategies.
- Leverage offshore advantages.
- Follow high value and integrity.
- Learn client culture.

Action

- Speed up computerization process at rural and remote areas.
- There is a need to increase the level of computerization all over India.
- More focus on strategic application of IT, is required.
- Users of the IT system must be taken into confidence for IS planning.
- Looking into the demand from national and international level, companies have to follow some dynamic or flexible approach.
- Strategic alliance with global IT super power may be a good option.
- Focus on western markets.
- Expanding into the areas of software solutions, knowledge solutions and e-learning.
- Increase global offshore delivery capability.
- More flexible organizational structure.
- Improve presence in different geographies.
- Improve productivity and growth.
- Improve human resources management processes.

Performance

- Increasing productivity will become easier through more computerization.
- User's involvement in IS planning will lead to development of more realistic; easy to implement plan that will also have better integration of IS plan and business plan.
- People will not think to migrate by getting better option like ESOP, better salary etc.
- To help to maintain India's position as number one in global market.
- Clearly outlined goals and State of art development complex.
- Retain core competency to become number one.
- High productivity and growth rates.
- Cost effective solution provider and Top of mind brand.

Flexibility Influence Diagrams

The causal loop diagrams for the modules show the broad out look about each subsystem and their integration in a flexible manner. The researcher has taken interest to find out the possible key variables involved in the system and to convert the causal loop diagrams to Flexibility Influence Diagrams (FIDs) for better understanding of all the modules and the integrated system with respect to various actors. It may be mentioned here that the key variables shown in these diagrams are not exhaustive and many more could have been added. Attempt has been made to consider all critical variables and to make the model simple for better clarity. The flexibility in the IT policy can be best described through the flexibility influence diagram by the SAP analysis where the main actors can be considered as IT Industry, User Industry and Government. The situations and processes for one actor vary from that of the other. Hence, each subsystem mentioned above should be flexible enough so that each actor can act with freedom of choice.

The variables marked under the heading situation and process respectively can be mapped one to one on the causal loop diagram for respective actors to understand the influence of relationships with respect to the actors. The concerned actor would have a freedom of choice only on process variable and not the situation variable. In each module, all the actors may not necessarily be relevant and thus the FIDs of only relevant actors for these modules are shown.

Flexibility Influence Diagram for R&D Subsystem

In this subsystem, all the three actors are relevant to play their role with freedom of choice with different situations and processes as shown in Figure 5.

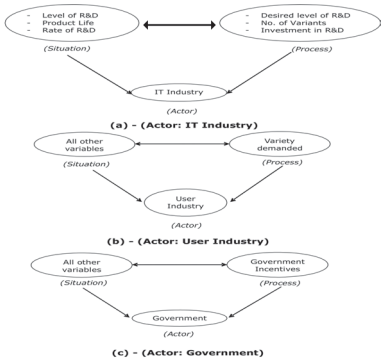

Figure 5: Flexibility Influence Diagram for R&D Subsystem

Flexibility Influence Diagram for Current Level of IT in Operation

In this subsystem, the actor IT industry has the situations and processes to play its role whereas the others two actors, viz. user industry and government don't have any situation and processes. The FID for this subsystem is shown in Figure 6.

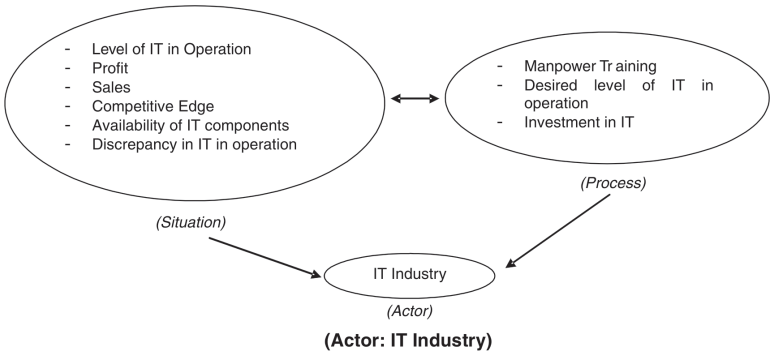

Figure 6: Flexibility Influence Diagram for Current Level of IT in Operation

Concluding Remarks

IT industry is a very dynamic industry and its role is very sensitive as far as India's economic growth is concerned. The policy guidelines plays a very major role in the industry for its growth and survival. In view of this a study is undertaken to make out the IT Policy in India. By going insight of the study, a number of issues and its cause were found out. In this study, the need of flexibility in the conceptualization of the IT industry has been mentioned in general and that of IT software and services industry in particular where the issues like R&D issues, level of IT policy in operation have been discussed in detail.

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