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INTERNATIONAL GOOD PRACTICE FOR ESTABLISHMENT OF SUSTAINABLE IT PARKS

Review of experiences in select countries, including three country case studies: Vietnam, Russia and Jordan

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Executive Summary

1.1. Background

Historically, Science and Technology Parks have typically evolved around tertiary educational institutions or other research organizations. The role of science and technology parks has been to:

- Recruit and co-locate new and established knowledge-based companies;
- Promote innovation based on "smart" technologies;
- Provide an interface or shared research environment for research organizations and private industry; and
- Leverage local knowledge resources to enhance a region's economic base.

The United States and select countries in Europe were the first to set up dedicated science parks during the sixties. Many of these parks were set up to cater to knowledge or technology-intensive sectors like engineering, chemicals, and electronics. In Asia, the phenomena of setting up dedicated parks to enable knowledge sharing started in the early seventies in several countries. Japan and Korea took the lead, focusing on basic research and development activities conducted by government research and development institutes, and universities. It was only in the late seventies and early eighties that the non-government sector started setting up operations in such parks to avail the benefits of government supported R&D. In the late nineties, developing countries increasingly started to establish similar parks as a preferred tool for promoting their information technology (IT) industry. Given that these countries were often constrained by severe infrastructure limitations, it was easier to provide state-of-the-art physical, communication, and social infrastructure within a designated area to enable IT companies to operate.

1.2. IT Parks: What Has Worked and What Has Not

The first step in this assessment was to identify five countries for analysis, from which a total of six IT Parks were selected to get a representative sample covering both (i) successful and not-so-successful IT Parks , and (ii) IT goods as well as IT and BPO (Business Process Outsourcing) services. Our analysis has been based on the CLIP framework, the individual components of which have been detailed below:

- Capital attempts to assess i) Investment, ownership, and management issues of the IT Park in terms of how it has been funded, role of the government and the private sector; ii) Mix of anchor occupants and early stage companies in the park and iii) Provision of business incubation services by the park management and availability of private equity/venture capital and other means of financing;
- Linkages include i) Nature of products and services offered by key occupants and their fit with the target markets; ii) Assessment of forward and backward linkages of key occupants of the park; iii) Relationships between key occupants and resource organizations such as academic institutions and R&D centers, given the nature of products and services offered by key occupants; and iv) Value-added services offered such as market access, business planning and operational support, and developing appropriate linkages within and outside the park;
- Infrastructure addresses i) Availability and relative cost of land/space; ii) Quality of physical infrastructure including connectivity and urban infrastructure.; iii) Nature of social infrastructure like recreational facilities, and remoteness; iv) Political stability and law & order and v) Intra-park, domestic and international data & voice connectivity;

- People issues in terms of i) Quality of educational institutes; ii) Annual employee salaries & benefit levels and iii) Availability of people both in terms of numbers and skill-sets.

Based on our assessment of the six IT Parks in three developing and two developed countries, the critical business success factors for setting up IT Parks based on the CLIP framework of analysis have been identified below:

1.2.1. Capital

- While IT Parks may be owned by either the government, private sector or both, it is essential that they are managed by the private sector, given its operational flexibilities and ease of decision-making as compared to the rules and regulations that government entities must adhere to.
- The success of an IT Park in attracting IT companies to occupy space/facilities within the park is largely dependent on the reputation and credibility of the anchor tenant. Though the IT Park developers have to offer various concessions and incentives in terms of subsidized rates, usage fees, and preferential treatment, having a globally reputed IT company as anchor tenant results in other smaller players. This is because these smaller players are attracted to the park with the knowledge that the IT Park must have world class infrastructure and facilities to be able to attract an IT player of repute as an anchor tenant. IT Parks like Hitec City India and Singapore Science Park have been able to market the park to occupants based on the fact that reputed organizations like Microsoft, Oracle Corporation, and DNV were already present in the park as anchor tenants.
- Angel investment, venture capital, and private equity have been identified as key enablers, specifically for development of start-ups and small and medium enterprises. Consequently, in countries like Korea and China where the presence of global angel investors/venture capital/private equity funds is limited, IT parks like Teadok Valley and Zhongguancun Science Park (ZSP) have set up their own dedicated venture capital funds, usually administered by government agencies/bodies. In addition, most successful parks have business incubation centers for supporting start-ups and small companies. However, irrespective of the venture capital/private equity setup of the individual park, infus-

ing the requisite depth to the venture capital/private equity market at the national level is also essential, as it enables transfer and sharing of good practice. Singapore, India and China represent some of the countries which have been able to achieve a degree of success in this area.

- IT Parks offering incubation services help nurture entrepreneurship and development of the SME sector in the local economy. The IT Parks gain when these operations scale up to become regular occupants. An example is ZSP in China, which offers specialized incubator services for overseas Chinese IT professionals seeking to return to China. These services have resulted in over 450 startup entities.

1.2.2. Linkages

Close working relationships with academic institutions like universities, colleges, and R&D institutes, are essential for IT parks like Taedok Valley, Singapore Science Park and ZSP, where the primary focus of some key occupants is on technology innovation in the areas of EDP equipment, telecommunications, integrated circuits and electronic components. The nature of requirements require leveraging of specialized R&D infrastructure for basic and applied research, and prototyping which are usually available with prominent academic and R&D institutes. Consequently, many of these IT parks have attempted to facilitate linkages between these institutions and industry players by co-locating them. For example, KAIST and ETRI are located within Taedok Valley. Quinghua University, Beijing University, and the Chinese Academy of Science are occupants of ZSP, and institutes like the Centre of Wireless Communication and the Institute of Microelectronics are located within the Singapore Science Park.

On the other hand, such linkages are usually not as critical in IT & BPO Services where innovation requirements are usually based on service delivery around existing software and hardware products, and most market leaders possess the requisite competencies in-house.

However, for both the above categories of companies, availability of quality manpower resources is key to success and hence dictates the performance of the IT Park. Consequently, many of the IT parks have been set up in close proximity with prominent academic institutions, centers of learning. In addition, factors

like existing infrastructure and amenities, and employment regulations play a key role in attracting the right competencies from other locations.

1.2.3. Infrastructure

It is clear from the case studies that physical infrastructure is important. Examples of this infrastructure include roads, urban infrastructure, social amenities for recreation and sports, proximity to airports, virtual infrastructure in terms of state-of-art data, and voice connectivity. While they may not serve as competitive differentiators as far as IT Parks are concerned, they are absolutely essential prerequisites. In fact, weaknesses in this area have been identified as one of the primary reasons for the underperformance of the IT Park at Hubli, India.

1.2.4. People

Availability of qualified and skilled manpower is essential to the success of any IT Park in attracting IT players as occupants. IT Parks, especially in developing countries like India, China and Malaysia have the capacity to generate employment for the educated population in the local economy, leveraging the low cost of skilled human resources as compared to developed countries.

Other key lessons emerging from the case studies are as follows:

Having the right product-services mix is critical

Most of the parks that have not underperformed have by and large focused on products and services in which their countries of operation have a competitive edge. Thus, Hitec City in India is focused primarily on IT and BPO services, while ZSP in China is focused on EDP and office equipment, software (China-centric in the form of word processor and digital publishing), and IT services. Similarly, most of the ventures in Taedok Valley have basic and advanced telecommunication as their primary focus. The only exception is Cyberjaya in Malaysia, which appears to have IT and BPO services as the primary revenue earners for its occupants. This is contrary to Malaysia's traditional strength in assembling EDP and office equipment. Malaysia's annual IT and BPO services exports during 2004 were estimated at USD 120 million and USD 40 million respectively—significantly lower than market leaders like India, Ireland, and Canada. The average salary levels in Malaysia are also more

than twice those of India and China, although they are around 30% of near-shore locations like Ireland. Given that the revenues are primarily being driven by captive shared services and data centers of global companies, this seems to be a conscious strategy of leveraging its not-so-distant location and cost advantages vis-à-vis primary outsourcing customers in the United States and Europe.

A supportive and proactive government is key

Each of the case studies underlines the importance of the role of government in the development of successful IT parks. The extent of government involvement has varied in individual countries, with some acting as investors and promoters and playing a key role in managing the parks (for example, in countries like Korea and China), in addition to playing their traditional roles of regulators and facilitators. On the other hand, countries like Singapore have gradually moved to a model wherein development and management of IT parks are primarily carried out by the private sector, with the government ensuring a conducive policy environment. The relatively late entrants like India, Malaysia, and even some of the more recent parks in China like the Dalian IT Park are based on this model. Some countries, like Korea, are gradually moving to a model where the private sector, including foreign investors, are likely to play a major role in the promotion and management of IT parks. Nevertheless, the government is expected to continue to play a key role in terms of formulation of appropriate policies for:

- encouraging innovation through financial and non-financial measures, including protection of intellectual property;
- promoting investments through appropriate financial & tax incentives, together with efficient and user friendly processes for implementing the policies; and
- facilitating capacity building by encouraging mobility of skills, appropriate employment policies, and extending financial support to select capacity building initiatives.

Examples include the Malaysian and Indian governments, both of which have adapted the single window mechanism for providing requisite approvals to IT sector companies through the Multimedia Development Corporation and STPI respectively.

A vibrant and pro-active IT park management team represents an added advantage

In addition to having the right infrastructure and linkages, the relative performance of an IT park is also dependent on the competence and level of initiative of its management team. Consequently, parks promoted and managed by groups/companies with requisite expertise have been found to outperform others. For example, the extensive marketing initiative launched by the private sector promoters L&T Infocity was one reason that Phase I of Hitec City was fully booked within the first four months of construction. The initiative of the management team emerges as a key differentiator not only at the time of marketing the park but also during subsequent operation, particularly for start-ups and smaller companies that are at times dependent on them for the required market and financing linkages. To this end, some IT park management companies like Ascendas have established relationships with organizations specializing in services such as business planning and market assessment and offer these services to occupants. It has also been observed that the private sector inevitably has an advantage on this front, as it has requisite practices in place to reward (or penalize) the respective management teams depending on their performance, unlike governments in most developing countries where performance-based management is still in its initial stages.

1.3. IT Sector Polices and their Impact

As in most other sectors, government policies and interventions have played a key role in the development of the IT sector in individual economies. The role of government has also evolved over time depending on the level of maturity of the sector. While government institutions/organizations in many countries have played a direct role in facilitating development of the sector in the initial stages, the government has shifted to a facilitation role once the sector has attained critical mass, with much of the subsequent growth initiatives being led by the private sector.

1.3.1. Policy Good Practice

An analysis of the regulatory and policy regimes in different countries reveals that most countries have followed a consistent approach to policy interventions for the development of the IT sector. However, the level of direct government involvement varies across individual economies, with some governments adopting a facilitative approach and others opting for direct interventions. For example, while the Government of India has primarily depended on private sector venture capital/private equity investments, China has opted for government-sponsored venture capital funds. Key trends in policy developments that appear to have an impact on the performance of the IT sector as well as policy initiatives that facilitated the growth of IT sectors in general and IT parks in particular, all based on the case studies are discussed below:

Adopting a holistic approach to policy development is key

As development of the IT sector and IT parks is dependent on a number of other sectors like telecommunications, roads, airports, venture capital/private equity, and capital markets, most successful countries have put in place suitable policies for improving efficiencies and service levels in these sectors. Thus, countries like Singapore were some of the earliest to put in place requisite policies for facilitating competition and private sector participation in telecommunications and infrastructure, ensuring effective regulation and development of the financial services sector, including capital markets. Even India, which is categorized as a developing country, has a policy regime that supports private sector participation and competition in most of the supporting sectors, in addition to a well regulated and vibrant financial services sector. On the other hand, countries like China have yet to achieve the same level of maturity in their financial services sector and hence have to depend on government-sponsored venture capital funds for supporting IT sector development.

Efficient institutional and implementation mechanisms are critical

While most countries have adopted regulations in line with established good practice, establishing the proper institutional mechanisms are integral to effective implementation. Most countries have attempted to achieve this by constituting nodal organizations within government for providing "single window services." For example, most of the incentives offered to the IT sector and IT parks in Malaysia are administered through the Multimedia Development Corporation. In India, most of the benefits and concessions are offered through the

Software Technology Parks of India, which has offices throughout the country.

The developer of an IT park requires various clearances for constructing buildings and related facilities in the IT park. Such clearances include building plan sanctioning, fire services clearances, sewerage and drainage clearances, and environmental related clearances. A one-stop clearance agency helps the developer get these IT park-related clearances faster, which helps them reduce time and thus enables reduction in project costs. For example, in Hyderabad, APIIC acts as the single point clearance agency for building and related construction of Hitec Park. Developers have significantly gained from this arrangement.

Intellectual property protection policies represent another case in point. While most countries like China and India have amended their Copyright Acts in line with TRIPS and have also set up dedicated Copyright Tribunals for adjudication, litigants have the option of approaching the existing judicial system as a final recourse. With the existing legal system in both these countries being considered relatively less efficient, value added intellectual property related IT activities such as new technology development have taken a backseat compared to other countries like Singapore and Korea, which have a faster process and a more streamlined judiciary.

Focused policies for IT park development are critical for "developing" ICT economies

Leveraging IT Parks for IT sector development becomes critical in economies like China and India which lag behind developed countries in key ICT indicators. With development of the IT sector being closely linked with "support" sectors like telecommunications and physical infrastructure, it is easier to provide these support services in geographically concentrated zones/areas. Consequently, many of these countries have adopted policies for encouraging development of IT Parks. An example of such a policy is the Information Technology Special Economic Zone (SEZ) policy in India, which offers a number of fiscal and other benefits to companies located in approved IT Parks. On the other hand, countries like Singapore, where the requisite support in terms of world class telecommunication and physical infrastructure is available throughout the country, have adopted policy regimes that are applicable to

all companies in the IT sector, not just to those located in a designated IT park.

Encouraging private sector participation is critical

Almost all countries have adopted a variety of policy mechanisms for encouraging private sector investment, not only in the IT sector, but in developing "support" sectors such as financial services, telecommunications, and physical infrastructure development. Other than a few niche areas such as specific research and development initiatives where government organizations have played a direct role, the government's role in most countries has been that of a facilitator. While in some countries this represents a conscious decision on the part of the government, in others it has also been driven to an extent by existing budgetary/fiscal constraints.

Many of the parks studied were developed through public-private partnerships. Such policies have benefited both the private sector as well as government. For example, in case of Cyber Towers, the Hyderabad state government contributed by providing land, and the private player was responsible for developing the land and constructing the building. Acquiring vast plots of continuous land would have been very difficult and time consuming for the private sector. However, with the government acquiring land through legislative means, the private sector developers were able to ensure that the related facilities were constructed in a record time of 18 months.

Flexible land-use policies providing the developers more choice

Flexible land use polices permit the developer to bundle IT office space construction with construction of other facilities such as shopping complexes, hotels, eateries, and housing complexes. Such bundling makes the project financially more attractive, given that the returns from the commercial/residential end use are typically higher. For example, in CFZ, Malaysia, 500 hectares of land has been zoned as commercial use. In Hitec City, Hyderabad, 40% of the net developable/usable area can be used for housing, a club house, recreational center, shopping center, a school, and other support activities.

Linking incentives/subsidies with identified strengths/core competencies of domestic companies

In developing countries like India and Malaysia, most IT and ITES companies are export oriented, with

the major markets being the United States and Europe. It may be observed that governments in these countries offer a number of fiscal incentives on export income/profit. On the other hand in countries like Singapore, where the target market segment for most IT companies is high-technology, research-intensive products, the subsidies and incentives offered by government agencies are linked to R&D spending. Adopting fiscal policies to suit the strengths and markets of indigenous companies is an effective policy measure to promote the domestic industry.

Effective coordination with other ministries/ departments

It is important to understand that the presence of good policies alone does not suffice. It is equally important that these policies get efficiently implemented. For proper implementation of policies, it is important that there is effective coordination among various government ministries, agencies and departments. Countries have taken different strategies to enable such coordination. In developed countries like Singapore, proper coordination between various departments and ministries administrating the subsides and incentives has been ensured through efficient e-Governance systems. In developing countries like India and Malaysia, a dedicated government agency has been created to administer the subsidies and incentives. For example, in Andhra Pradesh, India, incentives are administered through a high level coordination committee called Consultative Committee on IT Industry, which includes members from various government departments (such as Information Technology and. Communication, Labor Department, Municipal Affairs Department, and Land Department.), utilities (electricity, water supply) and industry associations (such as HYSEA and NASSCOM). This committee is responsible for granting various provincial/state subsidies, resolving implementation issues and prescribing guidelines for industry growth.

Having the right policy mix is essential for maximizing spillover benefits

As has been established through the IT Park case studies, successful development of an IT Park inevitably leads to significant spill-over benefits in terms of other economic activities such as real estate development and vibrant retail, hospitality, and financial services sectors. Many governments have attempted to maximize these spill-over benefits through a suit of policies such as allowing flexible land use, encouraging private sector investments in these sectors for faster development, and motivating IT sector participation in capital markets. Thus, while India provides additional flexibilities to IT & BPO companies for listing on premium stock exchanges in terms of a lower paid-up share capital vis-à-vis companies in other sectors, almost all the IT Parks covered in the study allow mixed land use with a specified proportion of the total land area earmarked for business end use, commercial end use, and residential purposes. It is essential for incorporating such flexibilities to existing policies or promulgating new policies with these flexibilities to maximize economic development.

Fostering efficient linkages with other economies is essential

All successful countries are observed to have policy and regulatory regimes that encourage trade and investment linkages with other economies. Such linkages are usually facilitated through a variety of policy instruments such as liberal foreign direct investment (FDI) guidelines, non-restrictive visa/work permit procedures, unrestricted trade in goods and services, and double taxation avoidance agreements. However, the level of maturity of the individual policies varies, with countries like Singapore adopting a relatively lower duty structure for imports across sectors, while others like India offering a concessional duty structure for all capital goods imports specifically for the IT sector.

Additional flexibilities exist for policy formulation in a federal structure of government

In countries like China, India, and Korea, which follow a federated structure with both central (federal) and state (provincial/local) governments, governments have attempted to differentiate themselves by providing additional benefits/concessions to IT/IT park companies. For example, in India, a number of state governments offer additional flexibilities/benefits, such as subsidies on capital investments and interest payments and offering discounted land prices linked to employment generation. In Korea too, much of the policymaking has gradually shifted from the federal to the provincial governments. Such initiatives have led to differential development of the IT sector in different geographic regions within the same country, with local governments attempting to differentiate themselves through additional benefits/concessions and investor-friendly implementation mechanisms.

For countries aspiring to offer offshore BPO services, formulation of a data protection act is a necessity

In view of the recent breaches in security in various BPO organizations, enactment of a data protection law has become a necessity. This has gained further importance with the data protection directive issued by the European Union (EU), which constitutes one of the biggest markets for providing offshore BPO services. Based on this directive, the United Kingdom has already enacted its 'Data Protection Act'. The EU directive and enactment of Data Protection laws by member countries imply that only countries having data protection laws in line with the EU directives will be favored for off-shoring BPO services from EU member countries. Some countries attempting to emerge as offshore BPO destinations have already formulated policies addressing this issue. In the Philippines, for example, the Department of Trade and Industry has issued "Guidelines for the Protection of Personal Data in Information and Communications System in the Private Sector". The guidelines also provide for an independent third party, namely, Data Protection Certifier, duly accredited by the government, to certify the privacy program of a company and thereafter to monitor and oversee its implementation and enforcement.

1.3.2. Policy Prioritization

It is evident that governments need to undertake a number of policy interventions to develop the country's IT sector. The government's role in facilitating the growth of the IT sector is primarily through developing holistic IT strategies linked to the core competencies of the particular country, such as innovation through R&D activities and low-cost skilled manpower. The country's IT sector growth strategy would require policy enablers, who would form the basis for formulation of specific policy initiatives. Given that implementation of an IT strategy is crucial to economic growth, especially for developing countries, some policy initiatives may have short term implications, like attracting IT players to the country. Other policies have long term implications, like ensuring sustainability of the IT sector. Policies that can be implemented in the short term have an immediate beneficial impact for the sector or "quick wins." The impact of policies typically aimed at sustaining the sector are seen over the long and medium term like for a non-English speaking country to ensure English speaking IT

skilled manpower for the IT sector may take 5–10 years to be effective after implementing the policy initiatives through the school system. Quick wins, although being far from comprehensive solutions in themselves, act as building blocks to a sustainable IT sector development.

1.3.2.1 Short-term Policies

Some of the key priority short term policies are highlighted below:

Provide fiscal incentives to encourage private sector participation

Government needs to provide fiscal incentives to encourage private sector participation in the IT industry. These incentives could be in form of tax exemptions. For example, in India, IT and ITES companies are provided with 100% exemption on profits from export of computer software until 2010. They could also cover areas such as customs benefits, subsidies for employment generation, and equity support for start ups. However, it is also critical that governments not just focus on providing such incentives to the IT companies, but also to support sectors like physical infrastructure development (transportation, telecommunications and real estate). For example, the government of Singapore removed restrictions on telecom licenses to introduce and encourage full competition in the telecom sector. Similarly, in India, the National Telecom Policy of 1999 opened up the telecommunications sector to private players. A number of private sector telecom operators started operations as a result, leading to immediate improvement in the country's communication infrastructure and customer service delivery due to increased competition.

Establish an effective implementation mechanism – single-window nodal agency

Effective implementation of incentive policies is one of the most important factors attracting private sector investment. The establishment of proper institutional mechanisms are integral to effective implementation, with most governments preferring to set up single-window/one-stop services. Such nodal agencies provide a one stop servicing facility for developers of IT parks as well as the occupants/residents of such parks. An example of such single-window/one-stop service nodal agency is Multimedia Development Corporation in CFZ, Malaysia, which is the single point of contact for park occupants for obtaining requisite government approvals and facilitating business linkages with the government.

Create a coordinating committee that fosters linkages with various government ministries/ departments/agencies

It has been observed that developing an IT park requires the involvement of various government ministries, departments, and agencies. It would be beneficial if a coordinating body comprising members from various government departments (like Information Technology & Communication, Labor, Municipal Affairs, and Land) and utilities (such as electricity and water), be formed. Such a coordinating body could be charged with approving an IT Park developers' plans, acquisition of land, and issues relating to utilities & supporting infra-structure. This will also ensure a fast track clearance and approval process. An example of such a commit-tee is the "Consultative Committee on IT Industry" in Andhra Pradesh, which is empowered to grant various provincial/state subsidies, and to resolve implementation issues.

Promote/Facilitate creation of an industry body specifically for promoting and development of IT sector

Steps should be undertaken by the government to facilitate/promote the creation of an industry body for the IT sector, which could represent the indus-try's interests in issues like government procurement, information security, workforce development, intellectual property protection and accounting, finance and taxation, and act as a bridge between industry and policymakers. One of the main objectives of such a body would be to maintain close interactions with the government in formulating the national policy and specific action plans for development of the IT industry. The body's mandate may also include coordinating with foreign govern-ments, embassies, etc. to make the visa and work permit rules more industry friendly; interacting with the education ministries and universities on industry's current & future skills requirements for ensuring necessary changes in curriculum; and campaigning against and generating awareness of software piracy and copyright laws.

Such an organization also offers valuable services to its member organization in terms of encouraging them to improve quality of service, adopt modern technologies and provide innovative solutions through organizing regular interactions/IT sector seminars/meets. The existence of such an organiza-tion also provides valuable linkages between entrepreneurs, investors, organizations and individuals desiring to connect with and mutually leverage complementary skills, services, resources, contacts and talents within the country. This also provides an ideal forum for overseas and domestic companies to explore the vast potential available for Joint Ventures, Strategic Alliances, Marketing Alliances, Joint Product Development, etc. An example of such an Industry Body is NASSCOM in India.

Design flexible land use policies for attracting private real estate players

Flexible land use policies are required to attract private sector real estate players to invest in the development of IT parks, since such policies can ensure higher returns on investments for the developer. Such policies typically allow mixed land-use, i.e., residential and commercial land-use along with industrial land-use. Other means of providing incentives to developers include allowing a higher floor space ratio. The Floor Area Ratio (FAR) or Floor Space Index (FSI) is the ratio of the total floor area of buildings on a certain location to the size of the land of that location. By allowing a greater FSI, government enables the private investor to create more space that can be rented out or sold to occupants, enabling them to realize higher revenues.

1.3.2.2. Long-term Policies

In addition to the above-mentioned short term policies that can be implemented on a priority basis to kick-start the IT sector development, govern-ments should also consider implementing policies having long-term implications for ensuring sustain-ability of the IT sector. These include policies to attract private sector involvement in education; foster linkages with other markets, such as the capital market, to attract private funding; promote corporate governance norms so that even if some short-term measures like fiscal incentives are removed, the continued development of the sector can be ensured. Long-term policies should be aligned to the core competencies of the country. For example, if a country's IT strategy is to focus on encouraging software development to leverage its low cost, educated manpower base, the government would need to improve the legal system to protect and promote proprietary knowledge, as this is often a company's main business asset. As such, laws relating to intellectual property, and the implemen-tation of such laws would be critical to gaining investor confidence.

1.4. Country Case Studies

1.4.1. Country Case Study: Vietnam

Based on our assessment of the IT sector in Vietnam, the following areas represent potential opportunities that can possibly be targeted for growth.

- IT hardware assembly and re-export operations, where Vietnam benefits from a strategic geographic location, which is being leveraged by global players for serving their Asia Pacific markets. The availability of engineering graduates at annual salaries ranging between USD$6,000–$7,000 as compared to USD $9,000–$10,000 in India and China also adds to its competitive advantage. The hardware sector revenues have doubled since 2002, resulting in a CAGR of 20%. A year-on-year growth of 50% was recorded in 2005, primarily driven by growth in exports. With the expansion plans of existing players like Canon and new entrants like Intel setting up facilities in the country, it is expected that the current levels of growth through exports in this sector will continue in the near to medium term. The domestic demand for computer hardware products is also expected to grow at 15% to 18% annually, as more businesses, including the financial sector, move towards increased automation. The domestic hardware market is currently dominated by local hardware assembly operations like FPT and CMS. These local players also represent global hardware companies as resellers of the global players like Toshiba, NEC, and HP. None of the global players have manufacturing operations for serving the domestic computer hardware market. Recently Intel has made a strategic investment of over USD$36 million in FPT to take advantage of the growth in the domestic hardware market.
- Domestic IT services and software sector, driven primarily by the requirements of the financial services sector and an e-government program that is being revived by the government. Global giants like Oracle and local players like FPT have already been contracted to develop software for the World Bank-funded Treasury & Budget Management Information System by the government. Currently, the IT software/services sector, with revenues of USD$250 million in 2005, is small compared to the IT hardware sector, despite having grown at a CAGR of 29% over the past 4 years.

Export revenues primarily from software development activities at USD $70 million in 2005 is largely insignificant. Exports are driven by software companies set up by overseas Vietnamese, mainly serving markets in the U.S., EU and Japan. With Vietnam obtaining WTO membership and having enacted Intellectual Property Protection laws in 2005 (applicable from July, 2006), it is expected that the domestic market for packaged software will achieve significant growth in the medium term once appropriate mechanisms to curb software piracy are implemented.

- Vietnam is well placed to offer back office transaction processing services like finance and accounting, payroll processing, insurance claim processing and other rule-based processing services to U.S and EU based organizations. There is a sizeable population of overseas Vietnamese in these countries, coupled with a favorable time zone difference. However, to effectively develop this sector, Vietnam will have to overcome the twin issues of i) ensuring an adequate supply of skilled manpower and ii) improving quality and reducing cost of international data and voice connectivity. Consequently, this segment of the market is likely to develop over the medium term with adequate government support.

1.4.1.1 Role of IT Parks and Proposed Business Models

Based on our assessment of Vietnam's IT sector and potential growth opportunities, we have attempted to present our assessment of the critical business enablers for developing sustainable IT parks in Vietnam. Our assessment is based on case studies of IT parks in other countries, including Vietnam, as well as the ground realities in Vietnam.

The generic, critical business enablers that are likely to feature in the expectations of all categories of IT companies have been highlighted below.

- Location of the park in an area that permits it to leverage the existing urban and social infrastructure of the two key cities, namely, Hanoi and Ho Chi Minh City (HCMC), as availability of skilled human resources is expected to be a problem in any other region.
- Simplified policy implementation mechanisms in terms of single-window facilities to provide operating licenses, sanction building plans, tax

and customs duty registrations, etc. These facilities would significantly reduce the time needed for setting up new/expansion operations.

- High quality physical connectivity and infra-structure in terms of air (both international and domestic), road and rail connectivity; a combination of multi-tenant buildings with contemporary facilities and build to suit options; adequate road and other surface transport connectivity with the adjoining city; intra-park roads, sewerage, electricity, etc.
- Lease or sale of land for built to suit facilities at rates lower than those prevailing in the adjoining city.
- State-of-art virtual connectivity in terms of data and voice infrastructure, including international connectivity.

Most of the foreign-invested IT hardware assembling units (e.g., Nidec, Canon) already operate out of industrial parks with the park management ensuring provision of basic facilities like quality uninterrupted power supply, water and sewerage treatment, telecommunication facilities, and single-window clearance facilities covering import and export processing formalities. Intel has announced plans to set up its proposed unit in the Saigon Hi Tech Park. However, domestic IT companies generally operate out of offices located in the cities of HCMC and Hanoi, due to the proximity to their clients as well as employees. With these cities offering the same telecommunication infrastructure as the IT parks, these companies do not have much motivation to relocate to IT parks, except those companies having expansion plans. It is expected that in the long term, IT parks will be required in Vietnam for accommodating global IT services players/large domestic players like FPT for setting up their software development centers and BPO facilities.

The IT Park case studies and primary interactions with various stakeholders clearly seem to demonstrate a case for management of the IT Parks to be vested with private sector players for ensuring adequate accountability and efficient service. Possibly, as has been the case in many other countries, existing facility management companies like C B Richard Ellis, and Bovis Lend Lease can be considered for this purpose. Consequently, a facilitation role is recommended for the government other than in situations where the land is owned by it. In such situations, the government can possibly

pick up an equity stake in the development company, given that financial returns on IT parks have been fairly attractive.

1.4.1.2 Policy Enablers

Given that government policies play a pivotal role in the development of the IT sector, we have highlighted policy measures based on good practice adopted for implementation by many countries covered under our study, which the Government of Vietnam may consider :

Policy Good Practice for IT Sector Development

Fiscal Incentives
- Extend reduced business income tax rates of 10% for export-oriented foreign invested IT hardware units, even if they are not located in designated technology parks/special economic zones.
- Introduce specific financing schemes targeted at domestic IT services and BPO companies, possibly through state-owned banks, to help them scale up operations. The government may establish a special fund to refinance bank lending to the sector.
- Exempt business income tax or charge a reduced rate of tax on capital gains made from the sale of equity in listed domestic IT companies to encourage venture capital and private equity funds to invest in the IT sector. This is likely to enable domestic IT companies to obtain funds to scale up their operations and achieve critical business volumes to partner with global players.

Innovation Policies
- Reimburse part/full initial expenditure incurred by domestic IT companies in obtaining quality accreditation such as SEI/CMM/BS 7799 from a special fund established by the government. This scheme may be applicable to those companies obtaining quality accreditation within a specific timeframe, say within the next three years.
- Establish a dedicated tribunal for dealing with disputes relating to infringement of copyright, patents on designs for IT companies. The tribunal would ensure that cases are resolved within a specified timeframe.

Human Resource Policies
- Encourage private sector investment or public-private partnership through income tax concessions in establishing finishing schools to train final year graduate students in requisite skills required for IT services and the BPO sector.

- Establish a high-level multi-disciplinary committee to track the changing needs of the IT sector and future demand for skills; and recommend changes in the curriculum for schools, colleges, and universities. Such a committee should include members from various government departments/ministries, such as the Ministry of Education, Ministry of Post & Telematics, Ministry of Science & Technology and industry representatives such as HCMC Computer Association and the Vietnam Software Association.

Investment Climate
- Encourage e-commerce in the country through enabling laws for establishing legal validity of electronic signatures; institutionalize the process of issue and certification of digital signatures; prevent potential abuses of computer systems for enabling e-commerce transactions in line with similar laws enacted in China, India, Malaysia, Korea, and Singapore.
- Allow foreign direct investment in the telecom sector and remove entry barriers for foreign telecom players preventing them from investing and participating in management of existing telecom companies. Special tax concessions like reduced rate of Income tax for a specified period and import duty exemptions for capital equipment may be considered for global telecom players willing to invest in telecom infrastructure required for the growth of the IT sector in the country.
- Implement a single-window mechanism for providing all benefits, concessions and permits to IT companies. This would require a single agency within government to be identified as the nodal agency, with a presence in all key cities. This agency would then process applications seamlessly in coordination with other ministries.
- Extend all the above concessions to local companies, subject to completion of listing on Vietnamese Stock Exchanges within a pre-defined period and extending additional fiscal benefits on successful listing on international stock exchanges.
- Formulate policies for attracting global venture capital and private equity funds like exemption of tax on income from investments and allowing losses to be deducted from other taxable income.
- Deepen existing capital markets through measures such as demutualization, and attracting large global financial institutions and investment banks.

Policy Good Practice for IT Park Development

Fiscal Policies
- Offer additional business income tax rate concessions/longer income tax exemption periods to IT park occupants, in line with QTSC and SHTP.
- Provide land owned by government for development and to IT park occupants at subsidized rates depending on level of employment generation.
- Support IT park developers by subsidizing rentals for plug and play infrastructure and land lease rates for an initial period (say 3 years), so that a part of these subsidies can be passed on to potential occupants, thereby creating a differentiation vis-à-vis normal office/commercial infrastructure.

Investment Climate
- Permit mixed land use in IT parks, allowing commercial and residential land use together with industrial land use, thereby improving project viability. The proportion of such land use can be fixed, say 30% of the total build-up space.
- Implement a single window mechanism for fiscal concessions and benefits, as well as all required statutory approvals, with a physical presence in the park.
- Extend all the above concessions to local companies, subject to completion of listing on Vietnamese Stock Exchange within a pre-defined period and extending additional fiscal benefits on successful listing on international stock exchanges.

1.4.2. Country Case Study: Russia

Based on our assessment of the IT sector as part of the country case study, the following areas represent potential opportunities that Russia can possibly target:

Domestic Market Opportunities

Unlike many other countries, such as Malaysia, India and China, realizations on domestic IT services in Russia are currently higher than in IT services exports. There also appears to be significant upside as far as growth in the domestic IT market is concerned, with turnover expected to increase to USD$14.32 billion by 2007 (Source: IDC Blackbook, Euromonitor). In terms of individual market segments:

- The demand for hardware is expected to increase by a CAGR of 16.7% per annum to around

USD$10.5 billion by 2007, driven by government spending and industry demand, with many of the customers being in the process of acquiring their first information systems. Based on our assessment of key trends, there appear to be significant opportunities in the semiconductor industry in the near term, driven by increasing over demand from IT hardware, telecommunications equipment and the consumer durables sector. Russia may be well placed to leverage its skilled manpower to target specific segments in this market such as fab less chip design, semiconductor packaging, assembly and testing over the near term.

- IT services, for which the market in 2005 was estimated at USD$1.39 billion, is expected to grow at around 20% per annum to reach USD$2 billion in 2007. With many of the larger companies already having implemented packaged application software (e.g., SAP, Oracle Applications), the growth in this segment is expected to be driven by packaged software implementation and system integration requirements of medium sized-firms in sectors like food, retail, and real estate. The leading packaged application vendors like SAP and Oracle are already gearing up to meet this demand by launching their small and medium enterprise and application service provider (ASP) versions.

- The packaged software applications market is also expected to increase at 20% per annum to reach USD$1.83 billion by 2007. The demand for packaged software is primarily expected from companies in high growth sectors such as oil & gas, energy, metals, communications, and retail, where there is increasing competition leading to efficiency pressures.

Export Market Opportunities

IT export revenues are expected to increase to USD$1.75 billion in 2007, translating to a CAGR of 34%. Based on our assessment, significant opportunities are expected in the following market segments.

- Leveraging the presence of existing global majors in IT and telecommunications (e.g., Intel, Sun Microsystems , Cadence Systems, Samsung) for continuing the focus on high-end development activities in the areas of system software development, and wireless technologies. Given that many of these companies are

also global leaders in areas such as semiconductors and telecommunication equipment manufacturing, expansion of their activities in Russia to cover other areas represents a potential opportunity. These areas include fabless chip design for IT, telecommunication equipment and consumer durables, chip fabrication/foundry facilities and semi-conductor packaging, assembly and testing services.

- Given that the salary costs of IT professionals in Russia are almost half that of other countries like Canada, and Ireland, and lower than in countries like the Czech Republic and Israel, which have successfully positioned themselves as near-shore destinations to countries like the U.S. and UK, there appears to be a significant opportunity for Russia to position itself in this space. The existing competencies of the human resource pool in Russia together with its geographical location are expected to serve as key competitive advantages. Representative offshore activities that can be targeted include the following:
  - Packaged application implementation and maintenance through a mix of onsite and offshore services.
  - System integration services.
  - Software application development for various industry verticals leveraging existing tools.
  - IT infrastructure maintenance and support.
  - Select knowledge process outsourcing activities like mathematical and econometric modeling for sectors like financial services.

- Unlike the high end IT services market proposed to be targeted primarily through captive development centers, the employment (and turnover) potential of this segment is expected to be significantly higher, thereby providing domestic IT services companies the opportunity to scale up rapidly.

1.4.2.1 Role of IT Parks and Proposed Business Models

Based on our assessment of Russia's IT sector and potential growth opportunities, we have attempted to present our assessment of the critical business enablers for developing sustainable IT Parks in Russia, based on the case studies of IT parks in other countries as well as ground realities in Russia. The generic critical business enablers that are likely to feature in the expectations of any IT company interested in setting up operations in an IT Park in Russia have been highlighted below:

- Location of the park in an area that permits it to leverage the existing urban and social infrastructure of the three key cities, namely, Moscow, St. Petersburg and Novosibirsk, as availability of the right quality of human resources is expected to be a problem in any other region.
- Simplified policy implementation mechanisms in terms of single window approval facilities for operating licenses; sanction of building plans; and tax and customs duty registrations to cut down significantly on the time for setting up new/expansion operations.
- High quality physical connectivity and infrastructure in terms of air (both international & domestic), road and rail connectivity, a combination of multi-tenant buildings with contemporary facilities and build-to-suit options, adequate road and other surface transport connectivity with the adjoining city, intra-park roads, sewerage, and electricity.
- Lease or sale of land for built-to-suit facilities at rates lower than those prevailing in the adjoining city.
- State-of-art virtual connectivity in terms of data and voice infrastructure, including international connectivity.

The IT Park case studies and primary interactions with various stakeholders clearly seem to demonstrate a case for management of the IT Parks to be vested with private sector players for ensuring adequate accountability and efficient service. Possibly, as has been the case in many other countries, existing facility management companies like C B Richard Ellis, and Bovis Lend Lease can be considered for this purpose.

Regarding investments into and ownership of the parks, there seem to be a number of private real estate companies like Sistema Hals, Rosevro Development, Leeds Property, and Technopolis with the requisite financial wherewithal for developing such projects. Consequently, a facilitation role is recommended for the government other than in situations where the land is owned by it. In such situations, the government can possibly pick up an equity stake in the development company, given that financial returns on IT parks have been fairly attractive.

Policy Enablers

Given that government policies play a pivotal role in the development of the IT sector, policy measures based on good practice adopted by many countries have been highlighted below:

Policy Good Practice for IT Sector Development

Fiscal Incentives
- Rationalizing customs duty on hardware vis-à-vis components, with simplification of import procedures for attracting global hardware companies.
- Providing tax breaks like exemption from export taxes for an initial period of five years for facilitating increase in exports.
- Providing specific fiscal incentives to semi-conductor companies, such as:
    - Exempting raw materials, equipment imported for fabrication, assembly and testing from customs duty
    - Rationalizing VAT on all semi-conductor products to a lower percentage.
    - Allowing accelerated depreciation rate for profit tax purposes (up to two times higher than the standard statutory rates).

Innovation Policies
- Providing tax breaks to encourage investments in research & development like
    - 100% exemptions on customs duty for equipment and goods imported for research & development ;
    - 100% income tax deduction on capital expenditure with respect to scientific research;
    - a refund of any amount exceeding a certain percentage of VAT paid on sale of software products, provided it is used for R&D purposes;
- Strengthening enforcement of copyright and patent legislations through creation of a dedicated tribunal for dealing with disputes on these issues; and
- Encouraging quality accreditations (e.g., CMM5, BS7799) by providing incentives or grants for reimbursing a part of the expenditure incurred for obtaining such quality certificates or for filing patents.

Human Resource Policies
- Encouraging development of management and business aptitude in engineering and other students through establishment of finishing schools. These schools could be structured as public-private partnerships, with infrastructure being provided by government (in case of

inadequate private interest) and course development and faculty being provided by companies in the IT sector.

- Developing English-language proficiency of the human resource pool through policy interventions like introducing compulsory English education from primary level.
- Setting up committees comprising both government officials and IT industry representatives for assessing requirements for changes to existing curriculum.
- Simplifying visa and associated regulations for IT professionals from other countries traveling on business-related purposes
- Strengthening training infrastructure for meeting IT sector manpower requirements through partnerships with global IT training companies.

Investment Climate

- Implementing a single-window mechanism for providing all benefits, concessions, and permits to IT companies. This would require a single agency within government to be identified as the nodal agency, with a presence in all key cities. This agency would then process applications seamlessly in coordination with other ministries.
- Consolidating the existing policies applicable to IT companies, together with implementation mechanisms, and communicating them in a transparent manner to existing and potential IT sector investors. Possible options include online publishing on the Minsvyaz (Ministry of Information Technologies and Communications) website with links from websites of industry associations (e.g., Russoft, Ankit). Necessary processes for regular updating of these policies would also be required.
- Extending all the above concessions to local companies, subject to completion of listing on RTS within a pre-defined period and extending additional fiscal benefits on successful listing on international stock exchanges.
- Formulating policies for attracting global venture capital and private equity funds like exemption of tax on income from investments and allowing losses to be deducted from other taxable income.
- Deepening existing capital markets through measures like demutualization, attracting large global financial institutions, and investment banks.

Policy Good Practice for IT Park Development

Fiscal Incentives

- Providing fiscal incentives to potential IT Park occupants, which are at least at par with the existing incentives available to IT companies located in Special Economic Zones (Policy reference nos. 116-FZ, 117-FZ, 144-FZ, etc.), to ensure adequate attractiveness of IT Parks
- Providing land owned by government for development and to IT Park occupants at subsidized rates, depending on level of employment generation.
- Supporting IT Park developers by subsidizing rentals for plug and play infrastructure and land lease rates for an initial period (say 3 years), so that a part of these subsidies can be passed on to potential occupants, thereby creating a differentiation vis-à-vis normal office/commercial infrastructure.

Innovation Policies

- Provide incubation facilities and space with world class plug and play infrastructure within the technoparks for start-ups and small and mid-sized IT companies at subsidized rentals for the initial period.

Investment Climate

- Permitting mixed land use in IT Parks by earmarking a proportion of the total land for commercial use (say70%) and residential use (say 30%), thereby improving project viability.
- Extending special concessions to all financial entities like banks, financial institutions, venture capital and private equity funds located in the IT Park. Representative concessions/benefits include exemption of tax on income on such units for an initial period (say 5 years).
- Implementing a single window mechanism for administration of the fiscal concessions and benefits, as well as all required statutory approvals like building plan clearances, environmental clearances and fire clearances. Moreover, such single window clearance agency should be physically present in the Park.
- Extending all the above concessions to local companies, subject to completion of listing on RTS within a pre-defined period and extending additional fiscal benefits on successful listing on international stock exchanges.

1.4.3 Country Case Study: Jordan

Based on our assessment of the IT sector in Jordan, the following areas represent potential opportunities that can possibly be targeted for growth.

Domestic Market Opportunities

At present, the industry is mainly dependant on the domestic market with exports contributing only 20% of the revenues. However, the domestic market in Jordan is limited in size, having grown by only USD$260 million during FY 2001–2004. According to reports published by Int@j, the domestic IT market in Jordan is expected to grow from USD$440 million in 2004 to USD$550 million by the end of 2006. The inherent size of the local economy may not be adequate for sustaining growth of an IT sector comprising 160 companies. Despite the government being the principal domestic client for the industry, and implementing a number of e-governance projects, growth opportunities for the industry appear to be limited.

Export Market Opportunities

IT export revenues grew at a CAGR of 26% during FY 2001–FY 2004. Based on our assessment, significant opportunities are expected in the following market segments.

- Near-shore BPO service provider for countries like the U.S. and U.K., given Jordan's geographic location and with salary costs of IT professionals in the country being comparable with China, India, Philippines and Thailand and much lower than countries like Czech Republic, Hungary, and Ireland.
- Given that the salary cost of IT professionals in Jordan is lower than in other Middle East countries like Saudi Arabia (nearly USD$18,000 per annum) it can position itself as the outsourcing destination for the Middle East. Since Jordan shares a common language (Arabic) with other countries in the region, it enjoys an added advantage in providing voice based outsourcing services for the Middle East market. The outsourcing market in Saudi Arabia, which represents one of the largest countries in the region, is estimated at nearly USD$400 million and is expected to grow at 13% over 2006 to 2010. The existing competencies of the human resource pool in Jordan, together with its geographical location, are expected to serve as key competitive advantages.

- Representative outsourcing activities that can be targeted include the following:
  - Data-based outsourcing activities related to back-office operations such as accounting, payroll processing, insurance payment/claim processing, and internal audit related services. Given that the accounting policies and practices followed in Jordan are aligned to international accounting standards and Jordan already has a mature financial services sector, it may have inherent advantages in the area of finance and accounting.
  - Voice-based outsourcing activities (e.g., technical assistance centers, call centers).

1.4.3.1 Role of IT Parks and Proposed Business Models

Based on our assessment of the IT sector and ground realities in Jordan, the generic critical business enablers likely to feature in the expectations of any IT company interested in setting up operations in an IT Park have been highlighted below:

- Location of the park in an area that permits it to leverage the existing urban and social infrastructures of the capital city of Amman as availability of the right quality of human resources is expected to be a problem in any other region.
- Lease or sale of land for build-to-suit facilities at rates lower than those prevailing in the adjoining areas.
- High quality physical connectivity and infrastructure in terms of air (both international and domestic), road and rail connectivity, a combination of multi-tenant buildings with contemporary facilities and build-to-suit options, adequate road and other surface transport connectivity with the adjoining city, intra-park roads, sewerage, electricity, etc.
- State-of-the-art virtual connectivity in terms of data and voice infrastructure, including international connectivity.
- Simplified policy implementation mechanisms in terms of single window approval facilities in areas such as operating license, sanction of building plans, and tax and customs duty registrations, so as to cut down significantly on the time for setting up new/expansion operations.

The IT Park case studies and primary interactions with various stakeholders clearly seem to demonstrate a case for management of the IT Parks to be vested

with private sector players for ensuring adequate accountability and efficient service. Possibly, as has been the case in many other countries, existing facility management companies can be considered for this purpose. Good practice in other countries clearly indicate the need for management control of the park development company to vest with the private sector for higher efficiency and productivity. Consequently, a facilitation role is recommended for the government other than in situations where the land is owned by it. In such situations, the government can possibly pick up an equity stake in the development company, given that financial returns on IT parks have been fairly attractive.

1.4.3.2 Policy Enablers

Given that government policies play a pivotal role in development of the IT sector, policy measures based on good practice adopted by many countries covered under our study are highlighted below. The government of Jordan may consider these for implementation:

Policy Good Practice for IT Sector Development

Fiscal Incentives
- Allowing local IT companies duty free import of capital goods for use in IT and BPO Services exports.
- Providing fiscal incentives like import duty exemptions on capital equipment; investment subsidies to private telecom companies on investments made in augmenting international data connectivity, initially with a focus on the Middle East, followed by Europe and U.S.

Human Resource Policies
- Establishing finishing schools through public-private partnership to train students in managerial and business aptitude, with the infrastructure being provided by government and curriculum and faculty being provided by IT companies.
- Constituting a committee comprising of government officials and IT company representatives to assess the existing curriculum for specific courses, based on requirements of IT companies.
- Providing fiscal incentives like tax breaks on employee training costs to companies .
- Encouraging local universities to increase intake of students in finance and accounting, and motivating students to pursue this area through targeted financial support

Investment Climate Policies
- Implementing a single window mechanism for providing all benefits, concessions and permits to IT companies. This would require a single agency within government to be identified as the nodal agency, with a presence in all key cities, which would then process applications seamlessly in coordination with other ministries.
- Extending all the above concessions to local companies, subject to completion of listing on Amman Stock Exchange within a pre-defined period and extending additional fiscal benefits on successful listing on international stock exchanges.
- Supporting listing of IT companies on Amman Stock Exchange through measures such as lower threshold of paid up capital requirements and reimbursing initial listing fees.
- Formulating policies for attracting global venture capital and private equity funds like exemption of taxes on income from investments, and allowing losses to be deducted from other taxable income.

Policy Good Practice for IT Park Development

Fiscal Incentives
- Providing incremental fiscal incentives to potential IT Park occupants like corporate tax holidays for an initial period (say 5 years).
- Providing land owned by government for development and to IT Park occupants at subsidized rates, depending on level of employment generation.
- Supporting IT Park developers by subsidizing rentals for plug and play infrastructure and land lease rates for an initial period (say 3 years), so that a part of these subsidies can be passed on to potential occupants, thereby creating a differentiation vis-à-vis normal office/commercial infrastructure.

Innovation Policies
- Provide incubation facilities and space with world class plug and play infrastructure within the IT parks to start-ups and small and mid-sized IT companies at subsidized rentals for the initial period.

Investment Climate
- Permitting mixed land use in IT Parks by allowing a proportion of the total land for other land uses like commercial, institutional and residential, which fetches greater returns and thus improves the financial viability of the project.

- Implementing a single window mechanism for fiscal concessions and benefits, as well as all required statutory approvals, with a physical presence in the Park.

- Extending all the above concessions to local companies, subject to completion of listing on the local stock exchange within a pre-defined period and extending additional fiscal benefits on successful listing on international stock exchanges.

IT Sector: Alternate Development Models

2.1. The Importance of ICT in Development

The contribution of the Information and Communication Technology (ICT) sector to socio-economic development is well acknowledged. A number of studies conducted by the United Nations Conference on Trade and Development (UNCTAD) and other development agencies have clearly established the close linkage between usage of ICT and macro-economic growth across various countries. The key constituents of this linkage include:

■ Contribution of the ICT sector to the Gross Domestic Product of the country through economic activity and trade.
■ ICT usage by citizens which results in a more informed and connected society with global expectations.
■ ICT deployment by government for enabling efficient service delivery, improving transparency and effective monitoring.
■ Businesses leveraging ICT to bring about changes to core business processes like supply chain a logistics, thereby augmenting operational efficiencies.

As is evident from the above, the importance of ICT primarily stems from its ability to be used as a tool to bring about improvements in efficiency. Consequently, while use of ICT is easy to identify, sizing of the sector is relatively difficult as, unlike a conventional sector, a significant portion of the value added would originate from firms (e.g., banks, manufacturing companies) which may not be within the sector. Before going forward, it is therefore important to clearly delineate the different components of the ICT sector. Based on an analysis of different existing classification systems (e.g., NACE, OECD, SIC) the ICT sector has been categorized into the following for purposes of the current analysis:

■ ICT goods
  ■ Electronic Data Processing (EDP) and office equipment
  ■ Telecommunications equipment
  ■ Integrated circuits and electronic components
■ ICT Services
  ■ Information Technology (IT) Services such as system integration, software development and maintenance, network infrastructure management, IT application outsourcing, and packaged software support
  ■ Business process outsourcing (BPO) services in the areas of customer care and support, finance and accounting, human resources, content development, etc.

It should be noted that while communication-related software and product development are included under ICT services, telecommunication services like landline and mobile phone services have been excluded from the current analysis. Consequently, the term Information Technology (IT) has been used in lieu of ICT for the remaining part of the report.

2.2. The Global IT Sector

Given the differences in classification and deficient information-collation mechanisms in different countries, it is extremely difficult to accurately assess global IT sector revenues. Nevertheless, global IT sector turnover was estimated at around USD$1,700 billion during 2004[1].

While information on domestic IT sector revenues are impacted by inconsistencies in definitions and deficient information-collection mechanisms, another key parameter that can be used for

1   United Nations Conference on Trade and Development (UNC-TAD) Information Economy Report 2005

assessing the performance of the sector is the value of trade in IT goods and services between different countries.

As per the International Trade Statistics, 2005, collated by the World Trade Organization, aggregate global exports of IT goods and services was around USD$1213 billion during 2004, with services accounting for around 7% of aggregate exports. An analysis of the trade statistics reveals the following:

- The 5 largest IT goods exporters included the European Union (EU) (28% of global IT goods exports), China (23%), United States (11%), Japan (9%) and Singapore (8%).
- EDP and office equipment exports accounted for around 37% of total IT goods exports, followed by telecommunication equipment (34%) and integrated circuits & components (29%).
- Korea had the largest trade surpluses in IT goods at USD$47 billion, followed by Japan (USD$38 billion) and Singapore (USD$24 billion). China, United States, and the EU emerged as net importers of IT goods (please refer to Figure 1 below for details).
- Significant regional trade flows have been discussed below.
  - EDP and office equipment exports from China to the EU and United States were around USD$22 billion and USD$24 billion respectively. Within Asia, China was the single largest exporter, with exports of USD$9 billion to Japan and USD$2 billion

to Korea. However, Korean EDP and office equipment exports to China were worth around USD$6 billion. Significant trade flows also exist between the United States, Canada, European Union, and Mexico, with aggregate U.S. exports to these countries being around USD$27 billion.
- Telecommunications equipment exports from Mexico, China and Japan to the United States aggregated $18 billion, USD$17 billion and USD$10 billion respectively. The EU represented another major market, with telecommunication equipment exports from China, Japan, Korea being of the order of USD$15 billion, USD$11 billion and USD$9 billion respectively. Within Asia, China and Korea are the dominant players catering to most of the regional demand for telecommunication equipment.
- The United States is one of the largest exporters of integrated circuits and electronic components globally, with exports of USD$49 billion to the EU (USD$5 billion), Mexico (USD$6.5 billion), Korea (USD $4.6 billion), China (USD$3 billion) and Japan (USD$2.4 billion). It is closely followed by Singapore with exports of USD$47 billion, which caters largely to the requirements of the EU, China, Japan, and Malaysia.

Based on an analysis of trade flows, countries like China, Korea, Malaysia and Singapore appear to be significant players in EDP and office equipment. South Korea and Japan are the global leaders in telecommunication equipment, while the United States, Singapore and Japan enjoy global leadership in integrated circuits and electronic components. While the EU contributed significantly to global trade flows, around 70% of its exports and 50% of imports are from/to countries within the Union. The other key trading partners of countries within the EU include the United States and China. Within the EU, exporters of ICT goods primarily include countries like the United Kingdom, Germany, Ireland, and the Netherlands, which have established IT goods manufacturing facilities. Key importing countries within the EU include Luxembourg and Spain.

As per the existing classification system followed by the World Trade Organization, IT services are categorized under other commercial services. Total

Figure 1. *Key Players – IT Goods Trade, 2004*
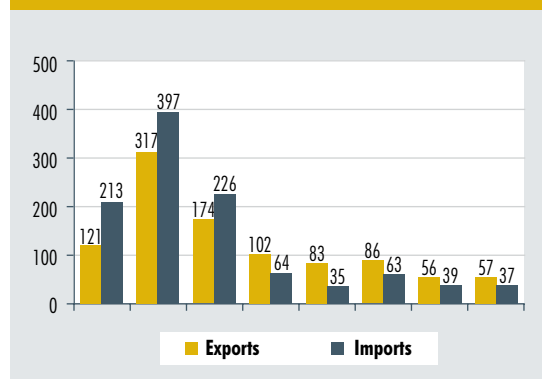
Source: WTO Trade Statistics, 2004 and PwC analysis.

Figure 2. *Key ICT Indicators for Different Countries, 2004*

Parameters	Korea	Malaysia	China	India	United States	Japan	Germany	Singapore
Social Indicators								
Total Population (millions)	48	25	1296	1080	294	128	83	4
Urban Population (%of total population)	81	64	40	29	80	66	88	100
ICT Sector Indicators Access:								
Telephone lines (per 1000)	467	176	241	43	606	531	660	430
Internet users (per 1000)	656	392	73	23	569	606	472	559
Personal computers (per 1000)	558	170	40	11	760	425	440	565
Mobile Subscriber (per 1000)	760	573	258	48	615	669	858	891
Population covered by mobile Telephony (%)	99	96	73	41	95	99	99	100
Quality:								
Broadband subscribers (per 1000)	247.6	10	16.5	0.6	129.1	145.8	83.6	118.2
International Internet Bandwidth (bits/person)	993	127	57	4	3308	1038	6850	5699
Affordability:								
Price basket for fixed line (US$/month)	7.3	8.7	3.6	3.2	25	26	17.5	6.7
Price basket for mobile (US$/month)	2.1	5.6	3.7	3.2	10.8	29.1	30.6	5.7
Price basket for internet (US$/month)	9.7	8.4	10.1	8.7	15	21.1	14.1	11
ICTExpenditure (% of GDP)	6.6	6.9	5.3	3.7	8.8	7.4	5.7	10.4

Source: World Bank, UNDP, ITU and others.

exports of other commercial services were estimated at around USD$750 billion during 2004. Assuming the share of IT Services at 2003 levels of 8%, total IT Services exports would be around USD$60 billion. However, there is a possibility that specific areas like BPO services may have been classified under other business services, which constitutes a significant part of other commercial services.

Other than the United States, Germany, United Kingdom, China, and Korea, which also have a significant domestic IT services market and are key players in IT goods exports, the market leaders in global IT services exports include countries like India, Ireland, and Canada, which have limited contribution to global IT goods trade flows. However, the IT services exports of these players is significantly more than countries such as China and Korea.

The level of maturity of the ICT industry in individual countries is also a key determinant of its relative positioning in IT goods and services. Consequently, countries like the United States,

United Kingdom, Germany, and Japan, which were early starters and have already made significant progress in ICT access and quality have well-developed domestic IT goods and services markets and are currently more focused on research and development. Their exports primarily comprise high-end products like specialized integrated circuits, chips, and system software. Then come countries like Korea and Singapore, which also have mature ICT markets and have assumed the role of prominent hardware manufacturers capable of manufacturing key components such as LCDs, CRTs, and DRAM and replenishing new peripherals and devices as the market progresses. The third tier includes countries such as China, Malaysia, and India, which generally started focusing on the IT sector during the mid to late nineties. They have successfully leveraged their cost advantages to emerge as assembly bases for computer hardware, manufacturers of standardized peripherals, etc. or as in the case of India, developers of application software, and providers of IT and BPO services. A comparison of key ICT development indicators for representative countries in each of the three tiers has been presented in Figure 2 above.

2.3 Science & Technology Parks in the IT Sector: A Global Phenomenon

Innovation has been one of the primary drivers of economic development across different countries. It has been at the core of new business opportunities in a world that is rapidly shifting from resource-based economies to those that are focused on the management and application of knowledge. Innovation, more than the application of labor and capital, has been the major driver of knowledge economies. It accounts for more than half of all growth in modern economies. While industries built on leading-edge technologies such as IT, biotechnology, and engineering are often seen as characteristic of a knowledge intensive economy, innovation has the potential to transform almost all industry sectors.

Science and Technology Parks, typically involving tertiary institutions or other research organizations, have become an established part of the innovation infrastructure in many economies. They represent an economic development tool that is particularly suited to developing regional knowledge economies. In appropriate regional environments, these parks have been found to provide a specialist mechanism to promote and stimulate commercial and industrial innovation, encourage re-industrialization, and foster sustainable regional development infrastructure options.

Within the broad tapestry of economic development tools, the special and unique role that science and technology parks usually perform is to:

- Recruit and co-locate new and established knowledge-based companies;
- Promote innovation based on 'smart' technologies;
- Provide an interface or shared research environment for research organizations and private industry; and
- Leverage local knowledge resources to enhance a region's economic base.

Given the high innovation content in the IT sector, it is therefore not surprising that most of the successful countries in the sector have focused on setting up science and technology parks for developing the sector. While the nomenclature (for example, Science Park in the United States, Europe, and Singapore;

Technopolis in Korea, IT Park in India) and models of development may have been different, the underlying principle has been common, namely to seek synergy and exploit advantages through networking of different market participants such as IT companies, universities, and research & development institutes, and infrastructure service providers.

One of the earliest initiatives in IT Park development was undertaken in the United States more than 50 years ago, when a Science Park was created within the Stanford University campus. Historically, Science Parks in the U.S. were established by universities to complement academic programs and generate additional revenue, leveraging their academic enterprise and research capabilities, land resources, and encouraging greater academic entrepreneurship (Source: Y. Zhang, 2005). Besides Science Parks being established in the academia environment, IT clusters also developed with organizations establishing mutual linkages amongst themselves. The Silicon Valley is an example of one of the highly acclaimed IT habitats in the world that has inspired the setting of IT Park all across the world.

2.4 Developing Economies, the IT Sector and IT Parks

Developing countries are increasingly looking towards the IT sector for accelerating their economic growth. Two countries that have made significant progress in this sector are China and India. The importance of the IT sector can be brought out by analyzing the sector's contribution to GDP and exports, along with the rate of growth of the industry as compared to growth in GDP. The IT sector has over time become a significant contributor to their economies. IT industry's share in the Indian GDP was 1.2% in FY2000 which increased to 4.8% in FY2006. In China, the sector's contribution to the GDP was around 4% for the period 1996–2000, which further increased to 5–7% for the period 2001–2005.

IT exports have grown at a rapid rate for both these countries. According to OECD data[2], China today

is one of the largest exporter of ICT goods with exports of around USD$180 billion. China's share of world trade in ICT goods reached USD$400 billion in 2004 as compared to USD$35 billion in 1996, a growth rate of around 38% for this period. According to Information Technology Annual Report 2006 published by the Department of Information Technology, Government of India, the software and IT-Enabled Services (ITES) exports from India increased from USD$6.3 billion in FY2001 to 17.7 billion in FY2005, the CAGR being 28% for this period. It is expected that the exports will grow by 32% in FY2006. The growth of the IT sector is outpacing the growth in the country's GDP for India and China. The Indian IT sector has grown at the CAGR of 28% for the last five years (2000–2005) whereas the GDP growth rate during this period has been in the range of 6–8%.Similarly in China, ICT sector's annual growth rate has exceeded 20% for the period between 2001–2006, whereas the GDP has grown between 8–10% for this period.

The global market for offshore services is expected to increase from USD$81 billion in 2005 to USD$252 billion in 2010,with the market size for IT Services estimated at USD$93.1 billion, Knowledge Process Outsourcing (KPO) services at USD$31 billion, R&D & engineering services at USD$19 billion, Business Process Outsourcing (BPO) services comprising back-end transaction processing services at USD$60 billion and contact centers at USD11.4 billion. (Source: Gartner, IDC, Neo-IT, A.T. Kearney Research). The key drivers for the expected growth in offshore services will be availability of low cost qualified manpower, in addition to having access to world-class communication facilities. Developing countries are expected to leverage such offshore market opportunities to develop their IT services sector, which is expected to play a significant role in generating employment opportunities and economic growth.

The developing countries have increasingly relied on IT parks as a preferred tool for promotion of IT industry. These countries are often constrained by severe infrastructure limitations. It is easier to provide world class infrastructure in select areas. The developing countries like India and China have concentrated state-of-the art physical, communication and social infrastructure in IT parks to enable IT companies to operate. On the other hand, developed countries like Korea, Japan, and others are often driven by the need to develop new technologies through networking between companies, research and development institutes, and centers of excellence.

The ownership and operating models for IT Parks have also been varied. While government ownership (usually the Ministry of Science and Technology) and management has been the dominant trend during the initial period of development, most developed countries today have well-established networks for private promotion and management of IT Parks.

Unlike other industrial clusters, IT parks are not constrained by factors such as the availability of natural resources, or raw materials. The key resource requirement is availability of quality manpower. One of the main reasons for the success of China and India in the IT sector can be attributed to their highly educated and skilled manpower. It has been observed that IT parks generate spillover effects, leading to a virtuous cycle of local economic development. IT park development helps generate impetus to local development of industries such as real estate, retail, and lifestyle and recreation.

Despite all these differences, IT Parks have been found to be an inseparable part of IT sector development and need to be carefully assessed to bring out good practice that can then be applied in the context of countries aspiring to make their presence felt in the IT sector.

IT Parks: What Has Worked and What Has Not

3.1. Evolution of Science and Technology Parks

The United States and select countries in Europe were the first to set up dedicated Science Parks during the sixties. Unlike the sector-specific parks in vogue today, many of these parks were set up to cater to the requirements of multiple knowledge or technology intensive sectors such as engineering, chemicals, and electronics. In Asia, the phenomena of setting up dedicated parks to enable knowledge sharing started in the early seventies, with countries like Japan and Korea taking the lead. However, many of these Parks primarily had government research and development institutes and universities as occupants, with limited representation from non-government business ventures. Consequently, the focus continued to be on basic research and converting research outputs to product prototypes, which could then be taken up for commercial purposes.

It was only in the late seventies and early eighties that the non-government sector started to play a role in this sector. The trend started with a number of applied research and development organizations promoted by private businesses setting up operations in the park to avail the benefits of government support to research and development. This gradually gave way to manufacturing facilities being set up in designated areas of the park and ultimately, a substantial portion or the entire operations of the business venture getting relocated to the park. By this time, with markets opening up, international trade flows and inter-regional technology transfer arrangements also started to impact knowledge or technology intensive sectors in particular.

The resultant impact on science or technology parks was two-fold, namely i) With individual sectors achieving critical mass and becoming more specialized, many parks started acquiring a sector or industry specific character and ii) Issues like intellectual property protection, promoting local enterprises for regional development, establishing backward and forward linkages became increasingly important and many existing parks reoriented their business models to provide these services. The role of the non-government sector in park management also increased as many of these services were of a specialized nature. Simultaneously, with most of the sectors achieving self-sustainability, the role of the government became primarily that of a facilitator and regulator from that of an investor and driver.

Current science and technology parks can therefore be categorized into two types, namely i) Horizontal parks straddling a number of sectors and ii) Sector-specific parks in knowledge/technology intensive areas.

3.2 Our Approach

The first step in the assessment included identifying five countries for further analysis, based on an assessment of the relative competitive positioning of individual countries as detailed in the previous section. Given the relatively higher focus of the current study on developing countries, 3 developing countries were included in the final sample in addition to 2 developed countries.

Next, a total of 6 IT Parks were identified across these countries so as to constitute a representative sample covering both i) successful and not-so-successful IT Parks and ii) IT goods as well as IT and BPO services. As a first step, an attempt was made to understand the relative performance of individual IT Parks through key parameters like number of occupants vis-à-vis years of operation, nature and credibility of occupants, and relative importance in the country's IT sector.

Figure 3. *The CLIP Framework*

Capital
- Sources of Debt
- Ownership
- Private Equity/ Venture Capital
- Anchor Occupants
- Business Incubator

Linkages
- Market
- Value Chain
- Internal Services
- Centers of Excellence

Infrastructure
- Land
- Physical Infrastructure
- Communication Infrastructure
- Social Infrastructure
- Environment

People
- Quality
- Salary
- Throughput
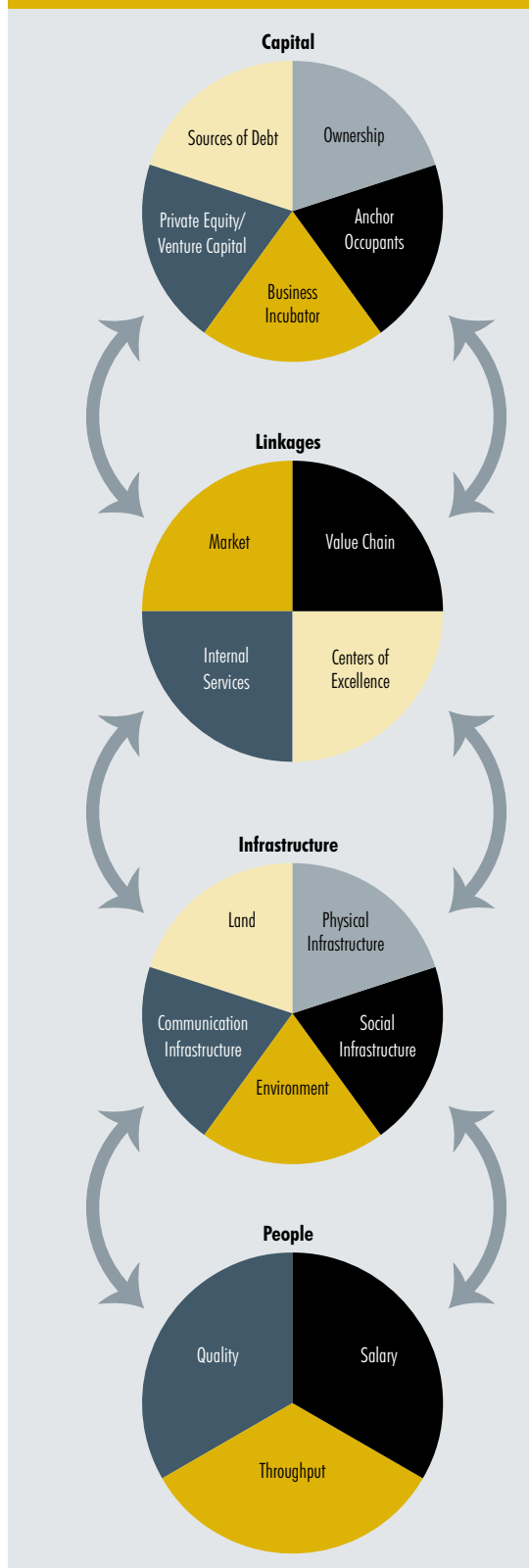
3.2.1 The CLIP Framework of Analysis

The individual dimensions of the CLIP framework, namely, **C**apital, **L**inkages, **I**nfrastructure and **P**eople were then used for assessing individual IT parks. The individual parameters of the framework have been explained below.

- **C**apital attempts to assess i) Investment, ownership, and management-related issues of the IT Park in terms of how it has been funded, role of the government and the private sector; ii) Mix of anchor occupants and early stage companies in the park, and iii) Provision of business incubation services by the park management and availability of private equity/venture capital and other means of financing.
- **L**inkages include i) Nature of products & services offered by key occupants and their fit with the target markets; ii) Assessment of forward & backward linkages of key occupants of the park; iii) Relationships between key occupants and resource organizations such as academic institutions and R&D centers, given the nature of products & services offered by key occupants; and iv) Value-added services offered in terms of market access, business planning and operational support, developing appropriate linkages within and outside the park, etc.
- **I**nfrastructure addresses i) Availability and relative cost of land/space; ii) Quality of physical infrastructure in terms of connectivity, urban infrastructure, etc.; iii) Nature of social infra-structure such as recreational facilities, and remoteness ; iv) political stability and law & order and v) Intra-park, domestic and interna-tional data and voice connectivity.
- **P**eople issues in terms of i) Quality of educa-tional institutes; ii) Annual employee salaries and benefit levels and iii) Availability of people both in terms of numbers and skill-sets.

3.3 Taedok Valley, Taejon, Korea

3.3.1 Background

Taedok Valley is located about 150 km south of Seoul and represents one of the first science & technology parks in Korea. The development of the valley started in 1973–74 with the construc-

tion of Taedok Science Town (TST) by the Ministry of Science and Technology, government of Korea, as part of an effort to overcome the increasing population (and consequently infrastructure) pressures on Seoul and develop additional centers of innovation and growth. The overall objective of TST was to foster closer links among research institutes, academia, and industry through the effective placement of government supported research institutes. The site was strategically selected so as to be close to the city of Taejon, one of the largest cities of Korea and the headquarters of the Korean Armed Forces. The development of Taedok Valley took place over a period of 20 years and included the following major milestones[3]:

- 197–74: Basic planning and commencement of construction of Taedok Science Town, comprising research & educational facilities, residential zone, commercial zone (for industrial enterprises) and green or open zone.
- 1977: Announcement of Taedok Industrial Base Development Area comprising 2 Industrial Parks supported by the research & development (R&D) institutes in Taedok Science Town.
- 1978: Commencement of relocation of key government research & development institutes such as the Korea Advanced Institute of Science and Technology (KAIST) and Electronics and Telecommunication Research Institute (ETRI).
- 1983: Merging of Taedok Science Town with Taejon City.
- 1990–98: Completion of phased relocation of government supported R&D and academic institutes; Commencement of Science Expo facilities and first exhibition in 1993; Passing of the Taedok Science Town (TST) Administration Act in 1993 designating Taedok Science Town Administration Office (TAO), Ministry of Science and Technology as the nodal agency for administration & management; Setting up of R&D facilities by large private sector players such as LG, Hanwha, Shinsung, and Dacom.
- 1999–2004: Reform of the TST Administration Act in 1999 with a focus on R&D commercialization promotion, setting up of business ventures; Patent Court relocated to Taedok in 2000; Special law for Taedok R&D Special Zone in 2004

3.3.2 Applying the CLIP Framework to Taedok Valley

Capital: The estimated total investment in Taedok Valley was USD$ 4.8 billion, out of which around 50% represented investments in industrial units/clusters and private sector R&D institutes. The balance was funded by the Ministry of Science and Technology, government of Korea. In line with government policy trends in Korea, the park is managed by Taedok Science Town Administration Office (TAO), which is an arm of the Ministry of Science and Technology. The key functions of TAO include effective utilization & management of land in line with regulatory guidelines, preserving the green zone and natural landscape and providing effective support to the occupant organizations.

More than 800 companies operate out of Taedok Valley, with around 45% being in the IT sector, 20% in biotechnology and the others focusing on areas such as chemicals and plastics. There are around 3 companies with annual revenues of over USD$30 million and another 5 companies with revenues exceeding USD$11 million. It also houses 399 research institutes, 21 public institutes, and 24 universities. Venture capital support is provided through the Taedok Angel Mart and a dedicated venture capital fund, with cumulative investments having exceeded USD$20 million. However, a number of large Korean conglomerates such as LG and Daelim have dedicated R&D facilities in the Science Town and serve as anchor occupants.

Linkages: The focus of IT sector occupants is primarily on areas such as basic and advanced telecommunications technology, telecommunication network operating technology, and data communications, in line with the relative competitive strengths of South Korea. Most of the units cater to the domestic and export markets. R&D support is available from the government-promoted Electronics and Telecommunications Research Institute(ETRI), as well as private R&D institutes set up by entities such as Dacom and Korea Telecom. The park also has an international intellectual property training institute which supports capability development in this area. There are around 23 business incubator centers, which offer marketing and sales support

3   Chungnam Development Institute, "The growth of Daedeok Valley and R&D special zone plan" 2005. (*http://www.rieti.go.jp/users/cluster-seminar/pdf/015_e.pdf*)

through focused technology transfer fairs and other events.

Infrastructure: Spread over an area of over 6,800 acres, Taedok Valley includes a i) residential zone, ii) commercial zone housing the industrial parks, iii) research & educational zone and iv) a green or environment-friendly zone. The cultural and social amenities include convention & concert halls, a sports complex, swimming pool, and athletic parks. The Valley is about 30 minutes from the Cheon Gju International Airport and is also well connected domestically through 3 major highways and 2 railway networks. Data and voice connectivity is provided by Korea Telecommunication Authority, which also has a dedicated international gateway in the region. There are around 13 buildings identified for business ventures, which are offered at discounted rents to occupants.

People: In line with the focus of Taedok Valley, the total number of scientists and researchers deployed in the research institutes, government institutes, universities, and businesses is estimated at over 25,000. There are 3 higher education institutions within the Valley, namely Korea Advanced Institute of Science and Technology (KAIST), the Chungnam National University and Chungnam college, all of which are government promoted, with a cumulative throughput of over 30,000 highly qualified resources. Around 3,300 patent applications originated from the Valley during 2001, translating to a ratio of 23.2 patents per 10,000 persons.

3.3.3 Key Lessons

Considering that the primary objective of TST was encouraging innovation through fostering linkages among research institutes, academia, and industry, the park appears to have attained a degree of success as is evident from the profile of its occupants. TST's success in innovation can be measured by patents generated from the park, which was 23.2 patents per 10,000 people in 2001, as compared to the national average of around 7 patents per 10,000 people. The R&D investment in the Park for year 2002 was $1,997.7 billion (2.1 billion USD), which was 12.4% of the total national R&D investment.

The key lesson from the TST case study is that good linkages amongst park occupants, like industry, academic institutes and research & development institutes, is one of the essential factors for facilitating innovation through development of new product and services. IT Parks, which focus on R&D, should be developed in proximity to good academic or R&D institutes and/or should be housed in the campuses/neighborhood of such institutes.

3.4 Zhongguancun Science Park (ZSP), China

3.4.1 Background

Zhongguancun Science Park (ZSP) is located in the northwest of Beijing, about 15km from Tiananmen Square. Zhongguancun, in the Haidian District, was selected by Chen Chun Xian, a nuclear physicist, as the location for the first non state-owned science & technology company in 1980. By 1986, it was home to more than 100 non-state owned S&T companies, with its main street acquiring the name of "Zhongguancun Electronic Street". In May 1988, the State Council approved the setting up of the Beijing Experimental Zone in Haidian, which marked the formal development of ZSP.

The objectives for establishing ZSP are three-fold; (i) economic development through the promotion of hi-tech industries, (ii) employment generation, and (iii) creation of a base for innovation in the field of science and technology.

The park has been in existence for the last 18 years and has achieved the following milestones during the course of its journey to becoming one of the largest science and technology parks in China[4].

- 1991: Beijing Shangdi Information Industry set up as the first incubator in ZSP.
- 1992: Fengtai Science & Technology Park and Changping Science & Technology Park were established.
- 1994: ZSP was classified as a single zone including multiple parks.
- 1997: ZSP sponsored the first annual Zhongguancun Computer Fair and it also became the first group network member of APEC Science Parks.

4   Xiaomin, Wang. "Zhongguancun Science Park: A SWOT Analysis", Visiting researchers series no. 10(2000), Institute of Southeast Asian Studies, May 2000

- 1998: The Overseas Students Pioneer Park was established within ZSP.
- 1999: The State Council approved "Request for instruction on actualizing the strategy of flourishing country by science and education, and accelerating the construction of ZSP", thereby leading to the constitution of the current ZSP Management Committee, which was subsequently vested with the powers of municipal economic administration in the park.
- 1999: Three companies, namely, Beijing Science Park Construction Co Ltd, Beijing Science Park Bidding Co Ltd, Beijing Zhongguancun Science Guarantee Co. Ltd. were established to speed up the construction of facilities within ZSP.

3.4.2 Applying the CLIP Framework to Zhongguancun Science Park

Capital: From its inception in 1988, the government has been funding facilities development in ZSP. The park is managed by the ZSP Management Committee, which comprises nominated members of different government bodies (e.g., municipal management committee, different municipal departments). The major services offered by the park management committee include land use and facilities planning, investment services, labor management, business services, and environmental protection.

The occupants of ZSP primarily include IT companies (68% of total number of companies), optics-machinery-electronics integration companies (10%), and new materials, new energy and environmental protection companies (12%). According to the 2004 Beijing Statistical Handbook, there are more than 12,000 enterprises across ZSP's seven parks. However, only 10–20 companies, such as the Stone Group Corp., Legend Group Corp., and BD Founder Group, which are market leaders in their respective fields, have revenues over USD$200 million, with another 100 companies managing to cross USD$10–20 million in revenues. Around 20% of companies represent joint ventures with investment from countries such as the United States and Japan. There are also around 1,500 R&D centers and hi-tech companies set up by global companies such as Microsoft, IBM, Intel, Sun Microsystems, and Mitsubishi. The balance includes small companies and start-ups which are involved in trading or copying media. Despite the existence of domestic venture capital funds of over USD$150 million

managed by the Beijing Municipal government and loan arrangements with commercial banks, these companies find it difficult to mobilize resources as there is a pronounced policy preference towards the larger companies.

Linkages: Companies in ZSP account for over 40% of the total software and IT services sales in China, primarily due to large companies like the Stone Group (80% share of the Chinese word processing market), Founder Group (market leaders in Chinese electronic publishing), Legend, Taiji, Nantian (leading system integrators). It also has companies like the Legend Group, which is not only competing for domestic market leadership but also features in the top 5 exporters of PC mother boards and add-on cards. Many of these firms have benefited significantly from their association with universities/centers of learning like Beijing University and Tsinghua University, and research institutions located in this area.

In ZSP, 39 institutions of higher education under Beijing University and Tsinghua University are present. There are 213 national scientific institutions and laboratories represented by the Chinese Academy of Science and Chinese Academy of Engineering present in ZSP which have excellent linkages with the companies located in this park. The presence of R&D centers and the research institutes has lead to more than thousand sophisticated discoveries from this park.

Infrastructure: By virtue of its location, the park is able to leverage Beijing's extensive road and rail connectivity, urban infrastructure, social infrastructure and amenities. It uses optical fibre for internal data connectivity, backed up by international gateways in Beijing. Voice connectivity is provided by China Telecom. Over time, there have been concerns on increasing land prices and property rentals. Land is owned by the government and leased out to the occupants. Typical lease period is 70 years.

People: Haidian district is home to 68 universities and colleges that produce high quality graduates for ZSP. Haidian is an educationally advanced district, with over 25% of the population having received higher education. In ZSP, 39 universities are located including Peking University and Tsinghua University with a total of student population of

400,000. From these universities around 100,000 students graduate each year.

The quality of manpower at ZSP is also quite high, as is evident from the over 55% university degree holders, 36% bachelors' degree holders and 19% Masters' degree holders or PhDs. ZSP enjoys close proximity with the prestigious Qinghua University, Beijing University and the Chinese Academy of Science. Around 3,218 patents were applied for from ZSP in 2004. The park also has a set of policies for encouraging overseas students and professionals to set up their own enterprises in ZSP. In 2004, over 5800 returned overseas Chinese students and scholars have started their own enterprise in ZSP. During 2003, more than 83,000 new jobs were created in ZSP with the total staff employed reaching around 489,000. Currently, it is estimated that around 650,000 persons are employed in ZSP. The average annual salary of IT professionals at the middle management level is around USD$10,000 to $12,000.

3.4.3 Key Lessons

ZSP is the pioneer of Chinese Science Parks and is also the largest, with an average annual growth of 20–30% over the last 10 years. ZSP contributes around 60% of the annual industrial growth of Beijing, with its business income accounting for 18% of the total income of all 53 Chinese hi-tech parks in 2001. Today, ZSP is considered to be a model for other science parks in China to replicate.

Key factors that contributed to the success of the park have been detailed below:

- Attractive fiscal incentives provided by the government to firms located in ZSP, including additional tax waivers, income tax benefits on expenses related to R&D activities, technology transfers and technology consulting. These incentives along with availability of world-class infrastructure within the Park have attracted well-known domestic enterprises (e.g., Lenovo Group, Stone, Founder Group) to operate from ZSP as well as many Fortune 500 companies (e.. g., Nokia, HP, Microsoft, Oracle) for setting up R&D institutions in the park.
- Attracting academic institutes in and around the park and establishing industry—academic linkages also helps. ZSP is well placed in terms of its proximity to academic and research institutions, surrounded by 39 leading universities and

213 research institutes including Tsinghua University, Peking University and the Chinese Academy of Sciences. Leveraging this proximity with academic institutions, the government, has established a useful platform for attracting and training innovative talents. This includes providing specialized incubator services aimed at returning overseas Chinese students which have resulted in over 450 start-up IT organizations.

3.5. Hitec City, Hyderabad, India

3.5.1 Background

The Hyderabad Information Technology Engineering Consultancy (Hitec) City is located in Hyderabad, the capital of the state of Andhra Pradesh and one of the fastest growing cities in India. As per the Census of India, 2001, Hyderabad was the sixth largest city in India with a population of 5.5 million. Andhra Pradesh was relatively a late starter among the Indian states with respect to IT sector development. The government of Andhra Pradesh (GoAP) wanted to create an enabling IT sector environment in Hyderabad with an objective to attract large domestic and foreign IT companies to locate in the city and generate employment in the state. Moreover, GoAP wanted to position Hyderabad as the knowledge hub of India. Hitec city was the first step towards fulfilling GoAP's objectives.

Hitec City is located in the northwestern part of the city and is around 350 acres in area. Key milestones in the development cycle of Hitec City include:

- November 1998: Construction of Cyber Towers, the first multi-occupant 10 story building with four quadrants or zones, spread across 6 acres of

Cyber Towers was developed as the signature building of Hitec City by L&T Infocity, a joint venture between Larsen & Toubro Ltd (L&T), one of the leading engineering companies in India and APIIC. While L&T held 89% stake in the company, APIIC's stake was 11%. While APIIC provided the land for development, L&T was responsible for construction of the facility, marketing of the space and facility management & maintenance. L&T Infocity also developed other facilities within Hitec City such as internal roads, sewerage system, and optical fibre network for data and voice communication. Cyber Towers was conceived as a 10-story building with around 0.6 million square feet build-up area. The construction of Cyber Tower was completed within 14 months of allotment of land and it was fully occupied within 4 months of construction.

Around USD$28 million was invested for construction of Cyber Towers. The main revenue streams for the developers included i) selling of the floor space, ii) leasing out of the floor space, iii) leasing out of car parking space and iv) maintenance charges. It is understood that L&T Infocity achieved break even within 4 years of construction. The built-up space has been sold to financial institutions such as Housing and Development Finance Corporation (HDFC) and ICICI Bank and to IT companies like Keane, at rates of around USD$33/sq ft. The current selling price is around USD$67/sq ft. Initially, the lease rentals for anchor investors like Microsoft India (R&D) Limited and Oracle ranged between USD$0.44 to 0.55/sq. ft/month. Subsequently, the rates increased to around USD$0.77/sq.ft/month for unfurnished space and USD $1.55/sq. ft/month for furnished space. Currently 60% of the space is on rent and 40% of the space has been sold.

All occupants pay USD$0.1/sq. ft. as service and maintenance charges to L&T Infocity. The services provided by L&T Infocity include backup power supply, air-conditioning facility, waste disposal & treatment, internal security system and parking facilities. Occupants of the facility include eateries, courier service providers, banks and telecom service providers which meet the requirements of IT and BPO companies.

(Based on interactions with Mr. R. Sridaran, Chief Operating Officer, L&T Infocity)

land, with a total built-up area of around 580,000 sq. ft. Cyber Towers was constructed in 14 months and achieved 100% occupancy within 4 months of completion.

- 2002: Completion of Cyber Gateway or Phase II of Hitec City, a multi-occupant trapezoidal structure, spread over 8 acres of land, with a total built-up area of around 866,000 sq. ft[5]. It offers ready to use space with plug & play facilities, ranging from 1700 sq. ft. to 36,000 sq. ft. or multiples thereof, depending on the occupant's requirements.
- 2003: Completion of the Hitex Exhibition Center within the park, for hosting internal exhibitions, trade shows and other corporate events. The Center is spread over 100 acres of land and includes 3 large exhibition halls of over 30,000 sq. ft. each, an open exhibition area spread over 350,000 sq. ft. and a trade fair complex.
- October 2004: Commencement of operations at Cyber Pearl or Phase III of the park, comprising over 300,000 sq. ft. of ready-to-use space with plug & play infrastructure.
- 2004–06: Completion of a number of independent IT Parks (e.g., Mindspace IT Park, Vanenburg IT Park, RMZ Futura IT Park), with built-to-suit facilities.

- January, 2006: Inauguration of the Hyderabad International Convention Center, spread over 15 acres of land, with over 291,000 sq. ft. of meeting space capable of accommodating over 5,000 delegates and a conference complex comprising break-out rooms with state-of-art automation and audio-visual facilities. The complex also includes a 287 room business hotel, operated by Novotel.

An estimated 5,000 acres of land adjoining Hitec City, comprising campuses of large IT companies such as CMC, TCS and Microsoft and residential blocks is currently in an advanced stage of development.

3.5.2 Applying the CLIP framework to Hitec City, Hyderabad

Capital: The Hitec City comprises multi-occupant buildings such as Cyber Towers (please refer Box 1 for details) and Cyber Pearl and stand-alone individual company facilities such as Infosys Development Center, Satyam Technology Center, HSBC Call Center, and Deccan Park TCS. The

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5   "HITEC City" Available at: *http://www.ltinfocity.com/html/hitec/cg.htm.* Last accesses August 2006

estimated total investment in the park (without considering the adjoining area of around 5,000 acres which falls under Cyberabad) is estimated at USD$375 million. The multi-tenanted facilities within the City were promoted by government of Andhra Pradesh (GoAP) in partnership with reputed private sector companies like L&T, K. Raheja Group, Ascendas and the Emaar group, Dubai. Andhra Pradesh Industrial Infrastructure Corporation (APIIC) which is the nodal agency for the state/provincial government provided the land for development while the private players developed and manage the facilities. This public-private partnership (PPP) model enabled leveraging of the i) Facilities development capabilities, ii) Financial strengths and ii) Marketing skills of the private sector partners (please refer Box 1 for details). The construction cost of the multi-occupant buildings varied between USD$22 to 33/sq. ft.

More than 150 companies currently operate out of Hitec City, with almost all focusing on IT and BPO Services. These include around 15–20 anchor occupants like GE, Microsoft, Oracle Corporation, HSBC, Keane, Accenture, Qualcomm, Verizon, Bank of America, CSC, most of which were provided space at concessional rentals factoring in discounts as high as 30%.

Many of the large IT companies like Microsoft, GE, Dell, Infosys initially commenced operations in the multi-occupant buildings like Cyber Towers, Cyber Pearl & Cyber Gateway and subsequently set up their own facilities in the built-to-suit portion of the land. Plots were provided at significantly discounted prices by APIIC, with discounts as high as 50%.

Linkages: The focus of the occupants is primarily on IT services such as system integration, application development, and package implementation and BPO services such as finance and accounting, payroll processing, and customer care services, in line with the relative competitive strengths of India as a country.

Most of the units cater to the export markets including HSBC, Dell, TCS, Accenture, and Google, which essentially operate as captive shared services centers for their parent companies. The total IT and ITES exports from the state of Andhra Pradesh was USD$2.8 billion in FY06, translating to around 16% of India's exports of IT and BPO services. According to industry experts, 50% to 60% of the exports are from companies located in and around Hitec City. The clustering effect was also clearly visible, with a number of smaller companies like SDT Technologies relocating themselves to Hitec City, to leverage proximity with larger players which represented prospective clients.

Given the product & services profile of key occupants, linkage to entities such as research & development institutes and centers of excellence does not appear to be critical. For promoting better co-ordination among IT companies located in Hyderabad and interactions with government, the Hyderabad Software Exporters Association (HYSEA) was formed in 1991. Box 2 describes the role played by HYSEA in development of the IT sector in Hyderabad. The association has also played an important role in development and growth of Hitec City.

Other than facilities management, the management of the IT Park does not offer any value-added services such as market access, business planning & operational support, or resource mobilization.

Infrastructure: Spread over an area of over 350 acres, Hitec City is only 30 minutes from the central business district of Hyderabad and about the same distance from the Hyderabad International Airport. Hyderabad is the 6th largest city in India, and is well connected to all major cities in India through the national & state highway and rail network. To improve the road connectivity with other parts of the city and Hitec, a outer ring road is being constructed around the city. A new international airport is being constructed at Samshabad, about 20 minutes from Hitec City. This will further improve the air connectivity of Hyderabad.

Hitec city has a robust communication infrastructure in terms of the following:

- Voice connectivity within and outside the park is provided by the state owned BSNL and private sector service providers like Tata Teleservices, Reliance Infocomm and Bharti.
- High speed optic fibre data connectivity is provided by VSNL and Software Technology Parks of India (STPI), both of which are connected to international gateways.

BOX 2. *The Role of HYSEA*

The Hyderabad Software Exporters Association (HYSEA) represents one of the first active regional industry association of IT and BPO companies in India. It was started in 1991 by Chief Executive Officers of 15 companies located in Hyderabad. The current membership of the association is around 294. HYSEA aims to promote cooperation and good business practices among its members. Its various activities include:

- Acting as a voice of the industry to government
- Providing a platform for discussing key issues impacting the IT sector
- Providing membership at very low rates to ensure participation by both small and large companies
- Arranging seminars
- Sharing of industry good practice among members
- Creation of industry databases
- Conducting training programs on areas such as leadership, HYSEA also functions as a coordinator between industry & government and it acts as the collective voice of IT and BPO companies. It activities in this area include:
  - Constitution of Special Interest Group for working on the Draft Information Technology Policy developed by GoAP.
  - Representing the IT industry on the Consultative Committee, under the Department of Information Technology and Communications to address critical issues involving the IT sector.
  - Interacting with the government in getting the area surrounding Hitec City declared as government "Notified Area" so that this area gets special developmental attention from the government, especially with respect to improvement of physical infrastructure such as roads, drainage, sewerage, and transport service.

(Based on discussions with Mr. Shaktisagar, Former President, HYSEA)

The price of built-up space in Hitec City ranges between USD$55–$67/sq,ft. Monthly rentals range between USD$0.67–$0.77/sq. ft for unfurnished space and USD$1.33–$1.55 for furnished space.

Where the space is leased out, the occupants need to sign an agreement with the developer. Salient features of such agreements include:

- In-built escalation of 12%–15% of rental every three years
- Deposit equivalent to 6 to 12 months rentals
- Lock-in period of 3 years for unfurnished and 5 years for furnished spaces
- Lease renewal option solely with tenant

A comparison between the monthly rentals in Hyderabad and other cities of India has been presented in Figure 4 below.

Hitec city has a dedicated 132 KV electricity sub station for providing uninterrupted electricity supply to its occupants.

- In addition, multi-tenanted buildings such as Cyber Towers, Cyber City, and Mindspace have generators as standby to ensure 100% reliability, in event of electricity outage.

Figure 4. *Space Rental (USD/sq.* ft)

City	Lowest	Highest
Hyderabad	0.44	0.84
Kolkata	0.51	1.00
Chennai	0.58	1.00
Bangalore	0.76	1.20
New Delhi	0.55	1.90
Mumbai	1.00	3.30

Source: Cushman and & Wakefield

- The unit cost of electricity is comparable with other major Indian cities. Figure 5 compares the unit cost of electricity of Hyderabad with other Indian cities.

The social infrastructure of Hyderabad is comparable to any other metropolitan city of India[6]:

- It houses two sailing clubs, flying club, golf course, a turf club and a number of shopping complexes, restaurants, and multiplexes.

6   "Government of Andhra Pradesh, India" Available at: *http://www.aponline.gov.in/apportal/index.asp.* Last accessed July 2006

Figure 5. *Electricity Tariff (cents/unit)*

City	cents/unit
Mumbai	~12
New Delhi	~10
Bangalore	~8.7
Chennai	~8.7
Hyderabad	~8.7
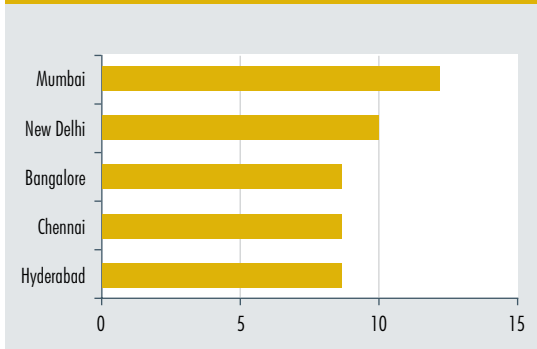
Source: Center for Monitoring Indian Economy (CMIE).

- The city has a large number of quality hotels such as Taj Krishna, Taj Banjara, Marriot Viceroy, and ITC Kakatiya.
- Hyderabad has a number of strong specialty hospitals such as Apollo, CARE Hospital and Indo-American Cancer Institute and Research Center. A number of reputed schools are present in Hyderabad such as Delhi Public School, International School of Hyderabad, and Hyderabad Public School.
- Prominent residential areas like Banjara Hills, Jubilee Hills, Begumpet are well connected to Hitec City. The city has been expanding in the direction of Hitec City with a large number of residential and commercial complexes being constructed in and around the region.

The good physical and social infrastructure, stable law and order situation, location advantage (more or less centrally located between the northern and southern parts of India) and multicultural dimension of Hyderabad, ensures excellent quality of life for the residents of the city. According to many industry sources, companies located in Hyderabad have been able to attract and retain skilled human resources from other parts of India due to the better quality of life offered by the city. Box 3 below describes the experience of Keane India Limited, one of the anchor tenants of Cyber Towers.

People: It is estimated that more than 160,000 persons are employed in the IT and BPO industry in Andhra Pradesh. Around 80,000 employees are estimated to be employed at Hitec City, comprising a mix of engineers, IT specialists and graduates (in BPO companies). The state of Andhra Pradesh has 23 universities and over 230 engineering colleges, with an aggregate output of 86,000 engineers every year, including 32,000 computer science engineers and graduates in computer-related courses. The total number of students graduating from the universities in other disciplines of science, arts or commerce is more than 350,000 per year. Hyderabad itself has four universities which account for a large proportion of the workforce in the IT & BPO sectors, namely, University of Hyderabad, International Institute of Information Technology, Osmania University and the Jawaharlal Nehru Technological University.

According to industry experts, manpower cost in Hyderabad, for IT and ITES professionals, is one of the lowest in India.

BOX 3. *Keane India Limited Operations at Hitec City, Hyderabad*

Keane India Limited started its operations in 1998 from Cyber Towers, Hyderabad. The company provides BPO services in areas of insurance, healthcare and financial services to clients in the US and UK. The revenues generated from its Hyderabad facilities was around USD$20 million in 2006 with the company having a staff strength of 500 within the park (50% of its total strength in India).

Keane was one of the first few occupants of Cyber Towers and hence received a concessional rate of USD$33/sq. ft as against the prevailing price of around USD$45/sq. ft. The company currently occupies the entire 8th floor of Cyber Towers (Built up area of 52,000 sq. feet).

In the initial years ,the physical infrastructure in and around Hitec City was inadequate. However, GoAP invested heavily to develop quality infrastructure, including road network, electricity, water supply system, sewerage & drainage lines, and transportation system. To ensure quality communication infrastructure in Hitec City, STPI-Hyderabad was relocated to Cyber Towers in 1998. One of the key advantages highlighted by Keane was the proactive attitude and easy accessibility of senior GoAP officials in resolving infrastructure and other issues during the initial period.

(Based on interaction with Brig. Harikumar Krishnannair, Head- Knowledge and Learning, Keane India Limited)

- The average salary of a junior level IT professional (less than one year work experience) in a company located in Hitec city is around USD\$3 300 to \$4 500 per annum.
- The average salaries of middle level IT professionals (2 to 4 years of work experience) and highly experienced IT professional (more than 5 years work experience) ranges between USD \$8,900 to 11,000 per annum and USD\$17,700 to 33,300 per annum respectively.

Interaction with companies located in Hitec City indicate that they are satisfied with the quality of professionals available. While more than 80% of the workforce of small companies like SDT technologies (a software product development company) represent localities, the proportion is around 40% to 50% for larger companies like Keane India Limited.

To meet the human resource requirements of the IT sector, the state government has undertaken a number of initiatives, including:

- Government in partnership with the private engineering colleges and industry has launched a unique program named "Jawahar Knowledge Center" (please refer to Box 4 for details). The Jawahar Knowledge Centers (JKCs) act as the finishing schools for IT students imparting them with industry oriented skills.

- GoAP has made English compulsory in graduation stage to increase the supply of English-speaking graduates.

3.5.3 Key Lessons

Hitec City is one of the more successful IT Parks in India. The park has been able to achieve its objective of generating employment with Hitec, employing more than 160,000 people. Using Hitec City as the focal point, a larger IT City— Cyberabad has developed in the surrounding area. Today, Hyderabad with its world-class infrastructural facilities required by the IT sector is one of the preferred destinations for IT companies in India. Large IT companies such as Microsoft, IBM, SAP, Oracle, Infosys, TCS, Satyam, Wipro, and CTS are located in the Hitec City. The key elements that have led to the park's success are as follows:

- A supportive and proactive government, which properly marketed the IT Park and was able to attract key large anchor investors like Microsoft and Oracle.
- World-class physical and virtual infrastructure, which has been created through a public-private partnership and managed by an efficient private management team that provides world-class quality service to occupants.
- Steps were taken by government on a public-private partnership basis to augment the human

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BOX 4. *Highlights of the Jawahar Knowledge Center Scheme*

The gap in the quality of talent available locally was initially identified as a limiting factor for the industry in AP. In order to improve the quality of IT students, especially from private colleges, GoAP started the Jawahar Knowledge Centers (JKCs) in 2004. The Jawahar Knowledge Center was an initiative started collectively by the private colleges, industry participants and different agencies of GoAP like the Department of Information Technology, Institute of Electronic Governance and Andhra Pradesh State Council of Higher Education. These JKCs act as finishing schools for the final year students. As part of this program industry grade skills are imparted to final year students to make them industry-ready. In each of these JKCs, training programs are conducted by industry-trained mentors and JKC trained students. Hands on training is provided through live projects. GoAP offers the students small computerization and e-governance projects for Urban Local Bodies, Rural Local Bodies and Government departments. The participants are trained both in soft (e.g., mock interviews, group discussion, teamwork) skills and technical skills. A number of IT companies actively participate in the training programs.

In 2004, in the first year, 36 JKCs were created. The program covered 1066 female students from 102 private engineering college. Out of these 235 students were recruited by companies like IBM, Infosys and Satyam. In the second year, the intake was increased to around 6000 from 163 colleges spread across AP. Around 1300 students were recruited by companies like Wipro, Satyam, Infosys, IBM, TCS, CA, and Intelligroup. In the second year JKC was also extended to 11 non-engineering degree colleges to train students in BPO skills (e.g., medical transcription, data processing). 45 such trained students were selected by Nipuna, a Hyderabad based software company. In 2006, the program has been extended to cover 13000 students from over 200 colleges.

(Based on discussions with Dr. G. Subbarao, State Chief Information Officer & E.O. Special Secretary to Chief Minister, GoAP & Dr. T.S. Reddy, Academic Director, Institute for Electronic Governance, Hyderabad)

resource and thus improve the quality of manpower for ensuring supply of skilled manpower resources for the IT Park occupants.

■ Single-window clearance system created in the form of APIIC, which reduced the procedural delays for the real estate developers and thus enabled them to construct multi-occupant buildings/built to suit facilities in the park, minimizing delays on account of clearance/ regulatory processes.

3.6 IT Park, Hubli, India

3.6.1 Background

The IT Park at Hubli[7] is located about 420 km north of Bangalore, the capital of the state of Karnataka, which is often hailed as the Silicon Valley of India. Hubli-Dharwar is the second largest urban center of Karnataka after Bangalore with a population of around 900,000.

With the rapid growth of Bangalore city, fueled by the growth of the IT sector, there has been a tremendous pressure on the city's infrastructure. Moreover, given the shortage of available office space in the city, rentals have been increasing at a rapid pace, which was forcing several IT companies to explore options of locating their operations in other states. With the objective of reducing pressure on Bangalore and retaining/attracting IT organizations in the state, the government of Karnataka wanted to develop the Tier II cities as an alternate destination for the IT companies. The development of the IT park at Hubli was part of such an initiative launched by the state government.

The construction of the park started in the late nineties and spanned a period of around 2–3 years. The first 277,000 sq. ft. multi-occupant building was ready for occupation in 2002. Till date, around 100,000 sq. ft. of the existing facilities have been occupied[8]. Key milestones in the development of IT-Park Hubli include:

■ 1998: Government of Karnataka (GoK) decided to develop Tier 2 cities such as Mangalore, Hubli-Dharwar and Mysore as additional IT hubs, to provide alternate and low-cost options for IT companies.

■ 1999: GoK decided to redesign a commercial

complex being constructed by Hubli-Dharwar Municipal Corporation as the IT Park-Hubli.

■ 2000: Larsen and Toubro Ltd., a well established construction company with extensive experience in constructing IT parks, was appointed by GoK to redesign the commercial complex and construct IT Park-Hubli.

■ September 2002: IT Park-Hubli was inaugurated. The initial occupants were STPI-Hubli, Tata Teleservices and Karnataka State Electronics Development Corporation Limited (KEONICS)

■ 2002–2004: Other than the initial occupants, no major IT firm had taken space in the IT Park. The other occupants in the IT Park were non IT commercial organizations. However, a few local small IT players leased out incubation space at the STPI facility in the IT Park-Hubli.

■ May 2006: To overcome low occupancy rates, GoK organized an event called "Destination Hubli" to attract IT companies to the park. GoK also initiated steps to reduce the rental cost of the space available in IT Park, Hubli through policy actions.

■ June 2006: GoK announced plans to develop an additional 40 acres of land adjoining the existing IT Park building as stand alone development centers for IT & BPO companies.

3.6.2 Applying the CLIP Framework to IT Park, Hubli

Capital: The estimated initial investment in the physical facilities of the park was USD$ 10 million, with the Department of Information Technology funding the entire investment. The park is managed by KEONICS[9], a state-owned enterprise.

Despite four years having passed from completion of development and increasing demand from established IT and BPO services companies for setting up new facilities in second tier Indian cities, only 10 companies have set up operations at the park.

■ Many government agencies like STPI-Hubli (4,000 sq. ft.), Koenics (2,300 sq. ft.) and Indian Institute of Information Technology (IIIT), Hubli (22,000 sq. ft.) are occupants of

7   "Software Technology Parks of India, Hubli" Available at: http://www.hubli.stpi.in/index.html. Last accessed July 2006.
8   "No takers for Hubli IT Park" Available at: http://sify.com/finance/fullstory.php?id=13880597. Last accessed July 2006
9   "KEONICS" Available at: http://www.keonics.com/. Last accessed August 2006.

the IT Park. In addition to Tata Teleservices which provides voice connectivity to the park and occupies around 14,000 sq. ft., all these agencies were among the initial occupants of the park.

- Koenics acts as the manager of the park and provides facilities such as backup electricity supply, maintenance, security, and car parking. It also runs a IT training center inside the park. Though IIIT-Hubli has occupied space in the park from 2002, it is still not operational. The space is occasionally used by the IIIT management for meeting and seminars.
- A few start up/initial stage companies like Sagar Technologies and V-7 Technologies operate out of the business incubation center run by STPI-Hubli.
- Neilsoft, which has its Indian head quarters located in Pune, started its operations from the incubation center in STPI-Hubli and has subsequently rented out around 10,000 square feet space in the IT Park.
- Other occupants include service providers like Tata Teleservices and commercial establishments such as banks, computer service centers, and shops.

However, the park failed to attract large IT & BPO companies unlike other tier 2 cities in Karnataka like Mysore, where Infosys Technologies, one of the largest IT companies in India, has set up its corporate training center at an estimated investment of USD$56 million. GoK, having realized the importance of attracting anchor tenants into Hubli for development of the IT sector in the city, is currently offering both land and built-up space at concessional rates to such players.

Linkages: The focus of the current occupants is primarily on IT services like application development and BPO services such as customer care services, insurance claims processing, and engineering designs & cad-cam drawings, in line with the relative competitive strengths of India. However, services offered by current occupants appear to lack requisite depth, given that these are all early stage companies. Consequently, Hubli-Dharwar accounts for only USD$1.2 million IT and BPO revenues, which is only 1.5% of IT & ITES revenue of the state.

Given the product and services profile of key occupants, linkage to research & development institutes, centers of excellence do not appear to be critical. The park is managed by Koenics, which does not offer any value-added services such as market access, business planning and operational support, or resource mobilization. Recently, in September 2005, to create an environment suitable for growth of the IT sector in North Karnataka and to increase interaction between industry, academics and government, the BPO-ITES-CRM (BIC) Society was formed. The Society acts as a common forum for all the stakeholders and facilitates exchange of ideas.

STPI-Hubli, which is housed in IT Park, Hubli, provides incubation space to small start-up companies. The facilities provided to these companies include internet connectivity, telephone connections, fax, access controlled security system, conference facilities, electricity backup and computers.

The rental charged for such space is USD$145 per workstation per month with the number of workstations currently available being 24. A number of Hubli-Dharwar based small companies have availed such facilities and then moved out to locations outside the park after achieving a minimum scale of operations.

Infrastructure: Hubli is one of the most prominent cities in North Karnataka and is about 600 kms from Mumbai, 400 kms from Pune, 560 kms from Hyderabad and 800 kms from Chennai.

- National Highway (NH 4) connects Hubli with Bangalore, Pune and Mumbai. NH 4 is a part of the Golden Quadrilateral Project, which aims to augment road connectivity between important cities in India. Bangalore and Pune are around 8 to 10 hours from Hubli by road. The city is well connected by state and national highways to other cities in North Karnataka such as Belgaum, Haveri, Davangere, and Bellary.
- Hubli is also well connected to Bangalore, Pune and Mumbai by rail, with travel time to Bangalore and Pune being around 8 hours and Mumbai around 12 hours.
- Though the road and rail connectivity of Hubli with other parts of India is satisfactory, it is not well connected by air. Hubli has its own domestic airport, however, there is only one flight operating from the airport connecting Bangalore and Belgaum. The nearest interna-

tional airport is around 180 kms from Hubli located at Goa, which is around 3.5 hours journey from the city by car. However, the closest international airport with a critical mass of international flights is Bangalore International Airport, located about 400 kms from the city.

Robust communication infrastructure exists within and outside the IT Park. The data and voice connectivity infrastructure is provided by two state owned operators, namely, BSNL and STPI along with Tata Teleservices, a private sector telecom operator.

- Voice connectivity services are provided by major telecom service providers including the state owned BSNL and private sector players such as Tata Teleservices, Reliance Infocomm, and Bharti.
- To ensure high quality data connectivity, TPI-Hubli is housed within IT Park Hubli. STPI-Hubli, the fifth internet gateway in Karnataka, has its earth station in the IT Park. High speed optical fibre data connectivity (4 Mbps gateway upgradeable to 45 Mbps) is provided by STPI, which has its international gateway in Bangalore.

The relatively high rentals at IT Park-Hubli, compared to other similar facilities available in Hubli and other second tier cities of Karnataka have been identified as one of the main reasons for low occupancy.

- The rental charged for leasing out space in IT Park-Hubli varies between USD$0.33 to 0.66/sq. ft/month as against USD$0.11 to 0.22/sq feet/month in other parts of the city. For this reason, companies like N.S. Infotech, Transparent Technologies, IBSI India and Rite Scribe have decided to set up offices in other parts of the city.
- GoK has since recognized the problem of high rentals and in May 2006, it has issued a government order reducing the rentals to around USD$0.22 to 0.33/sq. ft/month for IT Park, Hubli. Post reduction in rentals Neilsoft has leased 10,000 sq. ft. area in the IT park.

Being a tier 2 city, rentals and land prices in Hubli are cheaper than other Indian cities such as Kolkata, Pune, and Bangalore.

- The average commercial space rental in Hubli is less than half compared to tier 1 cities such as Kolkata, Bangalore, and Hyderabad.
- Residential rentals are 20% to 30% lower than other second tier cities such as Ahmedabad and Kochi.
- The state government has announced a scheme recently to provide land to large IT and BPO companies at a subsidized rate (20% to 30% cheaper than the market rate). Additionally, depending on the quantum of investment made & employment generated, such companies will receive a concession on stamp duty & registration charges on such land procured ranging between 50% to 100% of the amount.

Though the IT Park has excellent electricity connection in terms of a dedicated 11 KV feeder and 100% generator backup facility, Hubli itself often faces electricity shortages. The electricity utilities charge a concesssional rate of USD 8 cents per unit, in comparison of 10 cents per unit charged other industries (Source: Karnataka Electricity Regulatory Commission). GoK is spending USD$5 million to improve the electricity system and provide reliable electricity supply by replacing old poles/conductors and transformers.

The IT park is dependent on the urban infrastructure at Hubli, which is essentially a tier II city and lacks the infrastructure and amenities of a tier 1 city such as Bangalore, New Delhi, or Mumbai. As per industry sources, one of the main reasons why Hubli-Dharwar could not attract major IT and ITES companies is the lack of quality physical and social infrastructure. The city does not house any multiplex and has very few quality shopping centers, recreational facilities, eateries, or modern housing facilities. Further, there have been law and order problems in the past on account of tension between two communities.

People: The state of Karnataka has 19 universities and over 100 engineering & technical colleges, with engineers, IT specialists and computer-related courses over 75,000 students graduating every year. Traditionally the Hubli-Dharwar twin cities are considered as the educational hubs of the North Karnataka region.

- Hubli-Dharwar has two universities with more than 180 colleges affiliated with these universities.

- There are 16 engineering colleges in North Karnataka, with two of these engineering colleges being located in Hubli. Around 1100 students graduate from these 2 engineering colleges annually.
- There are more than 60 graduate colleges situated at Hubli, out of which 24 are degree colleges. Around 20,000 students graduate from these colleges every year.

The average cost of human resources available in Hubli is cheaper compared to other cities located in the state of Karnataka like Bangalore, Mysore, and Mangalore.

- The average salary of junior level IT professionals varies between USD$2,200 to $3,300 per annum.
- For an IT professional working in the middle and top management level, the average annual salary varies between USD $4,400 to $6,600 and USD$8,900 to $13,300 respectively.

The local IT and ITES industry is satisfied with the quality of students graduating out of the colleges present in Hubli. Major IT companies present in India such as IBM, Infosys, Wipro, Sasken, Mindtree, Progeon, and Tata Consultancy Services recruit engineering graduates from Hubli. In Hubli-Dharwar and Belgaum (situated around 90 kms from Hubli-Dharwar) around 300 IT and ITES professionals are employed. More than 95% of these employees are local.

3.6.3 Key Lessons
The IT Park at Hubli has not been able to fully achieve the envisaged objective of attracting IT companies that could consider Hubli as an alternative to Bangalore. Thus far, there are no large IT companies occupying space in the IT park. In 2006, the IT park housed some small companies, government training institutes, and service providers.

However, more than 50% of the park was vacant. The case study of Hubli IT Park highlights the following key lessons:

- In the initial phase, it is important to attract large anchor tenants in an IT Park. One of the key motivators for anchor tenants to locate to an IT Park is comparatively lower rentals and similar benefits.

- For the IT park to be successful, it is important that basic social infrastructure (health care, education, recreational facilities)is present in the neighborhood of the IT Park. Without such facilities, it is difficult to attract quality human resources.
- The management of IT Parks needs to provide value added services, especially to relatively small and medium sector occupants, such as business development support, networking support, and accounting assistance.
- Private players are best suited for managing IT parks as they enjoy relatively higher operational flexibility vis-à-vis government. For example, when changing the rent schedule, government needs to pass an order, which is time consuming. Such decisions can be taken in the private sector without having to follow the similar approval processes.

3.7 Singapore Science Park, Singapore

3.7.1 Background
Singapore Science Park (SSP) is one of the earliest science and technology parks of Singapore. In the late 1970s Singapore's economy was driven mainly by the manufacturing sector. In the early 1980s, Singapore identified new technologies and research and development as key areas of the country's future economic growth. In this backdrop SSP was established in 1980s.

The main objective for developing SSP was to stimulate innovation and generate economic benefits by assisting knowledge-based firms and knowledge intensive activities.

The development of Singapore Science Park took place over a period of more than 25 years and included the following major milestones:

- 1980: The government of Singapore approves construction of Singapore Science Park.
- 1982: The first tenant of the park, Det Norske Veritas (DNV) sets up office at Science Park I.
- 1988: The National Computer Board of Singapore officially inaugurates its building at SSP.
- 1992: Technology Parks Pte Ltd, a subsidiary company of Jurong Town Corp., established to

manage the Singapore Science Park on a commercial basis.

- 1993: Construction of Science Park II commences.
- 1996: The Park introduces an array of value-added services to benefit tenants such as sports facilities, restaurants, organized activities, free shuttle bus services and childcare. The Innovation Center opens at the Science Park as Singapore's first incubator facility for start-ups. The S$12 million Science Hub opens at the Park as Singapore's first business and recreational hub exclusively for SSPs corporate tenants.
- 1997: Arcasia Land Pte Ltd. replaces Technology Parks Pte Ltd as developer and manager of SSP consequent to a series of corporate restructuring exercises.
- 2000: SSP partners with Sophia Antipolis Science Park of France to explore collaborative business initiatives.
- 2001: Ascendas Pte Ltd. replaces Arcasia Land Pte Ltd as a result of a merger between Arcasia and JTC International, former international arm of the Jurong Town Corporation.
- 2002: Galen, the first building in Science Park III is completed. Ascendas Real Estate Investment Trust (A-REIT) is listed on the Singapore Exchange as Singapore's first business and industrial property trust. The four multi-tenanted Science Park buildings in the A-REIT portfolio include Alpha, Gemini, Aries and Capricorn.

3.7.2 Applying the CLIP Framework to Singapore Science Park, Singapore

Capital: Singapore Science Park[10] is owned and operated by Ascendas Pte Ltd[11]. In the initial phase, SSP received significant support from the government of Singapore. The government allocated the park around 15 acres of land at Ayer Rajah Road during Phase I development and committed around 30 acres of state land for its Phase II development. The Park development was incorporated into the National Technology Plan. Moreover, to enhance the Park's development and competitiveness, some of the key government organizations like the Science Council of Singapore, the Singapore Institute of Standards and Industrial Research, the National Science & Technology Board, and the Information Technology Institute were relocated into or established in the Park. These government organizations have effectively acted as anchor occupants of the Park.

More than 300 companies operate out of SSP, with around 50% of them being in the IT & telecommunication sector, 11% in chemical, 10% in engineering, and the balance focusing on areas such as life sciences, pharmaceuticals, and food& flavors. About 50% of the tenants are foreign firms. In terms of their origins, 27%, 11% and 9% are from USA, Europe, and Japan, respectively. Around 70% of the local firms are small and medium enterprises, with 23% being start-up companies. The Park's foreign occupants include global players such as Sony, Silicon Graphics, and Lucent Technologies. The Park provides business incubation services to start-up companies, including helping tenants initiate contact with venture capitalists. Singapore has a vibrant venture capital sector with more than 160 venture capital firms, managing funds of over S$17 billion.

Linkages: The focus of the SSP occupants is primarily on EDP and office equipment, IC and components, basic and advanced telecommunications technology. Most of the units cater to both domestic and export markets. R&D support is provided by government-promoted R&D institutes such as the Center of Wireless Communication and the Institute of Microelectronics, as well as academic institutes such as National University of Singapore, and the Nanyang Technological University.

Ascendas, the private company responsible for managing the park, provides a number of value added services. Such services include:

- Market access services to occupants to help them enter new markets
- Promotional services for occupants' products, technologies, applications, and services
- Helping the occupants collaborate with compatible business or technology partners, through its wide network of alliances with organizations and science, technology, and industrial parks
- Helping companies recruit through its alliance partners

SSP has established linkages with a number of Science and Technology (S&T) Parks all over the world to explore complementary and synergetic opportunities of the respective occupants in these parks. Examples of such S&T Parks include Sophia

10 "Singapore Science Park" Availbale at: http://www.singaporesciencepark.com/home/index.asp August, 2006
11 "Ascendas" Available at: http://www.ascendas.com/home/index.html. Last accessed July 2006.

Antipolis Science Park, France; Alberta Research Council, Canada; Zernike, Australia; Heidelberg Technology Park, Germany; Technopolis, Finland and International Business Incubator, USA.

Infrastructure: Spread over an area of over 133 acres, SSP includes a number of amenities and facilities such as auto-banking, conference facilities (at Science Park I and II), clinics, childcare facilities, convenience stores, eateries and restaurants and fitness corners. Intra Science Park shuttle bus service is available to users. Box 5 below describes the experience of DNV, one of the anchor tenants located in SSP 1.

The Park is located about 30 minutes from the Changi International Airport and is well located at the heart of Singapore's Technology Corridor near Jurong Industrial Estate and the Central Business District. Figure 6 shows the location of SSP. The advantageous location helps the Park to leverage the urban, transportation and social infrastructure of Singapore together with data and voice connectivity. SSP's rentals and land leases are quite competitive with the rentals in the Innovation Center being 30% to 50% lower than the average market rate.

People: 7,000 research engineers, scientists, and supporting staff are employed at the park, with 52% holding basic degrees, 16% holding Masters' degrees, and 12% PhDs. There are four educational institutes located near SSP, namely, National University of Singapore, Nanyang Technological University, Ngee Ann Polytechnic and Singapore Polytechnic. Singapore produces more than 14,000

Figure 6. *Road Connectivity, SSP*

Source: Singapore Science Park – *http://www.singaporesciencepark.com*

engineers and IT specialists, MBAs annually from Universities, colleges and polytechnics, with the average annual salary of IT professionals at the middle management level being around USD$40,000. As per Infocomm Development Authority (IDA)[12], in Singapore more than

12 "IDA Singapore" Available at *http://www.ida.gov.sg/ idaweb/marketing/index.jsp*. Last accessed August 2006.

BOX 5. *DNV, Anchor Tenant in SSP*

DNV, Tech Center was established in SSP 1 on 17 January,1984, at 10 Science Drive and it was one of the first companies to set up offices at SSP. DNV was provided land on lease for 20 years, which subsequently was extended by another 10 years. The company benefits from world class utilities & services available to park occupants in terms of telecommunication services, electricity supply, water supply and drainage & sewerage,. Occupants are also offered discounted memberships at the recreational clubs in SSP 1. Moreover, Singapore as a city provides excellent physical, social, and recreational infrastructure to the occupants. Transport services connecting SSP are expected to improve further with a new MRT terminal coming up.

To DNV, being able to set up their office in SSP 1 has added tremendously to the company's brand image. This is primarily on account of stringent entry & operating standards as part of which only companies involved in areas such as high end technology, engineering, and R&D services are allowed to operate out of the Park. Consequently, the occupants command instant recognition and a distinct brand image within Singapore.

(As discussed with Mr. Fung Chan Hua, Head- Risk & HSE Services, DNV Technology Services, Singapore)

110,000 persons are employed in Infocomm industry. This represents around 5% of the total work force of the country. Figure 7 shows the distribution of Infocomm personnel across occupational categories. Employment in the sector is projected to grow at 4–5% per annum over the next 4 to 5 years.

3.7.3 Key Lessons

SSP is one of the most successful parks in Singapore and houses large companies focusing on R&D in high end technology. The park has 100% occupancy rate. Being located in SSP I is considered a privilege in Singapore, which adds to the occupant's corporate/brand image.

The SSP case study highlights the following key lessons:

- A vibrant and pro-active park management team is key to the success of the IT Park. The management team at SSP provides a number of value added services such as business plan development, networking, accounting assistance, and incubation space.
- Close linkage with academic institutions like universities and colleges and R&D institutes are essential for parks where the primary focus of key occupants is technology innovation.
- Creating a powerful brand image of the park is one of the key elements that has led to SSP's success.

3.8 Cyberjaya Flagship Zone, Malaysia

3.8.1 Background

The government of Malaysia developed the Multimedia Super Corridor Project with the objective of creating an ideal multimedia environment to attract world class multimedia/IT companies. The project aimed at creating a hub for Malaysian multimedia/IT companies to enable them to become world class standard over time, through operating in a highly competitive environment. The Cyberjaya Flagship Zone (CFZ)[13] is one of the five cybercities developed during phase I of the Multimedia Super Corridor project, conceptualized and implemented during the period from 1995–2006. Key milestones in the development of Cyberjaya include:

Figure 7. *Distribution of Infocomm Manpower*
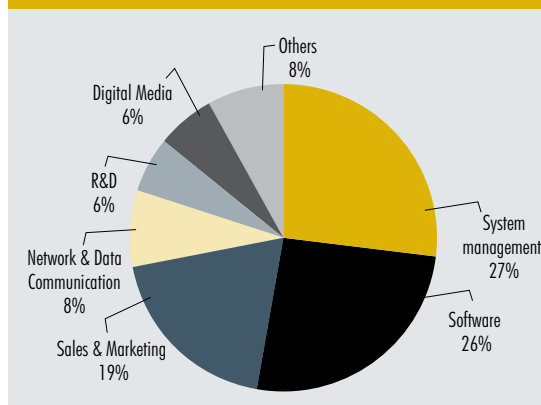
Source: IDA, 2004

- 1997: Groundbreaking ceremony at Cyberjaya; Cabinet announces decision to have University Telekom or Unitele set up its multimedia faculty in Cyberjaya, marking the beginnings of the Multimedia University.
- 1999: Inauguration of Cyberjaya and launch of the MSC Central Incubator in Cyberjaya.
- 2002: Launch of the MSC Flagship Center (now known as MSC Innovation Center) comprising Creative Application Development Center (CADC) and Solution and Assessment Development Center (SADC) in Cyberjaya.
- 1999–2006: Various companies commencing operations in Cyberjaya; alliances with different countries such as the United Arab Emirates, Sri Lanka, and India.

3.8.2 Applying the CLIP Framework to CFZ

Capital: The estimated initial investment in the physical facilities of the park was around USD$2 billion, funded by a joint venture company between the government and four other companies, namely, Setia Haruman Sdn Bhd, Nippon Telegraph and Telephone Corporation (NTT), Golden Hope Plantations, Permodalan Nasional Berhad (PNB). CFZ has been developed through public-private partnership. Cyber View, a government Linked

13 "Setia Haruman Sdn. Bhd. – Cyberjaya's Master Developer" Available at: *http://www.cyberjaya-msc.com/profile/background. htm*. Last accessed August 2006.

Company (GLC), is the owner of all the land in Cyberjaya. Setia Haruman Sdn. Bhd, a private enterprise, is the master builder. Sepang Town Council, a local authority, is responsible for all planning approvals for Cyberjaya. There are 363 companies operating from the park, which include around 20 large global players like Shell, DHL, HSBC, Motorola, Fujitsu, Ericsson, and small, local companies. The park offers business incubation services through the MSC Central Incubator including venture capital support.

Linkages: The focus of the current occupants is primarily on BPO services such as finance and accounting and payroll and human resources processing with most of the global players having their captive shared services centers in Cyberjaya. Consequently, many of the occupants are focused on export markets. The government is in the process of implementing a number of e-Government applications, where Multimedia Super Corridor[14] registered companies, of which CFZ is a component, are given preference. The Multimedia Development Corporation (MDeC)[15], an arm of the government acts as a single window for obtaining requisite government approvals and facilitates business linkages with the government. MDeC also undertakes capacity development programs in areas like process standardization and conformance to good practice.

Infrastructure: Spread over an area of over 7,000 acres, Cyberjaya includes i) a residential zone (>3000 houses & apartments), ii) an enterprise complex/office area (>2.2 million square feet), iii) an incubation center (> 60,000 square feet), iv) a commercial zone (> 30,000 sft) and v) a green and environment friendly recreational zone, Taman Tasik Cyberjaya (around 89 acres).

Number of persons residing in CFZ is around 11,000.

- Being a comparatively new township, people perceive CFZ as dull and boring compared to Kuala Lampur.
- The facilities and amenities present in CFZ include supermarkets, book stores, healthcare facilities, petrol pumps, banks, fire station, schools, hotels, and spas. However, CFZ lacks adequate number of eateries & restaurants.

Cyberjaya is about 45 minutes from the Kuala Lampur International Airport and is also well connected domestically through major highways and railway networks. According to the users, through the road network connecting CFZ is good, public transport services need to be augmented.

CFZ has a robust communication network is terms of the following:

- It is served by state-of-the-art optical fibre telecommunication network with a capacity of 2.5 to 10 Gbps.
- CFZ has a dedicated international gateway at Kuala Lumpur.
- Voice connectivity within and outside the park is provided by telecom service providers like Telekom Malaysia and Maxis Communications.

Services such as electricity and water supply are provided by public utilities. The average electricity tariff is 8 cents per unit. The occupants need to pay between 50 to 60 cents per m^3 of water consumed. All service providers enter into a performance agreement with users as part of which:

- Services are to be provided for 24 hours and 365 days a year.
- A 99.9% reliability guarantee is to be provided.
- If the services are not provided as per agreement, the service providers are subject to financial penalties. The space rentals in CFZ are competitive compared to rentals of similar space in other IT Parks in and around Kuala Lampur. However, the land prices at CFZ are higher for enterprise and commercial zones. A comparison between the monthly rentals and land costs of CFZ & other cybercities in Malaysia has been presented in Figure 8 below.

People: Around 15,000 employees are estimated to be deployed at Cyberjaya Flagship Zone, comprising a mix of engineers, IT specialists, and graduates (for IT enabled services). Many of these employees are foreign citizens. The total number of foreign citizens are estimated at 1,300 in 2006. Figure 9 provides details of the distribution of foreign citizens by their country of origin. The Multimedia University and
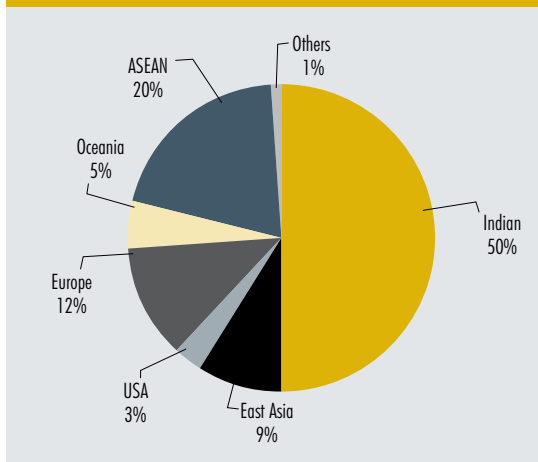
14 "MSC Malaysia" Available at: *http://www.msc.com.my/*. Last accessed August 2006.
15 "Multimedia Development Corporation Sdn Bhd" Available at: *http://www.mdec.com.my/*. Last accessed August 2006.

Figure 8. *Space Rental/Cost*

Cybercities	Office Rent (USD per sft per month)	Parking Charges (USD per month)	Enterprise Land Cost (USD per sft)	Residential Land Cost (USD per sft)	Commercial Land Cost (USD per sft)
Cyberjaya Flagship Zone	0.88–1.2	32–33	16.5–17.5	10–14.5	23–30
Technology Park Malaysia	0.93–1.1	32–33	NA	NA	NA
Kaula Lampur City Centre	2.32–2.42	37–38	NA	NA	NA
UPM-MTDC Technology Incubation Center	0.7–0.8	NA	NA	NA	NA
Penang Cybercity 1	0.6–0.9	25–30	5.4–7	16.5–21.5	19–27
Kulim High Tech Park	0.6–0.7	NA	3.5–4	6.5–7	5–5.5

Source: Multimedia Development Corporation (MDeC) Sdn. Bhd, DTZ Research

Figure 9. *Foreign Citizens in CFZ*

Source: MDeC Sdn. Bhd, DTZ Research

LimKokWing University College of Creative Technology are situated in Cyberjaya providing a ready pool of more than 13,000 human resources trained in foreign languages and IT skills annually. The average annual salary of IT professionals at the middle management level is around USD$20,000 to 25,000.

3.8.3 Key Lessons

CFZ has moderately been able meet the envisaged objectives. A number of global players like Dell, HSBC and IBM have started their operations in the IT Park. In 2006, 15,000 people were employed in CFZ.

CFZ case study highlights the following key lessons:

- Flexible land use policies provide IT Park developers with more options for recouping their investments. In CFZ, along with IT office space, developers were allowed to construct commercial and residential complexes which typically provides higher returns than IT office space. Such flexible land use policy provided an added incentive to the real estate developers.
- World class physical and virtual infrastructure represent essential necessities. Infrastructure like roads, urban and social amenities like recreation and sport, proximity to airport and virtual infrastructure in terms of state-of-art data & voice connectivity are absolute essential prerequisites for successful IT parks.
- A judicious mix of anchor occupants and small companies helps. CFZ was able to attract reputed companies like Dell, HSBC, IBM and Shell along with some local, small companies.

3.9 Critical Business Success Factors and The Relative Positioning of IT Parks

Based on the individual IT Parks assessed as part of the study, a summary of the positioning of individual parks with respect to critical business success factors has been provided below.

Figure 10. *Capital*

	Hitec City, India	IT Park-Hubli, India	SSP, Singapore	CFZ, Malaysia	Taedok Valley, Korea	ZSP, China
Ownership	PPP	Government	Originally Government; presently private	PPP	Private	Private
Management	PPP	Government	Private	Government	Government	Government
Anchor Tenants	Large Indian Private, Companies Global IT and BPO companies	Government agencies	Government & Private companies (mainly R&D)	Global IT and BPO companies	Large Korean Private, Companies, Large public R&D Institutions	Global IT and hardware companies, Large Chinese companies
Access to VC/PE	No dedicated funds; Fairly matured VC/PE market	No dedicated funds; Fairly matured VC/PE market	Vibrant VC/PE market	Dedicated Government sponsored VC funds	Dedicated VC Fund	Dedicated VC funds administered Beijing Municipal Government
Business Incubation Services	Not provided	Provided by STPI-Hubli, limited space	Provided – it is one of the focus services	Provided	Provided	Provided through individual universities

PPP: Public Private Partnership; VC: Venture Capital; PE: Private Equity

Figure 11. *Linkages*

	Hitec City, India	IT Park-Hubli, India	SSP, Singapore	CFZ, Malaysia	Taedok Valley, Korea	ZSP, China
Product & Services	IT & BPO services	BPO services	R&D, hi-tech products; IT services	BPO services	Telecommunication technologies, R&D	IT goods & services, Chinese language software for domestic market
Forward & Backward Linkages	Export market oriented	Mainly domestic market oriented, few companies export oriented	Domestic and export market oriented	Export market oriented	Domestic and export market oriented	Domestic and export market oriented
Value added Services by Park Management	None	None	Business development support, marketing support	None	Marketing and Sales support, R&D support	None
Centres' of Excellence	None	None	R&D Institutions, NUS, S&T Parks outside Singapore	Multimedia University	R&D Institutions, KAIST, ETRI, ICU, Chungnam University	Beijing & Tsinghua University, Chinese Academy of Science, Chinese Academy of Engineering, R&D Institutions

Figure 12. *Infrastructure*

	Hitec City, India	IT Park-Hubli, India	SSP, Singapore	CFZ, Malaysia	Taedok Valley, Korea	ZSP, China
Electricity Supply – IT Park	Government, dedicated electricity line backup facilities present	Government, dedicated electricity line, subsidized price, backup facilities present	Reliable supply, service level contract present	Reliable supply, service level contract present	Government, dedicated supply	Government, dedicated supply
Telecommunication	Competitive Market	Competitive Market	Competitive Market	Competitive Market	Competitive Market	Competitive Market
Internet Service Providers	Government and Private	Government and Private	Government and Private	Government and Private	Private dominated	Government and Private
Road Connectivity	Good	Fair	Excellent	Excellent	Excellent	Excellent
Urban & Social Infrastructure	Leveraging the quality infrastructure of Hyderabad, one of the largest cities of India	Inadequate, given that Hubli is non-metropolitan city	Leveraging the quality infrastructure of Singapore	Good, integrated commercial and residential clusters	Good, integrated township with commercial, residential & other land uses	Good, integrated township with commercial, residential & other land uses
Housing	Good, available near the IT Park, mainly Private Sector/PPP	Worse, compared to Tier 1 cities	Excellent, leveraging the quality housing stock of Singapore	Average, around 3600 houses & apartments within the park	Good, around 16,400 houses inside the park	Good

Figure 13. *People*

	Hitec City, India	IT Park-Hubli, India	SSP, Singapore	CFZ, Malaysia	Taedok Valley, Korea	ZSP, China
Engineering Throughput per year	>20,000 from Hyderabad (90,000 from AP)	1100 from Hubli (75,000 from Karnataka)	14,000 from Singapore	13,000 from CFZ	30,000 from Taedok Valley	100,000 from ZSP
Annual Average Salary (USD)[16] for middle management employees	9,000–11,000	4400–6600	40,000–50,000	20,000–25,000		10,000–12,000
Employment within Park	80,000	300	7,000	15,000	>25,000	650,000

3.10 Business models for IT Parks

It is evident from the individual case studies that there are significant variations in the business models followed for developing and managing sustainable IT parks. The role played by government and the private sector in promoting IT parks differ significantly in the six case studies. For example, while Andhra Pradesh Industrial Infrastructure

16 Salary figures based on expert opinion and "NeoIT ITO and BPO Salary Survey Report 2006" Available at: *http://www.neoit. com/pdfs/Whitepapers/OIv4i04_0506_ITO_and_BPO_Salary_ Report_2006.* August, 2006

Corp., a government organization, has partnered with private players such as Ascendas and Larsen & Toubro Ltd. to develop Hitec City, Hyderabad, the IT Park Hubli is promoted and managed entirely by different agencies of the state government of Karnataka. The role of government ranges from providing land or funds for developing IT parks to managing facilities post commissioning such parks. The private sector partner on the other hand brings in experience and expertise in construction, financial resources, and better marketing skills.

Based on ownership and management of IT parks, different business models can be worked out for developing and operating such parks. A summary of the business models adopted by the individual IT parks covered as part of the exercise has been presented in Figure 14.

Based on the case studies it is observed that government is best suited to facilitate the development of IT Parks, rather than developing and managing IT Parks themselves.

Government can facilitate IT Park development in the following ways:

- Create enabling infrastructure, such as connecting roadways, main water supply lines, and constructing sewerage and drainage lines to the IT Park.
- Help park developers acquire land. Typically, development of IT Parks requires huge chunks of land. It is very difficult for the park developers to buy such large chunks of contiguous land

from the market. Government can act as a facilitator in this respect, and assist the private players in acquiring requisite land. In case the land is owned by government, it can further help the park developer by taking an equity stake in the project, which is equal to the cost of the land.

- Develop enabling policies and regulations for both park developers and occupants for ensuring that the objective with which the park was established is fulfilled.

IT Parks are best managed and operated by the private players, given their flexibility in operations and decision making. The private sector is best suited for customer facing services and can commit to service level agreements with the park occupants. The success of any IT Park is measured by its ability to attract world class occupants and retain them by providing services as per their expectations. Private sector IT Park management organizations are also capable of providing a number of value added services to the occupants, such as support for marketing, recruitment support, access to external finances such as venture capital and business angels, establishing networks with other companies and/or universities, developing business plans, and business education and training. These services are usually availed by the small & medium enterprises in the IT Parks as well as those availing incubation facilities. This also helps the government's objectives in encouraging SME sector development in the IT sector.

Figure 14. *Business Models for IT Parks*

Management / Ownership	Government	PPP	Private
Government	**Hubli-India**: Facilities owned and managed by provincial Government		
Public Private Partnership (PPP)	**Cyberjaya-Malaysia**: Services provided by respective Government utilities	**Hitec-India**: PPP with provincial Government, majority ownership and management with private sector	
Private	**Zhongguancun-China, Taedok Valley-Korea**: Build to suit by private sector; urban infrastructure managed by local Government		**Science Park-Singapore**: Primarily multi-occupant buildings, managed by Ascends.

3.11 Returns from IT Park Investments

Based on the case studies covered as part of the study, it is observed that returns for IT Park developers can comprise two components:

- *Returns from the core IT Park infrastructure including multi-occupant buildings and build-to-suit facilities for large anchor investors*, which usually accrue to the developer in the form of a one-time sale/lease payment, followed by periodic charges levied on occupants for facilities management services. In other cases where IT Park facilities are offered on rent, the periodic payment also has an additional component towards facilities management charges. While the usual returns from core IT Park facilities vary from country to country, it is observed to range between 15%–20 % per annum. Sample return computations for a multi-tenanted building, which is a part of Hitec City, Hyderabad, and CFZ Malaysia, have been presented in Appendix 1 to this report.
- *Returns from ancillary infrastructure*: In some of the IT Parks like Hitec City, Hyderabad and CFZ, Malaysia, the IT Park developer is also mandated to develop ancillary infrastructure like retail and residential complexes, hotels and exhibition centers. The returns from these investments are usually higher than returns on core IT Park infrastructure about 20%–25%. Appendix 2 details indicative computations of returns from investments in residential complexes by IT Park developers in Hitec City, Hyderabad, as well as CFZ, Malaysia.

Consequently, many governments encourage IT Park developers to invest in a combination of core and ancillary IT Park infrastructure, so that the overall returns on their investments are adequate. This does not however alter the risk perception of the project, as both components are inter-dependent with demand for ancillary infrastructure being directly linked to the level of success of the IT Park. It is also observed that one of the primary tools used by policymakers for ensuring viability of core IT Park investments is allotment of land at subsidized rates than that allowed for residential and/or commercial end use. This has been the case for most of the IT Parks developed through public private partnerships like CFZ Malaysia and Mindspace, Hyderabad.

From the perspective of government policymakers, the major component of return from IT Park investments includes:

- Direct returns on core and ancillary IT Park investments in cases of government making investments, either on its own or in partnership with the private sector.
- Returns in the form of direct and indirect taxes on incremental income generated by both companies as well as their employees. As will be discussed in the subsequent section on impact of policies on IT sector development, many governments usually provide various fiscal concessions on this front during the initial period to ensure sustainable viability of the sector in the medium to long term.
- Positive spillover to other sectors through generation of additional employment opportunities; higher per capita income manifesting in higher spending in sectors like retail and real estate, which in turn lead to generation of further employment. Specific examples of such spillover effects in the context of the IT Park case studies covered during the exercise have been discussed below.
  - *Increase in employment*: L&T Infocity estimates that for Hitec City, Hyderabad, for every job created in the IT sector, an additional four non-IT related jobs have been generated.
  - *Retail investments*: In many countries, growth in IT sector has lead to the growth in retail sector. For example, in developing countries like India, organized retail has grown at the rate of 25%–30% for the last 3 years (KSA Technopak Study on Retail Sector in India). As per KSA Technopak Consumer Outlook survey, 2004, an average Indian urban household spent more than 20% of family income on recreational services/goods such as movies and theaters, books and activities, and eating out in 2004, which was much less than in the early 1990s. One of the reasons for such growth was the growth in the IT sector and the corresponding higher per capita income. In CFZ, the presence of the IT companies and the residential areas to accommodate IT sector employees created more demand for retail products. Such demand led to construction of more than 32,000 sft. of commercial space to accom-

modate retail outlets, supermarkets, food outlets, bookstores, etc.

- *Real estate*: The growth of IT sector fuels the growth in real estate sector. For example, in Cyberjaya, 2.2 million sft area of office space has been constructed and occupied by more than 325 companies between 1999 and 2005. A number of such facilities constructed are multi-tenanted buildings like Century Square-Phase 1 & 2 (around 0.5 m sft), Enterprise 1 (around 98,000 sft), Enterprise 2 (around 72,000 sft), Enterprise 3 (110,000 sft) and Cyber Garden (56,000 sft), which accounts for around 1 million sft. Also, around 70,000 sft of incubation has been constructed. Moreover, 3600+ residential houses, bungalows and apartments, accounting for more than 4 million sft have been constructed between 2000 and 2005. An additional 2000 residential houses are under construction, and will be delivered within the next 2 years. It is estimated that more than 7 m sft. space was constructed in Cyberjaya Flagship Zone between 1999 and 2005.

In addition to the above, other spillover effects observed on local economies from establishing IT Parks include technology transfer and skill development of the local human resource.

In IT Park context, technology transfer occurs when a local IT company partners with a global IT company and commences operations in the IT Park. The occupant entity could either be a local IT firm having a technology transfer agreement with a global major or a joint venture entity with shareholding between a domestic player and a global player. While the global player contributes with technical know-how, design and drawings, etc., the local partner provides knowledge about the local conditions and markets, and access to local skills and resources. It is generally found that where proprietary know-how requiring intellectual property rights protection is required, global players prefer to operate through wholly owned subsidiary entities, which allow them to retain complete management control over the local entity. For example, in case of the Saigon Hitech Park in Vietnam, Nidec of Japan (computer hardware components) and Intel (computer chip assembly & testing facility) have set up/in the process of setting up operations as occupants of the IT Park through wholly owned subsidiary companies.

The other significant spillover effect is the skill development of the local population. Given the requirement of skilled local resources by IT Park occupants, the local educated population acquire the necessary skills required to gain employment through taking courses in colleges, universities, or computer training institutes. Organizations also have their own training/skill development programs which further help the local employees develop skills. For example, for its Vietnamese operations scheduled to begin in 2009, Intel has already recruited engineering graduates from local colleges and has sent them for on the job training to their Chinese and Malaysian plants for ensuring that they acquire the necessary skills to operate the Vietnamese facility once it commences.

3.12 Key Learning from the Case Studies

As is evident from the individual case studies, there are significant differences between the objectives underlying setting up of individual IT Parks. For example, the primary objective underlying Taedok Valley in Korea and the Singapore Science Park was better collaboration between academia, research and development institutes, and industry players for introducing new and disruptive technologies. On the other hand, most of the IT Parks in countries like China and India are guided by the primary objective of generating more employment. Given the diverse objectives, it becomes difficult to assess the relative performance of individual IT Parks other than parks like the IT Park in Hubli, India, where underperformance is obvious. Nevertheless, based on the case studies, we have attempted to identify representative critical business success factors that have impacted the performance of IT Parks, irrespective of geographies.

Having the right product-services mix is critical

Most of the parks that have not underperformed have by and large focused on products and services where their countries of operation have a competitive edge. Thus, Hitec City in India is focused primarily on IT & BPO services, while ZSP in China has EDP & office equipment, software (China-centric in the form of word processor and

digital publishing) and IT services as focus areas of its occupants. Similarly, most of the ventures in Taedok Valley have basic and advanced telecommunication as their primary focus. The only exception is Cyberjaya in Malaysia, which appears to have IT & BPO services as the primary revenue earner for its occupants, contrary to Malaysia's traditional strength of assembling of EDP & office equipment. Malaysia's annual IT & BPO services exports during 2004 was estimated at USD$120 million and USD $40 million respectively, which is significantly lower than market leaders like India, Ireland, and Canada. The average salary levels in Malaysia are also more than twice those of India and China, although they are around 30% of near-shore locations like Ireland. Given that the revenues are primarily being driven by captive shared services and data centers of global companies, this seems to be a conscious strategy of leveraging its not-so-distant location and cost advantages, viz. a viz. primary outsourcing customers in the United States and Europe.

A supportive and proactive government is key

Each of the case studies underlines the importance of the role of government in development of successful IT parks. The extent of government involvement has varied in individual countries, with the government also acting as an investor, promoter and playing a key role in managing the park in countries like Korea, China, in addition to its traditional role of regulator and facilitator. On the other hand, countries like Singapore have gradually moved to a model wherein development and management of IT parks are primarily carried out by the private sector, with the government ensuring a conducive policy environment. The relatively late entrants like India, Malaysia, and even some of the more recent parks in China, like the Dalian IT Park are based on this model. Even countries like Korea are gradually moving to a model where the private sector, including foreign investors, is likely to play a major role in the promotion and management of IT parks. Nevertheless, the government is expected to continue to play a key role in terms of formulation of appropriate policies for:

■ Encouraging innovation through financial and non-financial measures, including protection of intellectual property.

■ Promoting investments through appropriate financial and tax incentives, together with efficient and user-friendly processes for implementing the policies.

■ Facilitating capacity building by encouraging mobility of skills, appropriate employment policies, and extending financial support to select capacity building initiatives.

Examples include the Malaysian and Indian governments, both of which have adapted the single-window mechanism for providing requisite approvals to IT sector companies through the Multimedia Development Corporation and STPI respectively.

World class physical and virtual infrastructure represents bare necessities

It is amply clear from the case studies that physical infrastructure like roads, urban infrastructure and social amenities for recreation, sports, proximity to airports, and virtual infrastructure in terms of state-of-art data and voice connectivity are absolutely essential prerequisites, even though they may not serve as competitive differentiators as far as IT Parks are concerned. In fact, weaknesses in this area have been identified as one of the primary reasons for the underperformance of the IT Park at Hubli.

A judicious mix of anchor occupants and smaller companies helps

Most of the parks that have done reasonably well have a mix of large credible domestic and global companies and relatively smaller local companies (including start-ups) as occupants. While Taedok Valley has many of the South Korean chaebols as anchor occupants, the large occupants at Hitec City, India, include global majors like GE, Microsoft, CSC, Verizon in addition to Indian multinationals like Infosys, TCS, and others. ZSP also has a mix of large international and domestic occupants, such as Microsoft, IBM, Intel, Legend Group, and Stone Group. Singapore Science Park's list of reputed occupants include Lucent, Silicon Graphics while CFZ, Malaysia has been able to attract reputed companies such as Dell, HSBC, IBM, and Shell. The only exception is the IT Park, Hubli, which only has small local companies as its occupants, which is possibly one of the reasons behind its underperformance.

While development of the domestic IT sector definitely constitutes one of the key objectives for most IT Parks, having large, established companies as anchor occupants enables reduction of operational risks and uncertainties, and facilitates industry cluster effects. These large players primarily leverage the infrastructure of the park and use their own management and technical bandwidth to replicate their success in other locations. Consequently, many of the successful parks have adopted a strategy to acquire critical scale by inviting these larger players, while supporting the relatively smaller companies (including start-ups) through value added services like business incubation.

Availability of angel investment, venture capital and private equity financing are essential pre-requisites

Angel investment, venture capital and private equity have been identified as key enablers, specifically for development of start-ups and small & medium enterprises. Consequently, in countries like Korea and China, where the presence of global angel investors/venture capital/private equity funds is limited, IT parks like Teadok Valley and ZSP have set up their own dedicated venture capital funds, usually administered by government agencies/bodies. In addition, most successful parks have business incubation centers for supporting start-ups and small companies. However, irrespective of the venture capital/private equity set up of the individual park, infusing the requisite depth to the venture capital/private equity market at the country level is also essential, as it enables transfer and sharing of good practice. Singapore, India and China represent some of the countries that have been able to achieve an extent of success in this area.

Providing Incubation facilities in the park is key

Other than providing general office space and utilities, providing business incubation facilities is one of the key distinguishing factor of IT parks. Through provision of incubation facilities, IT Parks foster innovation through supporting commercializing of business ideas, by supporting entrepreneurs and providing world class quality infrastructure like telecommunication services, conference facilities and office space. They also provide value added services like establishing networks with other companies and/or universities, support for marketing, recruitment support, access to external finances such as venture capital and business angels, and developing business plans and business education and training. This helps in developing entrepreneurship, and the SME sector in the domestic economy and the IT Parks gains when these operations scale up to become regular occupants of the IT Parks.

Linkages with Centers of Excellence are critical for select products and services, while skill linkages are essential for all types of products and services

Close working relationships with academic institutions such as universities and colleges and R & D institutes are essential for parks like Taedok Valley, Singapore Science Park, ZSP, where the primary focus of some key occupants is on technology innovation in the areas of EDP equipment, telecommunications, integrated circuits & electronic components. The nature of requirements require leveraging of specialized R&D infrastructure for areas such as basic and applied research and prototyping, which are usually available with prominent academic and R&D institutes. Consequently, many of these parks have attempted to facilitate linkages between these institutions and industry players by co-locating them. For example, KAIST and ETRI are located within Taedok Valley, Quinghua University, Beijing University and the Chinese Academy of Science are occupants of ZSP and institutes like the Center of Wireless Communication and the Institute of Microelectronics are located within the Singapore Science Park.

On the other hand, such linkages are usually not as critical in IT & BPO services where innovation requirements are usually based on service delivery around existing software & hardware products and most market leaders possess the requisite competencies in-house.

However, for both the above categories of companies, availability of quality manpower resources is key to success and hence dictates the performance of the IT park. Consequently, many of the IT parks have been set up in close proximity with prominent

academic institutions and centers of learning. In addition, factors such as existing infrastructure & amenities and employment regulations play a key role in attracting the right competencies from other locations.

A vibrant and pro-active IT Park management team represents an added advantage

In addition to having the right infrastructure and linkages, the relative performance of an IT park is also dependent on the competence and level of initiative of its management team. Consequently, parks promoted and managed by groups/companies with requisite expertise have been found to outper-form others. For example, Phase I of Hitec City was fully booked within 4 months of commencement of construction, one of the reasons being the extensive marketing exercise launched by the private sector promoters L&T Infocity. The initiative of the management team emerges as a key differentiator not only at the time of marketing the park but also during subsequent operation, particularly for start-ups and smaller companies, which are at times dependent on them for the required market and financing linkages. To this end, some IT park management companies like Ascendas have established relationships with organizations specializing in areas such as business planning and market assessment. and offer these services to occupants. It has also been observed that the private sector inevitably has an advantage on this front, as it has requisite practices in place to reward (or penalize) the respective management teams depending on their performance, unlike govern-ments in most developing countries where perfor-mance based management is still in its initial stages.

IT Sector: Policies and Their Impact

4.1 Introduction

As in most other sectors, government policies and interventions have played a key role in the development of the IT sector in individual economies. The relocation of leading defense contractor Lockheed to the Silicon Valley in the fifties, thereby bringing in significant orders and leading to creation of a large number of ancillary technology firms represents one of the earliest instances of government playing a crucial role in development of IT Parks. As has been discussed in the case studies of individual IT Parks, similar models have been followed by governments in different countries such as Korea and Singapore. The role of government has also evolved over time depending on the level of maturity of the sector. Consequently, while government institutions/ organizations in many countries have played a direct role in facilitating development of the sector in the initial stages, the government has shifted to a facilitation role once the sector has attained critical mass, with much of the subsequent growth initiatives being private sector led.

The current section highlights key findings of an assessment of the impact of government policies, institutional and implementation mechanisms on the development of the IT sector in general, and IT Parks in particular. In addition to direct interventions in the IT sector, we have also attempted to carry out a high level analysis of government policies and interventions targeted at i) other sectors such as physical infrastructure and telecommunications, which usually play a key role in development of the IT sector and ii) facilitating spillover effects from the growth of the IT sector to drive overall socio-economic development.

4.2 Framework for analysis

Given the different types of government policies and interventions impacting the development of the IT

sector and IT Parks, a categorization of the individual policy instruments becomes essential. For purposes of the current study, relevant government policies and interventions have been grouped into the following categories.

- Fiscal policies that primarily represent the different financial concessions and benefits offered to players in the IT sector.
- Policies aimed at encouraging innovation, and research & development, areas which have traditionally formed the backbone for the development of certain segments of the IT sector. Some of these policies could involve provision of financial concessions & benefits, as in the case of fiscal policies.
- Human capital-related policies, primarily intended to facilitate availability of requisite human resources, which constitute one of the key enablers for development of the IT sector.
- Policies impacting the investment climate of the country, which are aimed at making the economy attractive to domestic/international investors through a combination of policy measures and instruments. Most government policies and interventions in this category, while they may be tailored to meet the specific requirements of a particular sector like IT, are usually targeted at meeting socio-economic objectives through all round economic growth.

A detailed description of the key policy instruments in each of the above categories, together with suitable illustrations, has been presented in Figure 15 on the next page.

4.3 Fiscal policies

China
- Under the Policies for Encouraging the Development of Software Industry And Integrated Circuit (IC) Industry framed by the

Figure 15. *Types of Government Policy Instruments*

Broad Classification	Key Policy Instruments	Illustrative interventions
Fiscal Policies	Direct tax concessions and waivers	Income tax holidays, concessional tax rates, simplified return filing provisions, special tax exemption
	Indirect tax concessions and waivers	Customs duty exemption on exports and imports, service tax concession, sales tax waivers
	Subsidies, grants, incentives and other financial support	Capital subsidy, subsidies on land, power & telecom tariff, interest expenses
Innovation Policies	Research and development (R&D) support	Direct funding through strategic R&D grants & patent incentives, development test bed facilities, tax break on R&D expenses
	Intellectual property rights (IPR) protection	Legislation and implementation mechanisms for protecting products, copyrights and trademarks
	Providing incubation facilities and services	Support schemes for start-ups and SMEs offering plug & play facilities and other incubation services.
Human Capital Policies	Formulating educational policies & curriculum with a focus on IT sector requirements	Making changes in curriculum based on IT sector requirements, allowing private investment in education with requisite quality checks
	Supporting training & capacity building initiatives	Government sponsored/supported programs for developing and enhancing skill sets of IT work force
	Facilitating employment creation and attracting talent	Subsidies linked to job creation, policies to attract foreign experts, relaxed visa regulations and labor market policies
Investment Climate Policies	Simplified institutional and implementation framework	Declaring IT as a "priority sector" resulting in preferential treatment and efficient policy implementation mechanisms, single window clearance facilities, investment facilitation services
	Facilitating cross-border investments, trade in products and services	Favorable export import policies, free trade agreements, Double Taxation Avoidance Agreements, permitting foreign direct investments (FDI) with profit repatriation
	Enabling development of e-Commerce/e-Government	Legislations for recognizing legal validity of digital signatures & transactions, responsibility of service providers, incorporating cyber crime into existing penal provisions
	Venture capital (VC)/private equity market development	Government sponsored VC funds, transparent & well regulated financial services sector with special fiscal concessions/benefits for attracting global VC/private equity investors
	Facilitating development of enabling infrastructure, leveraging spill over benefits	Allowing competitive development of physical (roads, airports, urban infrastructure) and telecommunications infrastructure, flexible land use policies

State Council, a maximum tax rate of 10% is applicable for key software enterprises identified by the state against the normal tax rate of 30%. A number of government bodies, including the Ministry of Foreign Trade and State Bureau of Taxation, decide which enterprises are eligible for this.

- Software enterprises importing capital equipment as well as technology (including software) are exempt from payment of customs duties and import Value Added Tax (VAT).

India

- The Income Tax Act, 1961, offers a number of incentives to IT and ITES companies, including a 100% exemption on profits from export of computer software till 2010 and a higher rate (60% compared to 15% for plant, machinery and equipment) of depreciation on computers and software.
- Software Technology Parks of India (STPI), an autonomous organization under the aegis of Ministry of Communications and Information Technology, government of India offers a number of concessions to STPI registered IT and BPO units like 100% import duty exemption on capital goods imports, reimbursement of Central Sales Tax (CST) paid on capital goods purchases from the Domestic Tariff Area (DTA).
- Many state governments have started the practice of extending various financial concessions/benefits linked to the level of employment

creation. For example, government of Andhra Pradesh offers a rebate of USD$450 on the land cost for every job created provided at least 333 jobs are created per acre of land.

- Given India's federal structure, a number of state/provincial governments also offer additional financial incentives to IT and BPO units setting up operations in the region. Typical incentives offered include capital investment and interest subsidies and subsidies on electricity tariff.

Malaysia

- Under the Income Tax Act, 1967, 70% of the income from software development is exempt from tax for a period of 5 years.
- Additional benefits are offered to companies located in designated IT Parks like the Cyberjaya Flagship Zone. Companies in such areas are eligible for 100% of their income being exempt from tax for the first 10 years, 100% deduction on approved capital expenditure incurred during the first 5 years of operation, and duty free import of multimedia equipment.
- The government of Malaysia allows duty free import of multimedia equipments to the IT companies.
- The government of Malaysia also offers grants and subsidies to start up companies and local SMEs to meet various expenses through the Small and Medium Industries Development Corporation (SMIDC) of Malaysia. For instance, 50% of the cost of business planning and feasibility studies and 50% of the cost of upgrading production & design capabilities are reimbursed as grants.

Singapore

- Under the Singapore Income Tax Act, IT companies with "Pioneer Status" enjoy a 100% exemption from corporate income tax for the first 5 to 10 years of operation. In addition, companies with export revenues in excess of 20% of total revenues are eligible for tax exemption on export profits.
- The Economic Development Board (EDB) of Singapore runs a number of schemes to support local IT companies like the Start-up Enterprise Development Scheme (SEEDS). Under this scheme EDB provides equity support to a start up company by subscribing up to 50% of its share capital subject to a maximum investment of USD$300,000. EDB also provides managerial

support to local companies through Directors and Advisors for Technopreneurial Enterprise Scheme and the Enterprise Investment Incentive Scheme.

Korea

- The Corporate Income Tax Law gives special breaks to the IT sector under the aegis of Tax Incentive Limitation Law (TILL) for foreign invested companies involved in advanced technologies. Benefits include a 100% exemption from corporate income tax for 7 years from the first year in which profit was generated or the 5th year of operations, whichever is earlier. For the next three years, the income tax exemption is applicable to 50% of the profits. Additionally dividends are exempt from dividend withholding tax.
- The Tax Incentive Limitation Law (TILL) grants exemption from custom duties, VAT, special excise tax to the companies set up with foreign investment. Such companies also get up to 100% (prorated on the foreign ownership ratio) exemption from the aggregate land tax for the first 5 years of operation and up to 50% for the subsequent 3 years

A comparative summary of the fiscal policies of individual countries has been presented below.

4.4 Innovation policies

China

- The Policies for Encouraging the Development of Software Industry And Integrated Circuit (IC) Industry framed by the State Council provides incentives for software enterprises to invest in research & development. Any amount exceeding 3% of VAT paid on sale of software products are refunded to the company provided the amount is used in research & development.
- Patent Law of the People's Republic of China was amended in 2000 with patent right for inventions being valid for 20 years and the patent rights for utility models and designs valid for 10 years. The Copyright Law was revised in 2001 to include 'computer software' under the definition of 'works' enjoying copyright, with the copyright being valid for fifty years. The Trademark Law, revised in 2001,

Figure 16. *Fiscal Policy Highlights for Different Countries*

	China	India	Malaysia	Singapore	Korea
Direct Tax concessions & waivers	■ Reduced income tax rate of 10% for key software enterprises identified by the state	■ Income Tax holiday on profit from exports ■ Higher rate of depreciation on computers & software ■ IT Parks under the SEZ policy enjoys 100% IT break for 5 years, 50% tax exemptions for next five years and up to 50% of the profits ploughed back for next 5 years	■ 100% tax exemption for MSC Status companies for 10 years ■ 100% deduction on capital expenditure	■ 100% tax exemption for pioneer status companies ■ Tax on profit from export of services exempted	■ 100% Corporate income tax exemption for 7 years ■ 100% exemption from dividend withholding tax, for foreign investment in technology
Indirect Tax concessions & waivers	■ No customs duty and import VAT for software companies importing capital equipment including technology.	■ Duty free imports by STPI units ■ CST reimbursement on purchases from DTA	■ Duty-free import of multimedia equipment		■ Exemption from custom duties, VAT, special excise tax, for companies set up with foreign investment
Subsidies, Grants and other financial support		■ Rebate in cost of land by state governments ■ Subsidy for creating >2000 jobs	■ 50% cost of feasibility studies and business planning to SMEs	■ Equity support for start-up enterprises under the SEEDs scheme	

states that the period of validity of a registered trademark shall be 10 years. The above amendments are in compliance with WTO's Agreements on Trade-Related Aspects of Intellectual Property Rights (TRIPS). Additionally the Measures for Administrative Enforcement of Patent promulgated by the State Intellectual Property Office of China in 2001 aims at effectively resolving patent infringement and other related disputes.

■ China has a network of incubation centers which are usually set up in partnership between the municipal/local government and domestic venture capital investors. Almost all IT Parks have incubation facilities for start up/early stage companies.

India

■ Given India's federal structure, a number of state/provincial governments offer IT companies additional incentives linked to research and development. For example, the government of Andhra Pradesh as part of its IT Policy, 2005–2010, offers free space for 5 years to companies engaged in "high-end R&D" together with requisite software tools. Under this policy, the cost of filing patents are also reimbursed to companies based in the state.

■ The Indian Copyright Act, 1957 was amended in 1994 to include computer programs under the definition of "literary work" and any infringement of such copyrights was made a penal offence. The amended Copyright Act is based on the Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS) and provides for a Copyright Tribunal and a copyright protection period of 60 years.

■ STPI, under the Ministry of Communications and Information Technology, provides incubation facilities in each of its 49 centers spread across the country, with plug & play facilities, shared services support.

Malaysia

- The Ministry of Science & Technology Industries (MoSTI) operates a number of schemes to promote innovation among local IT companies. Schemes like the Industry Research and Development Grant Scheme (IGS), MSC Research and Development Grant Scheme (MGS) and Demonstrator Applications Grant Scheme (DAGS) offer up to 70% subsidy on R&D project costs. The Commercialization of R&D Fund (CRDF) has also been set up to support commercialization of R&D products from market survey to product launch.
- The Copyright Act, 1987 was amended in 1999 to include computer programs under the definition of "literary work" and any infringement of such copyrights was made a penal offence. The amended Copyright Act is based on the Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS) and provides for a Copyright Tribunal and a copyright protection period of 50 years.
- The Techno-preneur Development Flagship (TDF) program was initiated to support local entrepreneurs through various incubation services. The National Incubation Network (NIN) under this program includes a country-wide network of incubation centers for start-ups and early stage companies.

Singapore

- Under the Income Tax Act a number of tax incentives related to R&D are offered like double deduction of all expenses related to R&D and exemption of withholding tax of royalty or technical fees paid to non residents.
- The Economic Development Board (EDB) of Singapore, through a number of schemes like the Innovation Commercialization Scheme (ICS), Innovation Development Scheme (IDS) and Technology Capability Upgrading Scheme, offers grants to support R&D activities. Under the Research Incentive Scheme for Companies (RISC), EDB reimburses cost incurred on training, investment in equipment and professional services related to R&D projects through grants.
- The Copyright Act was amended in 1999 to harmonize it with key provisions under TRIPS. The amended Act provides for a 70 year protection for copyrights and setting up of a Copyright Tribunal to adjudicate IPR violations.

- EDB runs an island wide network of incubation centers named "Hub of Technopreneurs" (HOTSpots), which provide workspace and services like shared administrative resources, assistance in fund-raising and marketing, and general mentoring and guidance. The National Science & Technology Board acts as an advisory board to companies operating from these incubation centers.

Korea

- The Korean Tax laws permit up to 7% of the investments incurred in R&D and man-power development as tax deductible expenses. Up to 50% of the income from technology transfer by the patent holder is also exempt from income tax.
- The Korean government provides matching grants to original investments by foreign companies in R&D centers in the country through special support funds set up for the purpose. Ministry of Information & Communication and Ministry of Science & Technology supervise and operate similar funds to provide financial support for R&D programs.
- In 2000, the Copyright Act, the Computer Program Protection Act, and the Trademark act have been amended to comply with the TRIPs agreement. In addition, a Standing Inspection Team (SIT) has been set up under the Ministry of Culture & Tourism and Ministry of Information & Communication, to work with Ministry of Justice to intervene on various IPR infringements
- The Small & Medium Business Administration (SMBA) provides a single-point support mechanism to the Small & Medium Enterprises in areas such as human resources, marketing, and innovation. SMBA also supports organizations like the Korean Business Incubation Association set up by incubators and incubation tenants to support and facilitate technical commercialization and marketing activities of incubators and incubation tenants. Almost all IT Parks have incubation facilities which are usually supported by the provincial/local Government and academic institutions for start up/early stage companies.

A comparative summary of the innovation policies of individual countries has been presented below.

Figure 17. *Innovation Policy Highlights for Different Countries*

	China	India	Malaysia	Singapore	Korea
Research and development support	■ Any amount exceeding 3% of VAT paid on sale of software products to be re-funded provided it is used for R&D	■ Free space, soft-ware tools& patent cost reimbursement for high end R&D companies at state level ■ 100% IT deduction on capital expendi-ture with respect to scientific research	■ Up to 70% cost of R&D projects reimbursed under IGS, MGS and DAGS ■ CRDF to support R&D investments	■ 200% deduction on R&D expenses ■ R&D grants under RISC, ICS, IDS schemes	■ Special R&D promotion funds ■ Tax credit for expenditure & investment in R&D facilities ■ Tax exemption from technology transfer income
Intellectual property rights protection	■ Patent Law and Copyright & Trademark Laws revised in line with TRIPS.	■ Amended Indian Copyright Act in conformity with TRIPS	■ Amended Malay-sian Copyright Act in line with TRIPS	■ Copyright Act in line with TRIPS	■ Amendments to Copyright Act, Computer Pro-gram Protection Act & Trademark act in line with TRIPS
Providing incubation facilities & services	■ Almost all IT Parks have incuba-tion facilities supported by provincial/local Government & academic institu-tions	■ Government run country-wide incubation centers under STPI	■ National Incuba-tor Network (NIN) under the TDF program sponsored by Government	■ EDB runs 7 HOT-Spots incubation centers, with management sup-port from NSTB	■ Small & Medium Business Admin-istration along with KoBIA provides SME & start-up support

4.5 Human Capital Policies

China

- The Law on Science and Technology Progress (1993) and Law on Popularization of Science and Technology (2002) enacted by Ministry of Science and Technology encourage enterprises to cooperate with research & development institutes to increase their capabilities. The government has included in its policy the responsibility of school and educational institu-tions to make science and technology education an essential part of the curriculum to popularize the same among students and teenagers.
- The government has recently allowed entry of foreign players into higher education on a case by case basis. For example, the Indian IT training company NIIT is in the process of setting up a network of centers for providing training in programming & spoken English to graduates.
- Chinese visa regulations are fairly simple and allow long term multiple entries from most of the countries based on valid letters of invite from business partners in China.

India

- Education is a concurrent subject in India, with both the central (federal) and state (provincial) exercising control. Consequently, a number of state governments have initiated changes like compulsory introduction of English at primary level with a focus on emerging BPO sector trends, setting up specialized units under the education department for tracking emerging trends in the IT sector and planning changes in the curriculum.
- A number of state (provincial) governments also support training & development initiatives with a focus on meeting the manpower requirements of the IT sector. For example, the government of Andhra Pradesh has set up Jawahar Knowledge Centers in all 23 districts of the state with the support of industry associations and corporate entities to impart focused technical and soft skills to engineering graduates with a focus on the IT sector. The government of Karnataka runs 220 training centers all over the state with the curriculum focused on different types and levels of IT and BPO skills.

- Visa regulations in India have been simplified for facilitating easy movement of professionals from other countries. India has also entered into a number of bilateral agreements with countries like Singapore (a Comprehensive Economic Cooperation Agreement was entered in 2005) for easy mobility of professionals between the two countries.

Malaysia

- The 2nd National Science & Technology Policy identifies development of human resources capacity & capability as a key thrust area for science & technology (S&T) development. A number of specific measures have been suggested in terms of achieving a specific proportion of students pursuing S&T courses to those pursuing other streams at the upper secondary level, including setting up a post-graduate S&T research university, introduction of financial incentives for students pursuing S&T, expanding the operations of the S&T Human Resource Development Fund, making academic curricula more hands-on & innovation oriented, and strengthening mechanisms for allowing industry to contribute to curricula development.

- Different training programs and institutes offer training programs to improve the available skill sets in line with industry requirements. For example, the MSC K-Workers' Development Institute was set up by the Ministry of Education with the mandate of matching the demand and supply of knowledge workers. The government, under the 2nd S&T Policy, has initiated measures for strengthening the existing system of certification of technical personnel & classification of skills, expanding the operations of the Skills Development Fund to finance industry training programs, allow joint management of the fund by the private sector and leveraging existing facilities at industrial training & other institutes.

- In addition to these, the government has taken up a number of initiatives like relaxed visa regime to facilitate mobility of resources. MDeC is empowered by government of Malaysia to approve applications by companies to employ foreign nationals.

Singapore

- Over the years Singapore has developed an open education policy inviting foreign universities to set up campuses in Singapore. Currently 15 international universities have their campuses in Singapore. The education curriculum at school and graduation level have been adapted to suit technology based industry. For instance computer education has been made compulsory in schools. As are result a huge pool of English speaking IT resources is available in Singapore.

- The Ministry of Education (MoE) in partnership with IDA runs a number of training programs like Infocomm Training Framework (ITF) to train different segments of the population and Critical Information Resource Program (CITREP) to train IT professionals in latest industry skills.

- Singapore has a policy for enabling easy entry for skilled foreigners through its Employment Pass/ Center Pass schemes. Foreign entrepreneurs wanting to promote businesses in Singapore need to apply for "EntrePass", an employment Pass for foreigners. The application procedures are quite simple. A successful applicant can register the new business on the basis of this pass. In addition to easy visa procedures, the country has entered into bilateral agreements (typically referred to as Comprehensive Economic Cooperation Agreements) with a number of countries for facilitating easy movement of professionals.

Korea

- The Korean government developed the 'Basic Framework for National Human Resource Development 2001' for creation of a knowledge based society. The government has also implemented plans like 'Adapting ICT into Education Master Plan-I, 1997–2001' and 'Adapting ICT into Education Master Plan-II, 2001–2005,' which focus on fully utilizing & integrating ICT into the National Curriculum in elementary and secondary school education. The government has also adopted 'the e-Campus VISION 2007' to encourage the use of ICT in university education and research.

- Both government and private sector organizations offer certification programs in the field of information and communication technologies. The national certification system, implemented under the National Skills Certificate law is administered by the Ministry of Information and Communication and Human Resources Development Service of Korea, under the Ministry of Labor. Currently there are more than

Figure 18. *Human Capital Policy Highlights for Different Countries*

	China	India	Malaysia	Singapore	Korea
IT focused educational policies & curriculum	■ Specific laws on popularization of and ensuring progress of science and technology ■ Entry of foreign players in higher education on a case to case basis	■ Private sector participation ■ Compulsory English from primary level in many states	■ 2nd S&T policy focuses on making curricula more innovation oriented, involvement of private sector in setting curricula	■ Computer education at school level ■ Existence of a large number of international/foreign universities	■ IT literacy drive through '10 million informatization program' ■ eCampus Vision 2007 for encouraging use of ICT in universities
Training & capacity building initiatives	■ R&D institutes based in Beijing are encouraged to run schools/training institutes jointly with colleges, universities and scientific research institutes qualified for training postgraduates	■ IT focused training centers supported by various state Governments	■ Operations of Skills Development Fund augmented under 2nd S&T policy to support industry training programs, leveraging existing industrial training facilities ■ MSC K-Workers' Development Institute set up by Finance Ministry	■ ITF, CITREP run by IDA and Education Ministry	■ Specialized organizations such a NCA, IITA, and ETRI, for promoting R&D in high technology
Facilitating employment creation and attracting talent	■ Simplified visa regulations	■ Employment linked financial incentives ■ Simplified Visa regulations	■ MDeC empowered to approve visa/work permit applications	■ Simplified visa regulations ■ Entrepass for foreigners setting up business	■ Simplified visa regulations

100 IT related certificates issued by industry associations or corporate groups. The government from time to time recognizes certificates issued by these private institutions as national certificates. Currently over a million people have been trained & certified under these schemes.

- The government has over time created a strong network of support institutions to promote research on e-learning, develop information related to education and research like the Bureau of Educational Information & Technology (1996) under Ministry of Education and Korea Education and Research Information Services (KERIS,1999)

- In 2000 the '10 Million Informatization Program' was launched by the government of Korea as an initiative to bridge the digital divide. In the same year the National Center for Lifelong Learning was set up under the aegis of Lifelong Learning Act (March 2000) to carry out research, collect information, and provide training to instructors and administrators on ICT education with a focus on senior citizens, illiterates, and the disadvantaged like the deaf and the blind.

- South Korean visa regulations are fairly simple and allow five year multiple entries from most of the countries based on valid letters of invite from business partners in the country.

A comparative summary of the human capital policies of individual countries has been presented below.

4.6 Investment Climate Policies

China

- The Ministry of Information Industry is responsible for formulating and administering policies for the development of China's IT and telecommunications sector at the Federal level. At the local government level, the provincial/municipal governments play a key role in areas

such as overseeing development of the IT sector & IT parks in their respective regions and managing local level venture capital funds.

■ The country promulgated the Electronic Signature Law in April, 2005, for establishing legal validity of electronic signatures and institutionalizing the process of issue and certification of digital signatures.

■ The role of private sector/foreign players in IT sector development is evident from the Memorandum of Understanding (MoU) entered into between the State Development & Planning Commission of China with Microsoft Corporation of USA in 2002. This is an all encompassing MoU under which Microsoft will assist China in facilitating development of the IT sector besides committing investments of USD$750 million over a three year period.

■ China has three main stock markets viz. Hongkong, Shanhai & Shenzen Stock Exchange with 1164 ,837 and 569 companies listed in the respective stock exchanges. The Hang Seng is the leading index for shares traded on the Hong Kong Stock Exchange. Started in 1969, the index consists of the 33 largest companies that trade on the exchange.

■ In 2005, 44,019 foreign-invested enterprises were newly set up in China, with a estimated investment value of USD$72.406 billion In China FDI is allowed in a number of sectors including retail, software and electronics. Many foreign players are present in the IT sector including Motorola, Samsung, Langchao, and LG. (Source: www.fdi.gov.cn).

■ China is a signatory to a Treaty for the Prevention of Double Taxation with over 65 countries all over the world. Among them are major IT markets like USA, UK, France, Germany, and Japan.

India

■ At the central (federal) government level, the Department of Information Technology (DoIT), Ministry of Communication & Information Technology, government of India is responsible for formulating specific policies and promoting the Indian IT sector. It has formulated and administers a number of schemes like STPI, Electronic Hardware Technology Park (EHTP), Export Promotion Capital Goods Scheme(EPCG) for providing various incentives & concessions to IT companies.

■ The DoIT has promulgated various legislations such as the Information Technology Act, 2000, and the Semiconductor Integrated Circuits Layout Design Act, 2000 as part of its initiatives to create a supportive legal framework for development of e-commerce in the country. It has also initiated the National e-Governance program (NeGP) for adoption of IT to bring about improvements in citizen service delivery both in the Central Government as well as individual states. Most of the large IT companies have benefited through significant additional business by participating in NeGP.

■ The state (provincial) governments also offer additional benefits & concessions through their respective Departments of Information Technology/nodal agencies. Many states have declared the IT & BPO sector as "essential services" to provide additional operational flexibilities to companies in these sectors.

■ India has a developed and well-regulated financial services sector, including liquid and vibrant capital markets in the form of Bombay Stock Exchange and the National Stock Exchange. There are a large number of international & domestic financial services players such as commercial banks, financial institutions, investment banks, venture capital & private equity funds, stock brokers, and foreign institutional investors. A number of international venture capital/private equity funds such as the Carlyle Group, the Blackstone Group, and General Atlantic Private Equity operate in the country, in addition to domestic players like ICIC and Kotak Bank. To encourage venture capitalists to invest in India, dividend income and long term capital gains from investments in a VC undertaking are exempted from tax. The Securities and Exchange Board of India, the regulatory body for Indian capital markets in its Guidelines for Venture Capital has laid down the regulations governing venture capital funds in India on listing and inviting public subscription for enterprises funded by VCs.

■ While the country lags behind in key ICT indicators, large cities have access to world class telecommunication infrastructure. Significant competition exists in most of the sectors (roads, airports, telecommunications), which usually play key supportive roles in IT sector development, with both government and private sector players being present.

- India has double taxation avoidance agreements (DTAA) with various developed and developing countries such as the U.S., the UK, France, Germany, China, Brazil, Malaysia, and South Africa.
- While there are FDI restrictions for some of the sectors like retail, which usually are key beneficiaries of IT sector spill over effects, 100% FDI is permitted in other sectors like real estate. With land use being a state (provincial) government subject, most of the state governments have allowed a combination of business, residential and commercial end use as far as IT Parks are concerned, to enable maximization of spillover benefits.

Malaysia

- Malaysian Industrial Development Authority (MIDA), the government's principal agency for promotion and coordination of industrial development in Malaysia offers a number of fiscal benefits for ICT companies. IT companies engaged in software development are eligible to be granted "Pioneer Status". Further to facilitate investment in IT parks, Multimedia Development Corporation (MDeC) was set up to act as a single window clearance agency for prospective investors in MSC.
- The international trade policy of Malaysia is designed to increase exports. Malaysia is part of the ASEAN Free Trade Area (AFTA), established in 1992 to reduce/eliminate tariffs on intra-ASEAN trade. Malaysian External Trade Development Corporation (MATRADE) was set up in 1993 to act as a nodal agency for local exporters and foreign importers. The country has also executed DTAAs with 52 countries including Japan, Korea, Germany, France, and the UK.
- The Malaysian Communications and Multimedia Commission (MCMC) was created in 1998 to regulate the ICT industry. Communications and Multimedia Act, Digital signature Act and Computer Crimes Act were promulgated in late 90s to ensure security and legality of electronic transactions.
- The government has embarked on a drive to create robust infrastructure suitable for IT industry. With the privatization of the government telecommunications department in 1987 and the formation of the National Telecommunications Policy (NTP) in 1994 the market is now fully liberalized. The government in partnership with private sector has invested heavily in building a high speed network (10 Gbps) that connects MSC with Japan, ASEAN, Europe, and the U.S.

Singapore

- In Singapore, IT was identified as a core sector as early as 1980 when the first five year "National Computerization Plan" (NCP) was formulated. The industry has been awarded "Pioneer Status". In addition to a number of special financial incentives it enjoys privileges like simplified compliance procedures. Infocomm Development Authority of Singapore (IDA), a statutory board of the Singapore government under the Ministry of Information, Communications and Arts was formed in December 1999 to promote and develop Singapore's vibrant IT industry. The Singapore Economic Development Board (EDB) acts as a nodal agency for administration of financial & other incentives across all industry sectors.
- Since 1965, Singapore has entered into a number of DTAAs with countries including Australia, Canada, China, France, Germany, and India. Over the years, Singapore has signed free trade agreements with countries like USA, Japan, India, Korea, Europe and others aiming to make Singapore a services hub.
- In 1998, the Electronic Transactions Act (ETA) and Computer Misuse (Amendment) Bill were enacted to provide a legal foundation for electronic signatures and to prevent potential abuses of computer systems.
- In April 2000, government of Singapore removed restrictions on telecom licenses to introduce full competition in the telecom sector.
- The Singapore Stock Exchange (SGX) was formed in 1999, is the Asia-Pacific's first demutualized and integrated securities and derivatives exchange. SGX is at the forefront of exchanges globally in attracting international issuers and is rapidly emerging as Asia's offshore risk management center for international derivatives.

Korea

- Government focus and emphasis on ICT is evident from the number of white papers and vision documents formulated by Ministry of Information & Communication like 'White Paper: Internet Korea 2005', 'Broadband IT Korea Vision 2007', 'IT839 Strategy 2004',

'Dynamic Digital Korea, White Paper 2004', 'e-Korea Vision, 2006,' which envision Korea as the world leader in IT.

- Korean government has enacted various IT specific legislations like 'Act on Promotion of Information & Communication Network Utilization and Information Protection 2001', 'Act on the Protection of Information Infrastructure 2001', 'Electronic Signature Act 1999', and 'Protection of Communications Secrets Act 1993' to promote IT sector. The government has entered into agreements with countries like China and Japan for enhancing information security. The Korean government is implementing 'Five-year Development Plan for Information Security Technology 2001–2005' and 'Mid & Long-term Basic Plan for Information Security 2003–2007' for the development of information security technologies.

- The government has extended nurturing support to eight technology based services, three crucial infrastructures and nine new business growth engines under its 'IT839 strategy 2004' to ensure growth of the Korean IT industry.

- Large amount of public funds has been infused by government to create a domestic venture capital market. Prominent examples of government venture capital funds include 'Small and Medium Business Fund(SMBF)' (which has initiatives like 'Dasan Venture' and 'Limited partnership funds'), 'The technology Credit Guarantee Fund,' and special funds such as 'The Informationalisation Promotion Fund' and 'The Science and Technology fund'. The government has provided further support in form of legislation allowing venture investments by banks, providing tax incentives to VCs, and creation of KOSDAQ for high technology start-ups.

- The Korean Stock exchange has a total number of 729 listed companies as of November 2006. The main tracking index is the Korean Composite Stock Price Index. The procedure for buying stock on the Korean market is complicated, especially for foreigners. An investor who intends to trade securities on the KSE market must open an account with a KSE member securities firm because only KSE member firms have direct access to the KSE market.

- The government provides incentives for advance technology FDI in the form of exemption/reduction of national taxes, exemption/reduction of regional taxes, free lease of land in Foreign Investment Zones and a negotiated Cash Grant to select companies.

- Korea has DTAA with more than 60 countries including India, China, Germany, and Russia.

A comparative summary of the Investment climate policies of individual countries has been presented in Figure 19.

4.7 Key Findings

As is evident from the analysis of the regulatory and policy regime in different countries, most countries have followed a consistent approach in terms of the different types of policy interventions for the development of the IT sector. However, the level of direct government involvement varies across individual economies, with some governments adopting a facilitative approach while others have opted for direct interventions. For example, while the government of India has primarily depended on private sector venture capital/private equity investments, China has opted for government-sponsored venture capital funds. In the current section, we have attempted to identify key trends in policy development which appear to have an impact on the performance of the IT sector. The six case studies also brings forth a number of policy initiatives which facilitated the growth of IT sector in general and IT Parks in particular. In this section, we also provide illustrations of such policy enablers.

Adopting a holistic approach to policy development is key

As development of the IT sector and IT Parks is dependent on a number of other sectors like telecommunications, roads, airports, venture capital/private equity, capital markets, most successful countries have put in place suitable policies for improving efficiencies and service levels in these sectors. Thus, countries like Singapore were one of the earliest to put in place requisite policies for facilitating competition and private sector participation in telecommunications and infrastructure and ensuring effective regulation and development of the financial services sector, including capital markets. Even India, which is categorized as a developing country, has a policy regime which supports private sector participation and competition in most of the supporting sectors, in

Figure 19. *Investment Climate Policy Highlights for Different Countries*

	China	India	Malaysia	Singapore	Korea
Simplified institutional and implementation framework	■ Ministry of Information Industry as the policy making & administrative agency, with supportive role from provincial Governments ■ MoU between government and Microsoft	■ Department of Information Technology for policy making & administering benefits ■ Central Government schemes like STPI for single window services ■ IT considered essential services in many states	■ MDeC acts as a one stop agency for investors in MSC. ■ Software development a "Pioneer Status" industry	■ IT regarded as a "Pioneer Status" industry. ■ The 1st 5 year NCP formulated as early as 1980 ■ IDA formed in 1999	■ Focused initiatives like 'Cyber Korea 21 initiative' & 'IT Korea vision 2007' to develop a world leader in ICT
Facilitating cross border trade and investments	■ 100% FDI allowed in IT & BPO companies, IT Parks ■ DTAAs with around 65 countries	■ 100% FDI in IT & BPO companies, IT Parks ■ DTAAs with developed and developing countries	■ MATRADE set up in 1993 under MITI ■ Tax treaties with Japan, Korea, Germany, France, UK, etc. ■ 100% FDI in IT & BPO companies, IT Parks	■ 100% FDI in IT & BPO companies, IT Parks	■ FTAs with USA, Japan, India, Korea, Europe and others ■ DTAAs with more than 60 countries ■ DTAA with over 60 countries
Enabling e-Commerce	■ Electronic Signature Law passed in 2005	■ Formation of Cyber Appellate Tribunal ■ Digital certification under IT Act, 2000	■ Communications & Multimedia Act, Digital Signature Act and Computer Crimes Act enacted in late 90's	■ Computer Misuse Act and Electronic Transaction Act enacted in 1998	■ Electronic Signature Act enacted in 1999, Protection of Information Infrastructure Act 2001.
Access to Venture Capital	■ Recent interest from global VC funds ■ Government supported existing VC funds at provincial/ IT Park level	■ Presence of established global VC funds ■ No tax on income from a VC undertaking	■ Dedicated Venture Capital funds like MSCVC and TPMVF	■ Financial hub of Asia with global VC funds ■ No tax on income from divestment of share by a VC fund	■ Govt. backed VC funds ■ Tax concessions to VC funds
Enabling Infrastructure development	■ Competitive telecom market with dominance of state owned players ■ Public private partnership (PPP) for physical infrastructure development	■ National Telecom Policy, 1999 opened up telecommunication market to private players ■ PPP for infrastructure development	■ National Telecom Policy passed in 1994 ■ PPP for infrastructure development	■ Telecommunication market liberalized in 2000 ■ PPP for infrastructure development	■ IT839 strategy for overall development

addition to a well regulated and vibrant financial services sector. On the other hand, countries like China are yet to achieve the same level of maturity in their financial services sector and hence have to depend on government-sponsored venture capital funds for supporting IT sector development.

Efficient institutional and implementation mechanisms are critical

While most countries have adopted regulations in line with established good practice, establishing the proper institutional mechanisms is integral to effective implementation. Most of the countries have attempted to achieve this by constituting nodal organizations within government for providing "single window services." For example, most of the incentives offered to the IT Sector and IT Parks in Malaysia are administered through the Multimedia Development Corporation. In India, most of the benefits and concessions are on offer through the Software Technology Parks of India, which has its offices throughout the country.

The developer of an IT Park requires various clearances for constructing buildings and related facilities in the park. Such clearances include building plan sanctioning, fire services clearances, sewerage & drainage clearances, and environmental related clearances. A one-stop clearance agency helps the developer to get these IT Park related clearances faster, which helps them reduce time and thus enables reduction in project cost. For example, in Hyderabad, APIIC acts as the single point clearance agency for building and related construction of Hitec Park. Developers have significantly gained from this arrangement.

Intellectual property protection policies represent another case in point. While most of the countries like China and India have amended their Copyright Acts in line with TRIPS and have also set up dedicated Copyright Tribunals for adjudication, litigants have the option of approaching the existing judicial system as a final recourse. With the existing legal system in both these countries being considered relatively less efficient, value added intellectual property related IT activities such as new technology development have taken a backseat compared to other countries like Singapore and Korea, which have a faster process and a more streamlined judiciary.

Focused policies for IT Park development are critical for "developing" ICT economies

Leveraging IT Parks for IT sector development becomes critical in economies like China and India, which lag behind developed countries in key ICT indicators. With development of the IT sector being closely linked with
"support" sectors like telecommunications, physical infrastructure, it is easier to provide these support services in geographically concentrated zones/areas. Consequently, many of these countries have adopted policies for encouraging development of IT Parks. An example of such a policy would the Information Technology Special Economic Zone (SEZ) policy in India, which offers a number of fiscal/other benefits to companies located in approved IT Parks. On the other hand, countries like Singapore, where the requisite support in terms of best in class telecommunication and physical infrastructure is available throughout the country, have adopted policy regimes applicable to all companies in the IT sector, as against companies located in a designated IT Park.

Encouraging private sector participation is critical

Almost all countries have adopted a variety of policy mechanisms for encouraging private sector investment not only in the IT sector but in developing "support" sectors such as financial services, telecommunications, and physical infrastructure development. Other than a few niche areas like specific research & development initiatives where government organizations have played a direct role, the government's role in most countries has been that of a facilitator. While in some countries, this represents a conscious decision on the part of the government, in others it has also been driven to an extent by existing budgetary/fiscal constraints.

Many of the parks studied were developed through public-private partnership. Such policies have benefited both the private sector as well as government. For example, in case of Cyber Towers, Hyderabad, government contributed by providing land and the private player was responsible for developing the land and construction of the building. Acquiring vast plots of continuous land would have been very difficult and time consuming for the private sector. With the government acquiring land through legislative means, the private sector developers ensured that the related facilities were constructed in a record time of 18 months.

Flexible land-use policies providing the developers more choice

Flexible land use polices permits the developer to bundle IT office space construction with construction of other facilities such as shopping complex, hotels, eateries, and housing complex. Such bundling makes the project financially more attractive given that the returns from the commercial/residential end use are typically higher. For example, in CFZ, Malaysia 500 hectares of land has been zoned as commercial use. In Hitec City, Hyderabad, 40% of the net developable/usable area can be used for housing, club house, recreational center, shopping center, a school and other support activities.

Linking incentives/subsidies with identified strengths/core competencies of domestic companies

In developing countries like India and Malaysia, most IT and ITES companies are export oriented with the major markets being the U.S. and Europe. It may be

observed that governments in these countries offer a number of fiscal incentives on export income/profit. On the other hand in countries like Singapore where the target market segment for most IT companies is hi-technology, research intensive products, the subsidies and incentives offered by government agencies are linked to R&D spending. Adopting the fiscal policies to suit the strengths and markets of indigenous companies is an effective policy measure to promote the domestic industry.

Effective coordination with other ministries/departments

It is important to understand that the presence of good policies alone do not suffice, it is equally important that these policies get efficiently implemented. For proper implementation of policies it is important that there is effective co-ordination between various government ministries, agencies and departments. Different countries have taken different strategies in to enable such co-ordination. In developed countries like Singapore, proper co-ordination between various departments and ministries administrating the subsidies & incentives has been ensured through efficient e-Governance systems. In the developing countries like India and Malaysia, a dedicated government agency has been created to administer the subsidies and incentives. For example, in Andhra Pradesh, India incentives are administered through a high level co-ordination committee called Consultative Committee on IT Industry which includes members from various government departments (Information Technology & Communication, Labor Department, Municipal Affairs Department, Land Department), utilities (electricity, water supply) and industry associations (HYSEA, NASSCOM). This committee is responsible for granting various provincial/state subsidies, resolving implementation issues and prescribing guidelines for industry growth.

Having the right policy mix is essential for maximizing spill over benefits

As has been established through the IT Park case studies, successful development of an IT Park inevitably leads to significant spillover benefits in terms of other economic activities such as real estate development, vibrant retail, and hospitality and financial services sectors. Many governments have attempted to maximize these spillover benefits through a suit of policies including allowing

flexible land use, encouraging private sector investments in these sectors for faster development, and motivating IT sector participation in capital markets. Thus, while India provides additional flexibilities to IT & BPO companies for listing on premium stock exchanges in terms of a lower paid up share capital viz. a viz. companies in other sectors, almost all the IT Parks covered in the study allow mixed land use with a specified proportion of the total land area earmarked for business end use, commercial end use and residential purposes. It is essential for incorporating such flexibilities to existing policies or promulgating new policies with these flexibilities to maximize economic development.

Fostering efficient linkages with other economies is essential

All successful countries are observed to have policy and regulatory regimes which encourage trade and investment linkages with other economies. Such linkages are usually facilitated through a variety of policy instruments including liberal foreign direct investment (FDI) guidelines, non-restrictive visa/work permit procedures, unrestricted trade in goods and services, and double taxation avoidance agreements. However, the level of maturity of the individual policies vary from country to country, with countries like Singapore adopting a relatively lower duty structure for imports across sectors, while others like India offer a concessional duty structure for all capital goods imports specifically for the IT sector.

There are additional flexibilities for policy formulation in a federal structure of government

In countries like China, India, and Korea which follow a federated structure with both Central (Federal) and State (Provincial/local) governments, regional governments have attempted to differentiate themselves by providing additional benefits/concessions to IT/IT Park companies. For example, in India, a number of state governments offer additional flexibilities/benefits including subsidies on capital investments & interest payments and offering discounted land prices linked to employment generation. In Korea too, much of the policymaking has gradually shifted from the federal to the provincial governments. Such initiatives have led to differential development of the IT sector in

different geographic regions within the same country, with individual local governments attempting to differentiate themselves through additional benefits/concessions and investor friendly implementation mechanisms.

For countries aspiring to offer offshore BPO services, formulation of a Data Protection Act is a necessity

In view of the recent breaches in security in various BPO organizations, enactment of a data protection law has become a necessity. This has gained further importance with the data protection directive issued by the EU (Directive/95/46/EC on the 'protection of individuals with regard to the processing of personal data and on the free movement of such data'), which constitutes one of the biggest market for providing offshore BPO services. Based on this directive, UK has already enacted its 'Data Protection Act'. The EU directive and enactment of Data Protection laws by member countries imply that only countries having data protection laws in line with the EU directives will be favored for offshoring BPO services from EU member countries. Some countries that are trying to emerge as offshore BPO destinations have already formulated policies addressing this issue. For example, Department of Trade and Industry, Republic of Philippines has issued 'Guidelines for the Protection of Personal Data in Information and Communications System in the Private Sector'. The guidelines also provides for an independent third party namely, Data Protection Certifier, duly accredited by the government, to certify the privacy program of a company and thereafter to monitor and oversee its implementation and enforcement.

4.8 Policy Prioritization

It is evident from the above that a number of policy interventions need to be undertaken by governments to develop the country's IT sector. The government's role in facilitating the growth of the IT sector is primarily through developing holistic IT strategies linked to the core competencies of the particular country such as innovation through Research & Development activities and low cost skilled manpower. The country's IT sector growth strategy would require policy enablers which would form the basis for formulation of specific policy initiatives. Given that implementation of the IT strategy is crucial to the economic growth, specially for developing countries, some policy initiatives may have short term implications like attracting IT players to the country while other policies have long term implications like ensuring sustainability of the IT sector. Policies that can be implemented in the short term result in an immediate beneficial impact for the sector or "quick wins". The impact of policies typically aimed at sustaining the sector are seen over the long & medium term like for a non-English speaking country to ensure English speaking IT skilled manpower for the IT sector may take 5–10 years to be effective after implementing the policy initiatives through the school system. Quick wins, although being far from comprehensive solutions in themselves, act as building blocks to a sustainable IT sector development.

Short-term policies

Some of the key priority short term policies are highlighted below:

Provide fiscal incentives to encourage private sector participation

Government needs to provide fiscal incentives in order to encourage private sector participation in the IT industry. These incentives could be in form of tax exemptions, for example in India, IT and ITES companies are provided with 100% exemption on profits from export of computer software till 2010. They could also cover areas such as customs benefits, subsidies for employment generation, and equity support for start-ups.

However, it is also critical that governments not just focus on providing such incentives to the IT companies, but also to 'support' sectors like physical infrastructure development like transportation, telecommunications, and real estate players. For example, the government of Singapore removed restrictions on telecom licenses to introduce and encourage full competition in the telecom sector. Similarly, in India, the National Telecom Policy of 1999 opened up the telecommunications sector to private players. As a result, a number of private sector telecom operators started operations, resulting in immediate improvement in the country's communication infrastructure and customer service delivery on account of competition.

Establish an effective implementation mechanism – Single window nodal agency

Effective implementation of the incentive policies is one of the most important parameters that attracts the private sector to invest. The establishment of proper institutional mechanisms are integral to effective implementation, with most governments preferring setting up 'single window/one-stop services'. Such nodal agency provide a one stop servicing facility for developers of IT Parks as well as the occupants/residents of such parks. An example of such single window/one-stop service nodal agency in an IT Park is Multimedia Development Corporation in CFZ, Malaysia, which is the single point of contact for park occupants for obtaining requisite government approvals and facilitating business linkages with the government.

Create a coordinating committee which fosters linkages with various government ministries, departments, and agencies

It has been observed that developing/constructing an IT Park requires the involvement/clearances from various government ministries/departments/agencies. It would be beneficial if a coordinating body comprising members from various government departments (Information Technology & Communication, Labor Department, Municipal Affairs Department, Land Department) and utilities (electricity, water supply) be formed so that the process of approving an IT Park developers' plans, acquisition of land, issues relating to utilities & supporting infrastructure can be undertaken. Such an empowered coordinating committee will ensure a fast track clearance and approval process. An example of such a committee is the "Consultative Committee on IT Industry" in Andhra Pradesh which is empowered in areas such as granting various provincial/state subsidies and resolving implementation issues.

Promote/Facilitate creation of an industry body specifically for promoting and developing of IT sector

Steps should be undertaken by the government to facilitate/promote the creation of an Industry body for the IT sector, which could represent the industry's interests in issues like government procurement, information security, workforce development, intellectual property protection and accounting, finance and taxation, and act as a bridge between industry and policy makers. One of the main objectives of such body would be to maintain close interactions with the government in formulating the national policy and specific action plans for development of the IT industry. The body's mandate may also include coordinating with foreign governments and embassies to make the Visa and Work Permit Rules more industry friendly; interacting with the Education Ministry, Universities on current industry's skill & future skill requirements for ensuring necessary changes in curriculum; and campaigning & generating awareness against software piracy and copyright laws.

Such an organization also offers valuable services to its member organization in terms of encouraging them to improve quality of service, adopt modern technologies and provide innovative solutions through organizing regular interactions/IT sector seminars/meets. The existence of such an organization also provides valuable linkages between entrepreneurs, investors, organizations and individuals desiring to connect with and mutually leverage complementary skills, services, resources, contacts and talents within the country. This also provides an ideal forum for overseas and domestic companies to explore the vast potential available for Joint Ventures, Strategic Alliances, Marketing Alliances, Joint Product Development, etc. An example of such an Industry Body is NASSCOM in India. Box 6 provides a brief description of Nasscom.

Design flexible land use policies for attracting private real estate players

Flexible land use policies are required to attract private sector real estate players to invest in development of IT Parks, as such policies can ensure higher returns on investments for the Park developer. Such policies typically allow mixed land-use i.e. allow residential and commercial land-use along with industrial land-use. Other means of providing incentives to developers include allowing a higher floor space ratio. The Floor Area Ratio (FAR) or Floor Space Index (FSI) is the ratio of the total floor area of buildings on a certain location to the size of the land of that location. By allowing a greater FSI, government enables the private investor to create more space which can be rented out/sold to occupants and thus enables them to realize higher revenues.

Long-term policies

Besides the above-mentioned short term policies that can be implemented on a priority basis to kick-start the IT sector development, governments would

also need to consider implementing policies having long term implications for ensuring sustainability of the IT sector. These include educational reforms to attract private sector in education; foster linkages with other markets like the capital market to attract private funding, introducing Corporate Governance norms so that even if some short term measures like providing fiscal incentives are removed after a specified timeframe, the continued development of the sector can be ensured. Long-term policies should be aligned to the core competencies of the country. For example, if a country's IT strategy is to focus on encouraging IT software development to leverage its low-cost educated manpower base, the government

BOX 6. *National Association of Software and Service Companies (NASSCOM)*

NASSCOM is the chamber of commerce for the IT software & services industry in India having over 1100 members, of which over 250 are global companies from the US, UK, EU, Japan, and China. NASSCOM was set up to facilitate business and trade in software and services and to encourage advancement of research in software technology.

NASSCOM's vision is to establish India as the 21st century's software powerhouse and position the country as the global sourcing hub for software and services. NASSCOM is committed to work proactively to encourage its members to adopt world class management practices, build & uphold highest quality standards and become globally competitive. The primary objective of NASSCOM is to act as a catalyst for the growth of the software driven IT industry in India. Other goals include facilitation of trade and business in software and services, encouragement and advancement of research, propagation of education and employment, enabling the growth of the Indian economy through the development of the IT sector and providing compelling business benefits to global economies leveraging global sourcing. Nasscom is engaged in a number of activities for developing the IT sector of India which includes:

Fostering Partnership with the Government
NASSCOM has representatives in various committees in the government of India, including the Ministry of Information Technology, Ministry of Commerce, the Ministry of Finance, Department of Telecommunication, Ministry of Human Resources Development, Ministry of Labor, and the Ministry of External Affairs. NASSCOM also acts as a consulting body for various state governments in India.

NASSCOM has played a key role in enabling the government in India to develop industry friendly policies. NASSCOM has been a proponent of free trade, arguing for zero tariff protection, strong intellectual property and data protection laws, deregulation of the telecom market and the creation of software technology parks and private sector participation in the education system—measures which have already resulted in significant growth of the industry. NASSCOM has also been interacting with several foreign governments to promote a win-win partnership through global sourcing to India. NASSCOM also plays a role in representing IT Industry interests in issues relating to global alliances on software quality standards, immigration policies, WTO and free trade in services and next-generation good practice in global sourcing of services.

Global Partnerships
NASSCOM plays an active role in the international software community. NASSCOM is a member of the Asian Oceanian Computing Industry Organization (ASOCIO) comprising representatives from 20 countries encompassing over 10,000 companies of the region. NASSCOM is also a founder member of the World Information Technology and Services Alliances (WITSA). This forum comprises ICT associations from around 70 countries.

Undertaking Research and Thought Leadership
NASSCOM undertakes research on the ICT industry in India and the world in order to continuously educate its members on new business opportunities, business practices in global markets, potential threats to industry growth and attract additional investments in India.

Encouraging improvement in Quality of Products and Services
NASSCOM strongly believes in encouraging its members to provide global quality products and services. The association provides assistance to its members in achieving international quality certifications by organizing seminars and related programs on quality standards and disseminating relevant information.

Intellectual Property Rights
NASSCOM is an ardent supporter of strong intellectual property laws in India. In 1990, NASSCOM began an active public awareness campaign to educate users about the lawful use of software and launched the country's first anti-piracy hotline and India's first anti-piracy toll-free hotline. NASSCOM has also successfully facilitated enforcement laws against software piracy in India and helped introduce Cyber Laws. NASSCOM continuously engages with the government of India for required changes in the IPR laws, keeping in line with WIPO and other International Laws and treaties. NASSCOM also works closely with the Business Software Alliance (BSA) to enforce copyright laws.

NASSCOM provides its members with various forums for making business connections and sharing good practice, for example, ITES-BPO Forum, Emerging Companies Forum, Product & Innovation Forum, Quality Forum, Security Forum, IT Workforce Development Program, IT Domestic Market Forum, NASSCOM Engineering Services Forum.

Within Nasscom, there are specific groups or forums which deal with specific IT industry segment or issues. Some of them include:

BPO Forum: The NASSCOM's ITES-BPO Forum is focused on addressing the specific needs of the ITES- BPO industry and build the India brand in ITES-BPO. The ITES-BPO Forum has now been active for the past four years and conducts a series of activities at a national and regional level involving industry players, government and the academia. In its ongoing efforts to maintain the cutting edge advantage and facilitate the build up of skilled manpower, NASSCOM has instituted various initiatives like BPO certification Program, creation of National Skills Registry for IT Professionals database and conducting executive development programs.

Emerging Companies Forum: Emerging companies form a significant percentage of the Indian software and services industry and the forum aims to draw strategies to explore the huge growth opportunity that exists in this segment. The forum also serves as a platform for the emerging companies segment to share experiences, ally on critical projects and even focuses on partnerships to cater to customer demands.

Engineering Services Forum: This forum was created in 2005 with the objective to help India-based engineering service providers optimally exploit the potential for engineering services offshoring/outsourcing (ESO) and help India achieve global dominance in this space. Recently this forum has released a study titled Nasscom- BAH study on the Globalization of engineering services, first ever detailed assessment of the global engineering services market. Further, this forum is focusing on (i) Creating greater awareness about India's relatively lesser known strengths in the ESO domain, (ii) Strengthening links with the domestic manufacturing industry—which has strong linkages and spill-over effects on ESO, (iii) Working with the academia to enhance the talent pool for ESO and (iv) Working with the government to ensure a favorable business policy and regulatory environment.

Providing a Forum for Innovation: The objective of this initiative is to promote the Innovative IT ideas and identify innovative companies in India. In the year 2004–05, NASSCOM ran a series of events across India, wherein Innovative companies made presentations to an expert panel. The six finalists from these presentations were then invited to present at the NASSCOM 2005 event at Mumbai. During 2005–06, NASSCOM would continue with this initiative of identifying and showcasing innovative companies and also organize series of events and roundtable sessions on building innovation across the organization.

IT Workforce Development Group: The Workforce Development initiative was created to catalyze IT industry interface with the Academia to ensure availability of globally employable quality IT professionals. The group is responsible for arranging a number of industry-academia workshops and seminars to discuss the current issues and design probable solutions.

Product Forum: The NASSCOM Product Forum aims to provide relevant industry information, exchange of ideas and identify issues related to marketing, branding, investments for products developed in India including. The forum also addresses issues relating to IP (Intellectual Property) creation and protection. The objectives of this forum are (i) Improve the base quality of software products built by Indian ISVs (ii) Improve credibility for "Made in India" software in local and global markets by establishing enterprise credibility with a certification program and aid in building a robust local software ecosystem (iii) Establish comfort for CIOs on local ISV solutions as they may suspect the quality of products from unknown vendors and hence prefer expensive global brands and (iv) Increase domestic demand for ISV solutions by establishing credibility with a third party industry certification.

Quality Forum: NASSCOM has recently launched this forum to discuss and promote various issues related to Quality. The key objective of the forum is to provide India with next generation leadership in the Quality space.

Trusted Sourcing: NASSCOM actively promotes India as a Trusted Sourcing destination and has been playing a proactive role in ensuring that the Indian Information Security environment benchmarks with the best across the globe. Through a 4 E initiative: Engagement, Education, Enactment and Enforcement, the NASSCOM Security Forum aims to create an enabling environment in the country for information security and compliance. NASSCOM has also formed a National Advisory Board on Information Security & Compliance. The main functions of the board include laying down security standards which include identification of amendments, liaising with the Ministry of IT to obtain buy-in from government, perform security audits & certification for members and run awareness programs with respect to security issues.

Domestic Market Forum: The Domestic Market Forum is being set up to further build the domestic market. The Indian user industries are outsourcing parts or entire IT infrastructure to specialized vendors. Recognizing the growing importance of the domestic market and the increased specialization which is the requirement of the user organizations, NASSCOM is forming the Domestic Market Forum which will serve as the platform or a link of the non IT sector with the IT industry.

Source: As discussed with Col. S.V. Ramachandran, Regional Director Nasscom & Nasscom Annual Reports

would need to improve the legal system to protect and promote proprietary knowledge as this is often a company's main business asset. As such, laws relating to intellectual property, and the implementation of such laws would be critical to gaining investor confidence.

Country Case Studies

5.1 Country Case Study: Vietnam

5.1.1 IT Sector: Contribution to GDP

The Vietnamese economy is estimated to have grown at an average rate of around 7% from 1997 to 2004, with the growth rate increasing to 8% in 2005. In 2005 the GDP was USD$52 billion (Source: World Bank).

Vietnam still remains an agricultural based economy with the sector accounting for 21% of its GDP and employing around 57% of its working population. Manufacturing and the services sector accounted for 41% and 38% of the country's GDP respectively.

The IT sector contributed USD$1.4 billion, or around 3% of GDP (please refer Figure 20 below). While the share of IT in Vietnam's GDP is significantly lower than countries like China and India where the IT sector contributes around 4%–5% of GDP, the Vietnamese IT sector has shown significant growth during the period from 2002 to 2005, with a CAGR of 22% during this period (Source: The Ho Chi Minh Computer Association).

5.1.2 IT Sector: Growth, Composition and Trends

Compared to other countries in the region, Vietnam has been a late starter in developing its IT sector. Though the Vietnamese government introduced its first IT related policy in 1993, the focus on developing the sector as a significant contributor to its economic development was made in 2000 when the Prime Minister approved the resolution on "establishment and development of the Software Industry in the period 2000–2005". Prior to 2000, the sector was largely dominated by IT hardware assembly operations.

During 2005, the revenues from the IT sector crossed the USD$1 billion mark and represented a growth of around 50% over the previous year. However the hardware sector continued to dominate this sector contributing 82% of total IT revenues. (please refer Figure 21 below for details). Key constituents of the sector include:
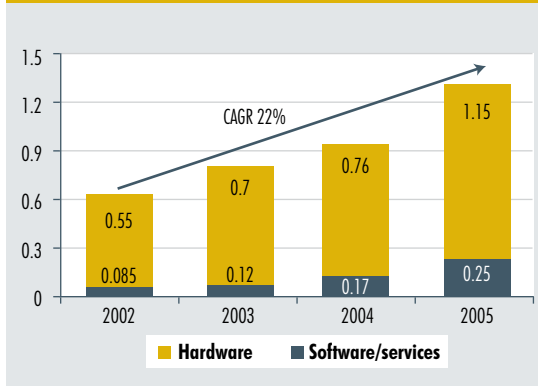
- Software sector comprising software development and services with revenues of USD$250 million in 2005. Of this, USD $70 million (28% of software sector revenue) was contributed by exports. Japan and the U.S. accounted for the major share of software exports mainly comprising software development.
- The software/IT enabled service sector has been recording a 40% year on year growth (please refer Figure 21 below)
- Over 80% of Vietnam's revenues from the IT hardware sector was contributed by exports by two foreign invested companies, namely, Fujitsu Computer Products of Vietnam Inc. which manufactures and exports printed circuit boards to its affiliates in the Asian Pacific region (2005 exports: USD$ 515 million) and Canon Vietnam Co. Ltd. manufacturing bubble jet

Figure 20. *IT Sector Share of GDP*
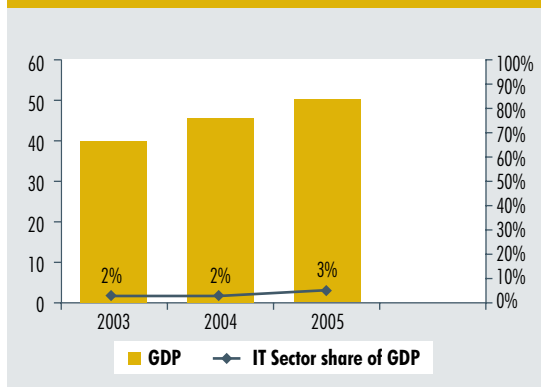
Source: The World Bank; The Ho Chi Minh Computer Association

Figure 21. Vietnam IT Sector Composition

CAGR 22%

Year	Hardware	Software/services
2002	0.55	0.085
2003	0.7	0.12
2004	0.76	0.17
2005	1.15	0.25

Source: Statistical Yearbook of Vietnam, 2005, The Ho Chi Minh Computer Association

Figure 22. Top 5 Vietnamese IT Companies (2005)

Company	Revenue, 2005 (mn)
FPT – Corporation for Fnancing and Promoting Technology	323.77
VDC – Vietnam Datacommunication Company	31.20
Samsung Vina Electronics Company	30.21
IDC Group – Ha Noi Informatics Development Co Ltd	24.71
CMS – Computer Manufacturing and Service Co Ltd	13.42

Source: Vietnam ICT Directory 2006: HCM Computer Association

printers with bulk of its printers exported to Europe and USA (2005 exports: US $450 million). (Source: Vietnam ICT Outlook 2006: HCM Computer Association)

- The software sector is dominated by small and medium sized companies set up by local investors and overseas Vietnamese. None of the well known global software players have a development center in Vietnam as of date.
- FPT is the leading domestic IT enterprise having both hardware as well as software operations. It is the leading producer of personal computers in Vietnam (2005 sales: USD$14.6 mn). However, bulk of its revenues are from trading in hardware and mobile phones. During 2005 its software operations contributed USD$23.86 mn with software exports being USD$13.2 mn (Source: HCM Computer Association). A list of the top 5 IT companies in Vietnam have been presented in Figure 22 alongside.

The enterprises in the IT sector are primarily located in and around the main cities of Vietnam, namely, Hanoi in the north and Ho Chi Minh City (HCMC) in the south. The major IT hardware units are located in Industrial Parks with Fujitsu having its facilities in the Dong Nai Province, Canon in Hanoi and Intel's proposed unit coming up in an High Technology Park outside HCMC. Most of the software enterprises are located in HCMC or Hanoi. Domestic software major FPT is headquartered in

Hanoi having development centers at Hanoi, HCMC and Danang.

5.1.3 Government Initiatives for Development of the IT Sector

The government of Vietnam has been consistently supporting the development and growth of the IT sector through policy interventions. The Master plan for IT use and development in Vietnam by 2005 was one such policy prepared by the Ministry of Science & Technology (MoST) and approved by the Prime Minister in 2002. The master plan had envisaged achieving the following milestones by 2005.

- Developing internet and introducing modern telecommunication networks to ensure at least 5% of total population had access to internet by 2005.
- 50,000 IT experts to be trained of which 25,000 people should be professional programmers with foreign language skills.

BOX 7. IT Hardware Sector Investments in Vietnam

Fujitsu's facility was set up at an investment of around USD$200 million in 1995.

Canon Vietnam's printer facility was set up with an investment of around USD$25 million in 2001. This facility is being expanded at an investment of around USD$100 million.

Intel has recently announced plans to set up a semiconductor assembly unit with an investment of USD$300 million.

■ Revenues of USD$500 million from software industry with 40% comprising export revenues.

As of date, though the country had not been able to achieve most of the above targets, it has made significant progress in working towards achieving the milestones. Currently, around 25,000 IT professionals are estimated to be working in software firms and software industry revenues amounting to around USD$250 million in 2005. The Ministry of Posts and Telematics (MPT) of Vietnam is responsible for the development of the IT sector in the country with MoST being responsible for development of IT Parks in the country. Based on the outcomes till 2005, MPT has already prepared the master plan for the period 2006–2010 which is awaiting the Prime Minister's approval. The focus of the 2006–2010 master plan is on IT enabled services like business process outsourcing and software services.

Vietnam's key ICT indicators as on 2004 are comparable with countries like China, India, Malaysia (please refer Figure 23 below for details).

As part of the government's initiatives to develop the IT sector in the country, an E-Governance initiative called "Project 112" was undertaken in 2001 with a budget of around USD$100 million. The project involved computerizing and standardizing state administrative management across provinces and cities through use of common databases and software. It was envisaged that on successful completion of this initiative, state administration and public services functions will be simplified with faster service delivery. However, due to change management issues, the system was not accepted by most public servants. The government, with support from the World Bank, is once again reviving this project with pilot projects being implemented in Ha Noi, HCMC and Danang. Given that local IT enterprises did not have adequate experience to undertake large scale projects, the contracts were given to global IT players. However, local IT enterprises were encouraged to partner with the global firms for implementation. (as per discussions with Mr. Tran Thanh Son, The World Bank)

Figure 23. *Key ICT Indicators for Vietnam*

Parameters	Indonesia	Malaysia	China	India	Philippines	Thailand	Vietnam	Singapore
Social Indicators								
Total Population (millions)	218	25	1296	1080	83	62	82	4
Urban Population (%of total population)	47	64	40	29	62	32	26	100
ICT Sector Indicators Access:								
Telephone lines (per 1000)	46	176	241	43	41	106	70	430
Internet users (per 1000)	52	392	73	23	58	112	65	559
Personal computers (per 1000)	19	170	40	11	29	74	11	565
Mobile Subscriber (per 1000)	141	573	258	48	387	420	53	891
Population covered by mobile Telephony (%)	85	96	73	41	80	92	93.8	100
Quality:								
Broadband subscribers (per 1000)	0.3	10	16.5	0.6	0.3	0.2	0.6	118.2
International Internet Bandwidth (bits/person)	18	127	57	4	12	48	27	5699
Affordability:								
Price basket for fixed line (US$/month)	6.2	8.7	3.6	3.2	12.2	8.3	4.3	6.7
Price basket for mobile (US$/month)	4.6	5.6	3.7	3.2	4.0	6.8	6.9	5.7
Price basket for internet (US$/month)	22.3	8.4	10.1	8.7	17.1	7.0	19.9	11
ICT Expenditure (% of GDP)	3.0	6.9	5.3	3.7	5.9	3.5	—	10.4

Source: World Bank, UNDP, ITU and others.

To overcome the infrastructure related constraints across the country, the government has actively adopted a strategy of setting up IT Clusters/Parks offering requisite infrastructural facilities and linkages for attracting investments in this sector. As per the Ministry of Posts and Telematics, government of Vietnam, there are currently 10 IT Parks in Vietnam, 4 of which are located near HCMC, 2 near Hanoi with the remaining 4 located in and around the cities of Haiphong, Danang, Cantho and Hue respectively.

Almost all the existing IT Parks in Vietnam have been established and funded by the city/provincial governments. The government's role has been that of a facilitator with its involvement limited to acquiring and developing the land and setting up the common infrastructure for the IT clusters including internal roadways, internal communication networks, power lines, water supply lines, and back-up power facilities. The management of these IT clusters are generally with State-owned enterprises with these enterprises charging maintenance fees from the occupants. The developed plots are given on lease to IT companies/Real Estate developers for constructing office space for IT companies with most of the lessees being from the private sector.

The only IT Park developed in the private sector is E-Town located in HCMC which has been set up and is operated by Refrigeration Electrical Engineering Company (a public listed company with 90% shares held by public and balance 10% by government of Vietnam).

The first IT Park in Vietnam, the Saigon Software Park in HCMC, was established in 2000. Quang Trung Software Park located around 15 Km from HCMC is one of the largest IT Parks and is considered to be one of the most successful IT Parks in the country. Saigon Hi Tech Park, which is about 15 Km from HCMC, is under development. An assessment of these IT Parks based on our visits have been presented in the following segment.

5.1.3.1 Saigon Software Park

Saigon Software Park (SSP) was established by the HCMC People's Committee (local government) with the objective of developing the software industry in Vietnam. HCMC is the largest city in Vietnam and is considered as the commercial capital of the country. Inaugurated in the year 2000, SSP is the first IT Park in Vietnam and is located in the heart of the business district of the city.

Applying the CLIP framework to SSP, we observe:

Capital: SSP was developed by the Saigon Electronic Information Company (SEIC), an enterprise owned by the HCMC local government. The local government awarded the SSP project to SEIC in 1997, when SEIC's original business of consumer electronics failed. While the land was provided to SEIC by the government, SEIC developed the 2500 square meter facility at a cost of approximately USD$1 million primarily comprising cost of construction, communication networking, and power back up facilities. This investment was funded through loans from state owned banks which were guaranteed by the HCMC government.

Since its inauguration in 2000, SSP has been enjoying near 100% occupancy primarily on account of its attractive location with all its tenants being in the software development/IT training business. Other than SEIC's own software operations (a recent diversification) occupying 400 square meters, all other occupants are from the private sector comprising a mix of local private companies and enterprises set up by overseas Vietnamese. Currently there are 14 tenants having rental agreements ranging from 1 year to 5 years. Most of the tenants renew their rental agreements every year. The largest tenant occupying 1000 sq meter space is Global Cyber Soft owned by an American of Vietnamese origin.

During the first 2 years, in order to attract local software companies, SEIC offered space at a subsidized monthly rate of USD$10 per square feet which included the cost of maintenance, electricity and internet services. Currently, rents are charged at market rates (USD$22 per square feet per month for ground floor occupants and USD$18.50 per square feet per month for upper floor occupants) with use of electricity and internet services being billed separately. Some of the original tenants have since vacated the park on account of high rentals. Saigon CTT, an occupant, had indicated during our interactions that the monthly rent charged at around USD$18.50 per square meter is substantially higher than commercial office space available in the locality at USD$15 per square meter.

Other than office space and related IT infrastructural facilities, SSP does not have any provisions for offering any incubation facilities or arranging funds for its tenants through linkages with Venture Capital funds/financial institutions or other financial sources.

Linkages: Most of the tenants in SSP are engaged in providing software services including software developing, media contents, and network solutions & system integration. Besides SEIC's own IT training center (a franchise of NIIT of India), another tenant, Saigon CTT occupying 200 square meters of space offers IT training courses. There is currently no forward or backward linkages amongst the tenants in terms of using each other services.

Infrastructure: SSP comprises a 5 story building situated in the heart of the business district of HCMC offering 2500 square meter of office space.

Facilities provided by SEIC to tenants of SSP include:

- Internet connection from the gateway provided by Vietnam Data Communication. While this service was considered to be very fast in 2000, currently there are a number of service providers offering similar/better connectivity through broadband at competitive rates. Occupants like Saigon CTT have opted for internet connectivity from external service providers.
- VSAT connectivity is provided to some tenants from LORAL Skynet, a US based service provider.
- While power is supplied by the state owned electricity company, SEIC provides generators for back up power in event of an outage.

Water supply and telecommunication services are provided by the State controlled service providers in HCMC.

Given SSP's location in the center of HCMC city, the employees of the tenants live in HCMC and have access to all facilities available in the city. Given the space constraint in SSP some of the original tenants have relocated to larger premises in HCMC when their businesses expanded, requiring more office space. Occupants like Saigon CTT indicated during our discussions that they too may relocate from SSP in the near future when they require more space for their training center as they expand and introduce new courses.

People: HCMC being the largest center for development of IT sector in Vietnam, there is adequate supply of trained manpower for the tenants of SSP. There are 33 universities/colleges in and around HCMC for providing trained manpower for the sector. In addition, there are numerous software training institutes in the city which trains graduates in becoming software professionals.

In conclusion, SSP essentially offers office space to software firms along with internet and communication facilities. Strictly speaking, it cannot be called an IT Park as it does not provide any linkages among its occupants or any special facilities, such as one stop service, incubation facilities for encouraging start up companies, or marketing/financing support. SEIC's role in SSP is essentially that of a landlord.

5.1.3.2 Quang Trung Software City (QTSC)

QTSC was conceptualized by members of HCMC Computer Association for providing adequate facilities for the development of the software industry in HCMC. The plan for QTSC was developed following a study by members of the Association which included visits to IT Parks in Bangalore (India) and Malaysia. The study was funded by US Trade Development Agency. In the year 2000 through a decision of the People's Committee of HCMC, QTSC was established on a 43 hectare plot (earlier used as a military base) located 15 Km away from HCMC.

In March 2001, QTSC was opened with 7 existing renovated buildings aggregating 12,000 square feet of office space. A unique advantage offered by QTSC was high-speed internet connectivity which was not available anywhere else in Vietnam. This prompted many local software enterprises including FPT, one of the largest domestic IT enterprises in Vietnam to take up space in QTSC. 4 new buildings were

subsequently constructed increasing the total area available for rent to 20,000 square feet. Currently 70 enterprises are occupying space in QTSC. In 2003, the master plan for development of QTSC was approved by the HCMC People's Committee.

As per the master plan, the 43-hectare plot of land has been divided into 47 plots to be leased to private sector developers/software enterprises. As per the master plan, 50% of the plots have been earmarked for software activities with other plots identified for the following activities:

- 6 plots for constructing residential apartments and villas.
- 4 plots for establishing IT training facilities including a university to be set up within the Park.
- 1 plot for a commerce and exhibition center.
- 1 plot for constructing a Health care center.
- 3 plots are to be used as a car parking area including a bus station.
- 1 plot for entertainment and recreational facilities.

Almost all the plots have already been leased out and construction activities have already started on most plots. Once the development of office space for software activities are completed in some of the plots by 2007, the 7 old buildings will be demolished and the existing tenants will be offered space in the newly developed facilities.

QTSC is maintained by Quang Trung Software City Development Company (QTSCDC), an enterprise under the administrative control of the HCMC People's Committee. QTSCDC has the mandate of implementing the master plan including managing the application process, allotment of plots, monitoring construction activities of lessees, construction of inside roads and other infrastructural facilities besides providing maintenance services to the occupants of the Park.

Applying the CLIP framework to QTSC, we observe:

Capital: The development cost of QTSC, estimated at USD$16.25 million was largely funded by HCMC People's Committee with government of Vietnam contributing a marginal amount. The IT Park is owned by the local government with the maintenance and development activities being handled by a government owned enterprise, QTSCDC.

Most of the plots have been allotted based on applications and conformity to the master plan on a first-come first-serve basis. Given that QTSC follows a one price lease policy, no bidding process was involved. Plots have been allotted to IT companies, real estate/commercial property developers (local private sector players as well as foreign enterprises), IT Training institutes/universities. Till date, lease agreements have been concluded with over 30 investors for developing 186,000 square meters of land at an aggregate investment of around USD$70 million. The lessees have been given the right of pledging the land use right and assets related to land as collateral to financial institutions operating in Vietnam for obtaining bank loans for their projects.

Currently, there are 70 tenants in the park comprising 36 domestic enterprises and 34 foreign-owned enterprises. It should be noted that most of the foreign enterprises have been set up by overseas Vietnamese. None of the tenants can be categorized as an anchor tenant and none of the well known global software players have come to QTSC till date. Initially, when it opened, QTSC attracted software enterprises due to internet facilities offered which was not available anywhere else in the country. However, following the availability of broadband based internet services in cities like HCMC since 2003, many of the original tenants have relocated to HCMC.

In 2005, QTSC started offering incubation facilities for start up enterprises through Quang Trung Software Business Incubation Company Limited (SBI). Details of the incubation center have been presented in Box 9. Given the current scale of operations, QTSC has not yet tied up with any financial institutions/venture capital funds for arranging financing for the occupants/incubatees. There is currently one venture capital fund dedicated to the IT sector in Vietnam, namely, IDG Venture Capital fund (corpus USD$100 million). VinaCapital is in the process of launching another IT sector dedicated fund with a corpus of USD$50 million. QTSC is currently in talks with both entities for a possible tie-up.

Official monthly rental rates in QTSC is USD$5.5 per square meter. The rental agreements with the respective tenants are renewed every year with the old tenants negotiating a lower monthly rate of around USD$3.50 including maintenance charges with

QTSCDC (based on interactions with Pyramid Software Development). For plots on lease, an annual lease rental of USD$0.76 per square meter is charged by QTSCDC with USD$0.40 per square meter being paid to the local government on account of land lease rental. QTSCDC retains USD$0.36 per square meter of land as maintenance fees.

Linkages: As per QTSC's charter, occupants in QTSC are expected to offer the following products/services:

- Software products/customized software
- Software outsourcing, offshore development
- IT services including data processing, call centers
- Software consultancy, including E-business, ERP solutions, etc.
- Development of scientific research and human resource training institutions relating to IT

The existing tenants in the park are primarily involved in software development, data processing and IT training.

For ensuring linkages and business relationship amongst the occupants, QTSC has put in place a strategy for attracting foreign software enterprises into the Park. QTSC through the government has approached development agencies including US Trade Development Agency, VNCI (US), JETRO (Japan), EU, and USAID to help market QTSC as an attractive IT destination in their respective countries.

In addition, efforts are being made to involve Microsoft, IBM, CISCO for partnering with the IT training institutes in QTSC to offer courses that will be beneficial for building the requisite skill base required for the occupants of the park.

Infrastructure: QTSC is located 15 Km from HCMC and is 15 minutes away from the international airport. QTSC offers the following facilities to occupants:

- Internet connectivity through 3 gateways, 2 with a speed of 34 Mbps and 1 with 100 Mbps. The 3 lines work alternately to ensure uninterrupted connectivity.
- Telecommunication services is provided through a network of optical fibre cables.
- Continuous power supply is ensured through 5 alternate lines from the national electricity

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BOX 9. *Incubation Center at QTSC*

SBI is structured as a non profit organization with QTSC Development Company holding 85% shares and HCMC Computer Association holding the balance shares.

For the first 3 years this project will be supported by EU's private sector development program which besides a financial assistance of Euro 2 million is also providing management expertise and know how for running the incubation program. EU's panel of experts will also help incubatees with commercialization and marketing of ideas/products/services.

EU will assist SBI till 2008, by which time its operations are expected to be sustainable.
SBI is in the process of building a 2000 square meter incubation center having a capacity for accommodating 25 enterprises on a plot allotted to it by QTSC. The facility expected to cost $1 million will be completed by 2007. This investment is being funded by the company's own resources. Facilities to be provided to incubatees include

(i) Office Space, (ii) office equipment including computers, (iii) Consultancy on business development and business planning.

Currently there are 3 projects are being evaluated for incubation, 2 being projects of students of state universities with the other one belonging to students of a local polytechnic institute. All the projects are in the area of software for internet/web development. The projects had been selected based on (i) personnel structure/team and (ii) evaluation of business plan. Post evaluation 2 selected projects will be supported for a maximum period of 3 years after which if successful, these enterprises will be expected to move in as tenants of QTSC.

SBI expects to use its relationships with banks and venture capital funds like IDG Venture Capital to arrange funding for the incubation enterprises. Additionally, EU funds may be given as loans.

SBI has proposed the following model for recovering rent for the incubation period from the incubatees:

- Year 1 – no rent
- Year 2 – 20% rent
- Year 3 – 80% rent

Rent expected to be charged will be USD$5.5 per sq mtr/month in line with that charged from other tenants of the park. Besides rentals, SBI also expects to generate revenues through offering training programs.

(Based on discussions with Mr. Wolf Rienow, EU Senior Advisor, SBI and Mr. Lai Tan Binh, Business Development Manager, SBI)

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network. In addition, each building has a diesel generator for providing back up power.
- One stop service for assisting tenants with licensing and administrative formalities, conducting customs procures, assistance with visa processing for expatriate employees.
- Transport service connecting HCMC.
- 24*7 maintenance service and security services.
- Restaurant and canteen facilities.
- Post office & ATM.

- Water is supplied by HCMC. QTSCDC operates a sewerage treatment plant.

All the occupants we had interacted with were largely satisfied with the services provided by QTSCDC. Most of the occupants found the one stop service to be very useful. While the quality of internet service provided in the park was appreciated by all, everyone felt that the services were expensive when compared to that in HCMC where the local government subsidizes internet services. Interactions with foreign invested occupants also indicated that telecommunication costs were much higher compared to other countries in the region. While the distance of QTSC is only 15 Km from HCMC, it takes 45 minutes traveling time from HCMC during morning/evening rush hour on account of traffic load and condition of the road linking the city. One of the main reasons cited by FPT, Vietnam's largest IT company, for shifting back to HCMC was that its employees found the traveling time to and from QTSC to be too long. It is understood that most of the initial tenants moved back to HCMC for similar reasons once internet services were available in HCMC.

QTSC has residential units, some of which are ready for occupation. However, given that there are no social or recreational facilities inside QTSC, employees of almost all tenants prefer to live in HCMC. Based on our interactions with select occupants, expatriate employees are comfortable living in HCMC which has all the infrastructure and facilities comparable with any metropolitan city in the world including good healthcare facilities and international schools.

People: Currently over 5000 people are working/ training in QTSC. There are 6 IT institutes in the park with 600 students completing their IT courses each year. There are around 33 universities and colleges in and around HCMC which provides skilled manpower required for the IT sector. Being close to HCMC, there is easy accessibility to skilled manpower for the occupants. Based on our interactions, most of the occupants felt that the curriculum followed by the local universities and colleges were not adequate to meet industry requirements. Knowledge of English language was identified as another barrier to providing IT enabled services like call center and outsourcing services involving interactions as the markets for these services are

primarily in Europe and America. The industry has to spend a lot of time on training graduates before they can be placed on jobs. However compared to other countries in the region, the rates for manpower in Vietnam is quite low ranging between USD$500– 1000 per month depending on experience and skill.

The local government is trying to augment the skill base for the IT sector through encouraging IT Training organizations to invest in QTSC and arranging partnerships for them with global IT majors like Microsoft, CISCO, Sun Microsystems, and IBM.

5.1.3.3 Saigon Hi-Tech Park (SHTP)
SHTP was established in 2002 based on a decision approved by the Prime Minister of Vietnam. Currently the park is under construction with the first phase expected to be ready by 2007. SHTP is situated 15 km from HCMC on the highway connecting HCMC with Hanoi. SHTP is strategically located in the largest focal economic region of the south of Vietnam covering 55 industrial zones/ export processing zones in HCMC and provinces of Dong Nai, Binh Duong, binh Phuoc, Tay Ninh, Long An and Ba Ria – Vung Tau. This region contributes nearly 30% of the country's GDP and has been growing at a rate double the national average. The objective of the government in setting up SHTP is to position the park as a technopolis serving the above referred economic region. SHTP is expected to focus on the following areas:
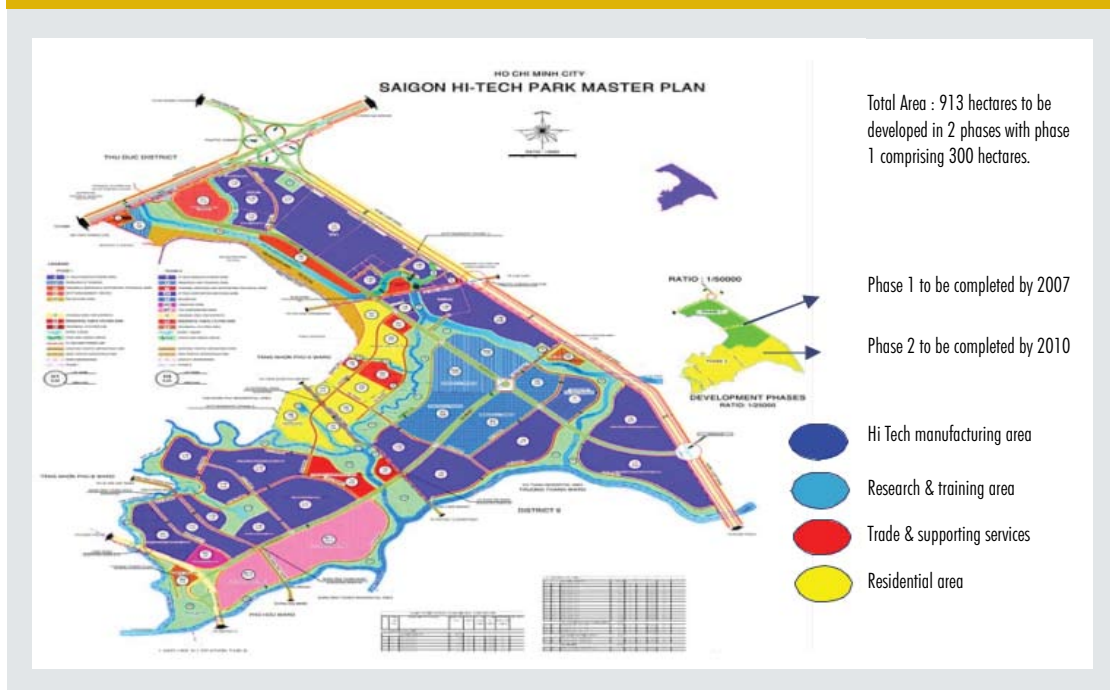
- Micro electronics, information technology and telecommunication.
- Precision mechanics and automation.
- Biotechnology.
- New/advanced materials, nanotechnology.

Applying the CLIP framework to SHTP we observe:

Capital: SHTP is a project of the Ho Chi Minh City People's Committee and is being funded by the local government. The park is being developed on 913 hectares of land with 300 hectares being developed in phase 1 and the remaining land will be developed in phase 2. While phase 1 is expected to be completed by 2007, phase 2 will be completed by 2010.

Two state-owned agencies have been set up for developing and managing the park, namely, SHTP Project Management Company for developing the

Figure 24. *SHTP Master Plan*

infrastructure for the park and SHTP Development Company for providing maintenance services to the occupants of the park.

SHTP Project Management Company is primarily involved in land development and constructing the infrastructure in the park including internal roadways, power/telecommunications network, and water & sewerage.

The plots developed are being leased to various entities selected by the SHTP Management Board in accordance with the specific zones identified in the master plan. Like QTSC, SHTP follows a one price formula with plots being provided for Hi Tech manufacturing, including software development on a 50 year lease at USD$50 per square meter under upfront payment option and USD$1.5 to $2.5 under the annual payment option. Maintenance fees are charged separately at USD$0.48 per square meter per year. Plots earmarked for commercial use including residential & hotel end use have an upfront lease payment of USD$220 per square

meter for a 50 year lease (annual payment option also available at USD$5–9 per square meter).

Though phase 1 is yet to be completed, 19 plots measuring around 270 hectares have already been leased to a mix of enterprises comprising global hi tech majors like Intel, Nidec of Japan, HP; local IT majors like FPT (for building a software development center); State owned enterprises like Saigon PostTel (telecom operator). Total investments expected to be made by the tenants is around USD$840 million.

Although there is no anchor tenant, Intel's decision to operate out SHTP has had a positive effect with the global majors like Microsoft and Motorola being approached by SHTP for investments in the park.

Once the park is operational, SHTP plans to introduce incubation facilities and enter arrangements with banks/financial institutions/venture capital funds for funding start up enterprises.

Linkages: As discussed earlier, the government had planned SHTP for providing linkages in terms of IT/Hi Technology products/Research & Development support to businesses located in the 55 industrial/export processing zones located in close proximity to SHTP. To ensure steady supply of skilled manpower, SHTP has been located adjacent to the National University campus, which has over 15,000 students pursuing courses in science and technology.

Infrastructure: SHTP will be providing the following facilities to its occupants:

- Telecommunications to include broadband packet switching network, wired & wireless data transmission, high speed internet access.
- Power through a medium voltage network connected to 2 different national sub stations, 24/7 back up with its own gas turbine power plant.
- Water will be sourced from Binh An water plant with SHTP operating its own 9500 cubic meter per day (scalable to 24300 cubic meter per day) high pressure pump station.
- 2 wastewater treatment plants.

Besides this, SHTP has earmarked zones for a hotel, residential areas, commercial areas.

SHTP is located on the Trans Asia Highway connecting HCMC with Hanoi. It is 15 Km from HCMC, 18 Km from the international airport at HCMC and 12 Km from the Saigon harbor.

Given SHTP's close proximity to HCMC, it is expected that people working in SHTP will live in HCMC and make use of the social infrastructure and recreational facilities of the city.

During our interactions with Nidec and Intel, both foreign enterprises expressed satisfaction with the infrastructural facilities to be provided in SHTP.

People: There are 30 universities and 27 vocational schools including IT training centers in the proximity of SHTP that should be able to supply skilled manpower for the occupants of the park. Occupants like Intel has already identified engineering colleges from where it will recruit and has initiated communication programs with students through participating in Hi Tech fairs and sponsoring seminars held at the

respective campuses. Like the occupants of QTSC, the outdated curriculum followed in most colleges/universities is an area of concern. Intel intends to recruit engineers and train them for a year in its other facilities in China, Malaysia, and Philippines before they are deployed at the Vietnam facility. Compared to other countries in the region, the cost of skilled labor is lower in Vietnam.

5.1.4 Assessment of Critical Business and Policy Enablers

It has been observed that most of the countries that have emerged as global leaders in the IT sector have been able to leverage some key business enablers, allowing their IT companies to thrive in the global marketplace. Additionally, the governments of many

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BOX 10. *Intel Investment in SHTP*

In February 2006, Intel announced that it would set up a assembly and testing unit for semi conductor products in Vietnam. This USD$300 million facility will be one of the largest foreign direct investments in Vietnam. Intel has decided to set up the facility in the Saigon Hi-Tech Park near HCMC. The facility is expected to be commissioned by early 2009 and will employ around 1200 workers.

While Intel did not disclose the names of the countries that were considered for this investment, it currently operates similar facilities in China, Malaysia, Philippines and Costa Rica. The possibility of expansion of these facilities vis-à- vis a green field project had been considered before arriving at the decision to invest in Vietnam. Intel's decision to invest in Vietnam was guided by the following factors:

- Total cost of operations, which included cost of constructing the facilities, cost of operations and labor.
- Availability of skilled human resources.
- Physical infrastructure like availability of quality power, road network, water and airport.
- Incentives offered by the government.
- Market access.
- Political stability and economic growth.

Vietnam ranked high in low cost of labor, physical infrastructure at SHTP and particularly political stability. Intel was also impressed with the attitude of the government and the efforts it is making in developing the IT sector.

Intel generally opts to locate its facilities in government owned Hi-Tech parks. Its facilities in China and Malaysia are located in government owned Hi-Tech Parks.

Intel will use its own funds for setting up its Vietnamese facility.

Intel has already identified engineering colleges and Technology universities from where it will recruit engineers.

(Based on discussions with Mr. Than Trong Phuc, Country Manager, Vietnam & Indochina, Intel Semiconductor Ltd.)

of these countries have consistently supported the development of the sector through a set of fiscal, innovation, people, and investment climate policies. The current section details our assessment of some of the critical business and policy enablers that are impacting/are likely to impact the development of the IT sector in Vietnam.

4.1.4.1 Sources of capital

The IT sector in the country comprises primarily of foreign invested companies and domestic companies. While most foreign owned enterprises have been funded through foreign direct investments from their respective parent organizations, the domestic enterprises mainly comprising small and medium sized enterprises have been funded primarily through promoters' capital.

Since 2002 the government has been mainly involved in establishing IT clusters funded through budgetary resources where plots developed within these clusters are leased to IT enterprises/IT office space developers.

The stock market in Vietnam is still in its development phase with the Ho Chi Minh City Securities Trading Centre (HOSTC) and the Hanoi Securities Transaction Centre being set up in 2000 and 2005 respectively. There are currently around 60 listed enterprises with a market valuation of USD$3.5 billion. The listed enterprises comprise a mix of public sector enterprises and private sector companies engaged in manufacturing and food processing. None of the IT sector companies in Vietnam has been listed as of date. However, Vietnam's largest domestic IT player, FPT plans to list on HOSTC in the near future.

Venture capital (VC) funds have been available for Vietnam's IT sector for the past 2 years when IDG Ventures Vietnam (a foreign enterprise) set up its local operations (Please refer Box 11). Recently in August, 2006 VinaCapital, a local enterprise, has announced the setting up the Vietnam Technology Fund with an initial capital of USD$50 million. The primary constraints for VC funding in Vietnam are the limited exit options on account of an under developed capital market system.

Vietnam has a well organized banking sector dominated by state-owned banks. In the recent past foreign banks such as Citibank, and HSBC, have commenced operations in the country thereby increasing the level of competition. However, local IT software enterprises not having asset intensive operations generally cannot borrow from banks as they cannot provide adequate security cover.

Incubation facilities are provided for IT start-up entities by select organizations in both the public as well as the private sector. Public sector initiatives include incubation centers operated by Universities like Hanoi University of Technology through its Centre for Research and Consulting on Management (CRCM) (Please refer Box 13) and the Quang Trung Software Business Incubator Company Ltd situated inside the Quang Trung Software City (please refer Box 8). In the private sector, FPT through one of its subsidiaries, FPT Technology Development is offering incubation facilities (Please refer Box 11).

5.1.4.2 Anchor investors

In most countries that have performed well in the IT sector, the growth has been contributed partly by domestic companies that have started small and large established anchor investors seeking to expand

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BOX 11. *IDG Venture Capital Fund*

International Data group (IDG) had set up a USD$100 million IT sector fund for Vietnam in 2005. Vietnam is the 4th country after USA, UK and China where IDG is providing venture capital funding. IDG intends to leverage its China experience for its Vietnam venture.

IDG's focus is to invest in Vietnamese IT enterprises involved in developing technology and providing IT services in the areas of internet.

IDG selects enterprises for investments based on (i) track record of management team and (ii) evaluation of business plan. IDG's typical range of investment is 20% to 50% of the share capital with a planned exit from the company after 5–7 years through IPO/sale of shares, arranging merger with other IT companies, or other means. IDG has provided VC funding to the following Vietnamese enterprises till date:

- Vinagames – a company providing online games;
  Vietnamworks.com – an on-line job search portal;
  Peace Soft – an e-commerce enterprise;
  iSphere – a software development company;
  Punch Entertainment – developer of games for mobiles and
  Mobile Solution Services – provider of online services

(Based on discussions with Mr. Truong H. Nguyen, VP/Director of Business & Technology Development, IDG Ventures)

to newer geographies to increase their competitiveness. Thus, in India, the growth has been led by both Indian multinationals like Infosys, Wipro, as well as global leaders including IBM, Genpact, SAP, and Oracle. In China, too, prominent players in the sector include local companies such as the Stone Group and the Legend Group, together with global companies such as IBM, and Microsoft.

While Vietnam too has been able to attract a number of large IT hardware manufacturers like Intel, Fujitsu, and Canon, none of the global players in the software sector have set up development centers in the country till date though they cater to the domestic markets through imports/agency arrangements with local IT enterprises like FPT.

5.1.4.3 Infrastructure

The enterprises in the IT sector are primarily located in and around the main cities of Vietnam, namely, Hanoi in the north and Ho Chi Minh City (HCMC) in the south. The major IT hardware units are located in Industrial Parks with Fujitsu having its manufacturing facility in the Dong Nai Province, Canon in Hanoi and Intel's proposed unit coming up in an High Technology Park near HCMC. Most of the software enterprises are located in HCMC or Hanoi with domestic software major FPT being headquartered in Hanoi having developments centers at Hanoi, HCMC and Danang.

The quality of physical infrastructure in the major cities like HCMC and Hanoi are adequate for the IT Industry.

- Power is supplied by state-owned power companies with most commercial buildings housing software enterprises and the Industrial Parks having back up power generating facilities.
- Telecommunication services are provided by state-owned telecom companies. Vietnam's international communication link is through 8 earth stations and 3 international switchboards linked to 3 international optical fibre networks, namely, (i) Vietnam Post & Telecommunications (VNPT) optical fibre network linking China and 4 ASEAN countries, (ii) SEA-ME-WE-3 submarine cable linking 34 countries in Europe, Asia and America and (iii) Thailand-Vietnam-Hong Kong submarine optical fibre cable network. VNPT operates the North-South optical fibre link which serves as the national telecom backbone. As per our discussions with Ministry of Post & Telematics representative, Vietnam intends to launch its own communication satellite by 2008.
- Internet connectivity is available in all major cities across Vietnam. There are currently 6 Internet eXchange service providers and 16 Internet Service Providers comprising both state owned enterprises and private sector players.

- Vietnam is well connected by air with all key cities having airports. Flights on domestic routes are operated by the state owned Vietnam Airlines. Both Hanoi and HCMC have international airports with major international airlines in addition to Vietnam Airlines connecting Vietnam to all major cities across the world.
- The roads within the cities are well maintained with adequate public transport in terms of bus and taxi services. The cities are connected by the National Highway.
- Office/commercial space is available in modern buildings mostly constructed by private sector developers offering facilities including basement parking, cleaning services, fire fighting, and round-the-clock security.

While most of the investors with whom we interacted agreed that Vietnam's infrastructure was adequate for the growth of the IT sector, they felt that the current telecommunication infrastructure including quality of internet services needs significant improvements if the focus of the software sector was to provide BPO services like call centers and data processing for overseas client. Another issue raised in this context was that the high cost of telecom services as compared to other countries in the region.

Both HCMC and Hanoi are vibrant cities in Vietnam having all facilities available in modern cities across the world including modern healthcare facilities, educational institutions, entertainment, recreational facilities, and public transport. There are many expatriates living in these cities with their families. Facilities available in these cities include:

- Modern residential units in high rise apartment buildings as well as villas are available on rent/lease.
- Both cities have numerous hotels in all star categories with global hospitality chains such as Hilton, Sheraton, and Sofitel operating hotels.
- Recreation facilities include shopping malls, opera houses, restaurants & pubs, and movie halls.

Representatives of almost all foreign invested enterprise we met agreed that Vietnam is a politically stable country with a good law and order record and their expatriate employees had no complaints with the quality of life in the country.
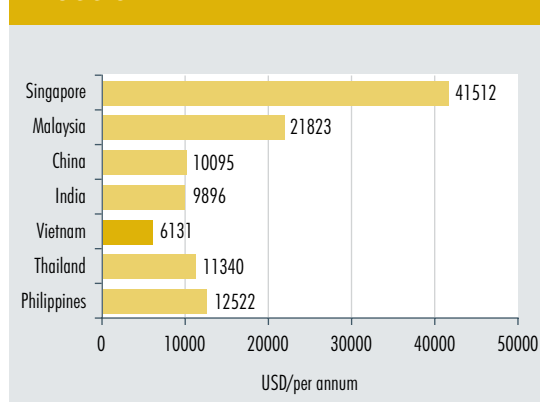
5.1.4.4 Human resources

The availability of skilled workforce at low salaries compared to other countries in the region has been a key enabler in the growth of Vietnam's IT sector. (Please refer Figure 25 for comparative salaries for IT sector with other countries in the region). There are currently around 50000 engineers/graduates in the country with 25000 persons estimated to be working in software firms.

Vietnam has around 70 universities and institutes offering engineering courses and bachelor degrees with the course duration ranging between 4–5 years. In addition there are over 100 colleges and 50 informatics centers which offer diploma courses with the course duration ranging between 2–3 years. There are currently around 80,000 students enrolled in various courses in these educational institutes with 15,000 students graduating every year.

There is a shortage of skilled persons required for the IT sector which has affected the growth of the software industry sector in the country. As per the IT master plan till 2005 there was a requirement of 50,000 IT software professionals by 2005 with the requirement expected to increase to 100,000 by 2010. This skill shortage is likely to impact the country's vision of achieving USD$1 billion from the software sector by 2010.

Almost all representatives of the IT sector comprising local software enterprises, foreign invested

Figure 25. *Comparative Salaries in IT Sector*

Country	USD/per annum
Singapore	41512
Malaysia	21823
China	10095
India	9896
Vietnam	6131
Thailand	11340
Philippines	12522

Source: neoIT – Offshore and Nearshore ITO/BPO Salary Report 2006.

companies, trade associations with whom we interacted have raised concerns on the quality of skills of the students joining the industry.

The primary reason for skills not matching to industry requirements can be traced to the outdated curriculum being followed by most universities/colleges which offers IT courses which is not in line with industry requirements.

The need to rapidly build up English language skill sets especially in the context of business process outsourcing services like operating call centers for overseas client is also being felt by the industry. Another key concern raised was the shortage of experienced IT professionals, especially those having project management skills. The government is aware of these problems and several initiatives have been taken by both government as well as industry. Some of these initiatives have been illustrated in Boxes 14, 15 and 16.

To overcome the skill shortage, large domestic software companies like FPT and TMA Solutions are in the process of setting up Technology Universities which would offer courses meeting industry requirements.

5.1.5 Corporate Governance and Management Issues

In most of the countries assessed as part of the study, effective corporate governance has been observed to be one of the consistent hallmarks of well-performing economies, including the IT sector.

Consequently, almost all the large global IT companies, including those in developing economies like China and India, follow global accounting and reporting principles, are listed on both local and global stock exchanges thereby having to comply with mandatory corporate governance principles, have financing partners in the form of global investment banks, venture capital/private equity funds who are usually represented on the company's Board of Directors and are run by professional management teams.

While foreign invested companies like Fujitsu and Canon follow corporate governance guidelines laid down by their parent organizations, local IT software companies are usually set up with promoters capital and are owner managed do not adopt corporate governance measures. The financial, accounting and performance reporting practices followed by of these companies are reportedly non-transparent, designed with the primary objective of minimizing payment of taxes. With the capital markets still nascent, shares in majority of Vietnam's 2400 companies change hands in unregulated over-the counter markets.

With the objective of introducing corporate governance measures, the government is offering tax incentives for such companies to shift the trading of their shares to the two stock exchanges. A new securities law that is expected to come into effect in 2007 seeks to lay out standards of disclosure and governance for all companies. (Source: Bloomberg)

5.1.6 Government Policies and Implementation Mechanisms

Government policies and interventions have played a key role in the development of the IT

BOX 14. *Topic 64*

Training Online Program on Information Technology for Communities – 64 provinces (Topic 64) is being implemented under the guidance of Center for Research and Consulting on Management (CRCM), Hanoi University of Technology.

The program involves updating the IT courses offered and equipment in 64 government-run IT training centers spread across the country. This initiative is being funded by Microsoft, USAID, Qualcomm and the state owned EVN Telecom. EVN Telecom will provide internet access free of cost for a period of 1 year to all the centers. CRCM will advise the IT training centers till they have a sustainable business model in place. By the end of 2007, 30000 to 50000 students are expected to benefit from this program.

(Based on discussions with Mr. Pham Minh Tuan, Vice Director, CRCM)

BOX 15. *Vietnam Education Foundation*

As part of this U.S.-initiated program, the Vietnam Education Foundation is facilitating the association between 10 identified universities of Vietnam with major technology universities in the U.S. including Cornell and Rice. Under this program the U.S. university will share its curriculum which will be adapted by the Vietnamese university. The Vietnamese Universities will have to maintain strict control on the standards of teaching and entry criteria for these courses.

sector in Vietnam. The government has been actively promoting investments in the software industry through enacting specific policies for the sector. A high-level assessment of the applicable policies has been presented in Figure 26 on the next page.

In addition to policies for facilitating development of the IT sector, case studies of successful countries like Singapore, China, and India have also demonstrated the importance of having efficient implementation mechanisms. There appears to be significant scope for improvement on this front as far as Vietnam is concerned. Some of the representative areas which present opportunities for streamlining have been highlighted below.

- Effective coordination is required among various government ministries, agencies, and departments in formulating and implementing policies benefiting the IT sector in Vietnam. Currently, various ministries and departments at both national as well as provincial levels have different roles and responsibilities in promoting the IT sector. For example while MPT is currently responsible for ensuring overall growth of the IT sector in Vietnam, MoST is responsible for overseeing the development of IT Parks. It is understood that the development of IT parks like Quang Trung and Saigon Hi Tech Park near HCMC has been largely through initiatives taken by the People's Committee of HCMC with MoST having a limited role.
- Absence of formal financing channels for local IT companies need to be addressed. Specific policies may be required to encourage these enterprises to list on stock exchanges. Incentives may also be given to banks for supporting actions such as lending to this sector or attracting venture capital funds.
- Although Vietnam has an Intellectual property law that covers copyright protection of IT software, enforcement needs to be strengthened given that over 90% of all packaged software used in Vietnam is estimated to be pirated.

5.1.7 Potential Growth Opportunities for the Vietnam It Sector

Before attempting to identify specific recommendations for development of the IT sector in Vietnam, it is imperative that the current and potential market opportunities available to companies operating in this sector are identified. Based on our assessment of the sector, the following represent potential opportunities that can possibly be targeted.

- IT hardware assembly and re-export operations, where Vietnam benefits from a strategic geographic location which is being leveraged by global players for serving their Asia Pacific markets. The availability of engineering graduates at annual salaries ranging between USD$6,000–$7,000 as compared to USD $9,000–$10,000 in India and China also adds to its competitive advantage. The hardware sector revenues have doubled since 2002 resulting in a CAGR of 20%. A year-on-year growth of 50% was recorded in 2005, primarily driven by growth in exports. With the expansion plans of existing players like Canon and new entrants like Intel setting up facilities in the country, it is expected that the current levels of growth through exports in this sector will continue in the near to medium term. The domestic demand for computer hardware products is also expected to grow at 15% to 18% annually as more businesses including the financial sector goes for increased automation. The domestic hardware market is currently dominated by local hardware assembly operations like FPT and CMS. These local players also represent global hardware companies as resellers of the global players such as Toshiba, NEC, and HP with none of the global players having manufacturing operations for serving the domestic computer hardware market. Recently Intel has made a strategic investment of over USD$36 million in FPT to take advantage of the growth in the domestic hardware market.

Figure 26. *Government Policy Instruments*

Broad Classification	Illustrative interventions
Fiscal Policies	■ Business Income Tax (BIT) rate of 25% is applicable for software enterprises in Vietnam (usual tax rate is 28%). BIT rate is further reduced to 20% and 15% for software enterprises investing in geographic areas with difficult socio-economic conditions and particularly difficult socio-economic conditions respectively. ■ Reduced BIT rate of 10% is applicable for software enterprises that have been set up under the provisions of Law on Foreign Investment in Vietnam. ■ All software enterprises enjoy exemption from business income tax for a period of 4 years from the date when taxable income is first produced. ■ Newly established software enterprises are entitled to reduced BIT rate of 10% for the first 15 years of operations. Additionally, these enterprise are exempt from BIT for 4 years commencing from the time they have taxable income and also benefit from a 50% reduction in the amount of BIT due for the following 9 years. ■ No export tax is levied on export of software products. ■ No Value Added Tax (VAT) is imposed on software products and services produced and sold in Vietnam. ■ No import tax for import of materials (not produced by domestic manufacturers) directly serving software product manufacturing operations. ■ Specific tax breaks for locating unit in designated software/hardware parks: ■ uang Trung Software City (QTSC) and Saigon Hi-Tech Park (SHTP) – BTI rate will be 10% for duration the project remains located in QTSC/SHTP. ■ TSC, SHTP and Hoa Lac Hi-Tech Park (HHTP): exemption from Business Income Tax for 4 consecutive years starting from first taxable profit making year and 50% reduction for the next consecutive 9 years. ■ SHTP – Exemption from payment of import duty and VAT for machinery, equipment, construction material that are not locally produced for units located within SHTP.
Innovation Policies	■ BIT exemption for income earned from scientific research and technological development, products manufactured during test production and products made from technology applied for the first time in Vietnam. ■ Expenses incurred on scientific and technological research, innovations and initiatives (even if in the nature of capital expense) is allowed as a deductible expense during computation of income tax ■ Intellectual Property Rights protection to computer programs and compilation of data, as well as layout design of semi-conductor and integrated circuits ■ 50 year protection under copyright and 20 years for invention patents.
Human Capital Policies	■ As part of Vietnam's Development objective till 2010 the courses offered in information and communication technologies at universities shall be comparable to that offered in advanced ASEAN countries. 80% of graduates undertaking these courses shall have adequate professional qualifications and foreign language knowledge to participate in the international IT market. ■ Government is encouraging universities to ensure the medium of instruction for ICT courses is English and adopt policies to attract foreign teachers conversant with English language. ■ To attract foreign professionals, the threshold limit over which personal income tax has to be paid by foreigners is around VND 8 million a month (Vietnamese nationals have a threshold limit is VND 5 million). In addition, foreigners are subject to lower tax rates ■ Vietnamese nationals directly participating in software manufacturing and service operations enjoy the same benefits in personal income tax threshold and tax slab rates as foreign nationals resident in Vietnam
Investment Climate Policies	■ Government in its development objective for 2010 has announced its intention to create a favorable environment in order to become an attractive and reliable investment destination for foreign investors, especially for large ICT conglomerates. ■ 100% FDI allowed in IT and foreign investments is encouraged in technology and R&D. ■ Investment licenses issued are valid for a period 50 years which can be extended to 70 years. ■ Joint Venture or foreign enterprises engaged in infrastructure development on BOT basis are exempt from BIT for 4 consecutive years commencing from the year in which it makes first taxable profit and will enjoy 50% reduction in BIT for the subsequent 4 years. In case these enterprises are involved in developing infrastructure for IT sector, the BIT exemption period will be 8 years instead of 4 years commencing from the year in which it makes first taxable profit. These enterprises are also exempt from import duties for imported equipment and machinery used in their projects. ■ Department of Planning and Investment (DPI) is the single window facility for issuing Business Licenses. DPI also guides potential investors on matters such as legal documentation requirements. The One stop service facilities at select IT Parks like QTSC & SHTP are authorized to receive applications and forward them to DPI ■ One-stop service at QTSC, SHTP and HHTP, which simplifies all investment procedures, including obtaining investment licenses, on-site customs office, procedures of land provision and land lease, constructions permit, visa, and housing ■ Benefits specific to QTSC and SHTP: Foreigners and overseas Vietnamese working in units located within the parks and their family members, will receive multiple entry visas for the period they continue to work in QTSC/SHTP ■ Government-promoted IT Parks like QTSC & SHTP follow a one price lease policy. The lessees have the right to pledge land use right and assets related to land as collateral. ■ Double taxation avoidance treaties with 38 countries, including key IT markets like Australia, Singapore, South Korea, Japan, UK, France and Germany. Agreements with Malaysia, Indonesia, China, Thailand, Singapore and Philippines for 'Specially preferential treatment in trade relations'.

- Domestic IT services and software sector, driven primarily by the requirements of the financial services sector and e-Government program which is being revived by the government. Already global majors like Oracle and local players like FPT have been contracted to develop the software for the World Bank funded Treasury & Budget Management Information System by the government. Currently, the IT software/ services sector, with revenues of USD$250 million in 2005, is small compared to IT hardware sector, despite having grown at a CAGR of 29% over the past 4 years. Export revenues primarily from software development activities at USD$70 million in 2005 is largely insignificant. Currently, exports are driven by software companies set up by overseas Vietnamese mainly serving markets in USA, EU and Japan. With Vietnam obtaining WTO membership and having enacted Intellectual Property Protection laws in 2005 (applicable from July, 2006), it is expected that the domestic market for packaged software will achieve significant growth in the medium term once appropriate mechanisms to curb software piracy are implemented.

- Vietnam is well placed to offer back office transaction processing services like finance and accounting, payroll processing, insurance claim processing, and other rule based processing services to US and EU based organizations, on account of a sizeable population of overseas Vietnamese in these countries coupled with a favorable time zone difference. However, to effectively develop this sector, the twin issues of i) ensuring adequate supply of skilled manpower and ii) improving quality and reducing cost of international data & voice connectivity will have to be overcome. Consequently, this segment of the market is likely to develop over the medium term with adequate government support.

5.1.8 Identification of Issues and Growth Strategies

Having identified the potential growth opportunities for the Vietnamese IT sector, it also becomes necessary to identify market participants who are

Figure 27. *IT Sector Growth Segments & Strategies*

Potential growth segments	Identified issues	Recommended growth strategies
Short term Hardware	- Market currently dominated by Foreign invested IT hardware assemblers	- Leveraging presence of Canon, Fujitsu and Intel, focused targeting of global IT players such as HP, Dell, and IBM to establish assembly units to serve the Asia-Pacific regions as well as the domestic market - Presence of global IT majors in Vietnam is expected to have a positive rub-off on IT Services, captive software development
Software Development & System integration services	- Applications in finance & accounting, payroll, etc. from local software developers for domestic market as well as exports	- Implement measures and mechanisms to curb software piracy. This will ensure that global & local software players are encouraged to market off the self software products in the domestic market - Encourage use of established packaged application software in domestic businesses to facilitate compliance to good practice in performance management & reporting, offer standardized training platforms to IT professionals which can then be leveraged for export markets
Long Term BPO Services	- Market currently dominated by local companies with inadequate scale of operations and limited market reach	- Facilitate entry of global BPO services companies like IBM, Genpact, Accenture, Wipro, TCS, etc. by offering them favorable incentives like subsidized lease rentals for locating in IT Parks - Encourage domestic companies to partner with global companies for offering BPO services, sharing of good practice, quality accreditations like SEI CMM – this will help domestic companies build capabilities which can be leveraged for export markets - Facilitate competition in the telecommunication sector to ensure world class communication infrastructure at competitive prices - Undertake reforms in the education sector to ensure adequate supply of skilled professionals

well placed to drive growth in the respective areas, together with potential strategies for development, based on identified good practice in other countries assessed as part of the study.

5.1.9 Role of IT Parks and Proposed Business Models

As has been demonstrated by the case studies, the key requirement underlying setting up of sustainable IT parks is the ability to attract credible occupants to the park, with business models that demonstrate sustainable viability. Consequently, having credible anchor investors in the park has been identified as an essential prerequisite for success both in developed as well as developing countries. In the current section, we have attempted to present our assessment of the critical business enablers for IT Parks in Vietnam, based on the case studies of parks in other countries including Vietnam as well as ground realities in Vietnam.

The generic critical business enablers likely to feature in the expectations of all categories of IT companies have been highlighted below.

- Location of the park in an area that permits it to leverage the existing urban and social infrastructure of the two key cities, namely, Hanoi and Ho Chi Minh City HCMC, as availability of skilled human resources is expected to be a problem in any other region.
- Simplified policy implementation mechanisms in terms of single-window approval facilities in areas such as operating license, sanction of building plans, and tax and customs duty registrations. so as to cut down significantly on the time for setting up new/expansion operations.
- High quality physical connectivity and infrastructure including air (both international and domestic), road and rail connectivity, a combination of multi-tenant buildings with contemporary facilities and build-to-suit options, adequate road & other surface transport connectivity with the adjoining city, intra-park roads, sewerage, and electricity.
- Lease or sale of land for built to suit facilities at rates lower than those prevailing in the adjoining city.
- State-of-art virtual connectivity in terms of data and voice infrastructure including international connectivity.

In addition, there are a number of potential value drivers which are expected to impact specific types of IT companies, with the level of interest also expected to vary across different categories of IT players (please refer Figure 28 in the next page for details).

Figure 28. *IT Parks – Segment-Specific Drivers*

Type of IT companies	Key value proposition of IT Parks, if any
Local hardware assemblers	■ Motivating factors: Incremental fiscal concessions like reduced rate of business income tax ■ Delimiters: Existing investments in infrastructure; proximity to markets
Global hardware players	■ Motivating factors: Reduction in time to market, for new entrants; Strategic geographic location for serving regional Export markets; Fiscal concessions; Need for state of art facilities for facilitating accreditation; Lower investments in ancillary infrastructure & facilities management; Linkages to Engineering institutes; Facilities for expatriate staff ; ■ Delimiters: Existing investments in facilities
Local software & IT services companies	■ Motivating factors: Reduction of time to market for expansions; Fiscal concessions; Built to suit options for custom development centers; Need for state of art facilities for facilitating accreditation; Domestic venture capital/private equity support; Lower investments in ancillary infrastructure & facilities management; incubation facilities ■ Delimiters: Existing investments in infrastructure for players with existing development centers; proximity to domestic clients; proximity to urban centers
Global software & BPO companies	■ Motivating factors: Reduction in time to market for new entrants/expansions; Fiscal concessions; Built to suit options for custom development centers; Need for state of art facilities for facilitating accreditation; Lower investments in ancillary infrastructure & facilities management; Linkages to colleges/universities/IT training institutes;

Most of the foreign invested IT hardware assembling units such as Nidec and Canon already operate out of industrial parks with the park management ensuring provision of basic facilities including quality uninterrupted power supply, water & sewerage treatment, telecommunication facilities, and single window clearance facilities covering import & export processing formalities. Intel has announced plans to set up its proposed unit in the Saigon Hi Tech Park. However, domestic IT companies generally operate out of offices located in the cities of HCMC and Hanoi due to its proximity to their clients as well as employees. With these cities offering the same telecommunication infrastructure as the IT Parks, these companies do not have much motivation to relocate to IT parks excepting for those having expansion plans. It is expected that in the long term IT Parks will be required in Vietnam for accommodating global IT services players/large domestic players like FPT for setting up their software development centers and BPO facilities.

The IT Park case studies and primary interactions with various stakeholders clearly demonstrate a case for management of the IT Parks to be vested with private sector players for ensuring adequate accountability and efficient service. Possibly, as has been the case in many other countries, existing facility management companies such as C B Richard Ellis and Trammell Crow with the requisite financial wherewithal for developing such projects. Consequently, a facilitation role is recommended for the government other than in situations where the land is owned by it. In such situations, the government can possibly pick up an equity stake in the development company, given that financial returns on IT parks have been fairly attractive.

5.1.10 Policy Good Practice which can be Leveraged

In almost all the countries assessed under this study, it has been observed that government policies have played a pivotal role in the development of the IT sector. The role of government in most countries has also been observed to evolve over time, with a more direct role during the initial stages of sector development gradually moving to a facilitative role with the picking up of private sector led growth.

The current section of the report highlights policy good practice that can be leveraged given the existing scenario in Vietnam, based on the countries analyzed as part of the study. For purposes of analysis, the good practice have been categorized into i) policies for developing the IT sector in the country and ii) policy good practice for development of IT Parks. Figures 29 and 30 below outline relevant policy good practice for facilitating development of the IT Sector and IT Parks respectively. As has been assessed during the study, IT Park occupants are offered a set of additional benefits over and above those available to IT companies not operating out of IT Parks. Consequently, the policy good practice highlighted for IT sector development would also be applicable to IT Park occupants, other than in cases where additional concessions have been envisaged in a specific area.

The measures outlined below only represent good practice adopted by other countries covered as part of the study. Consequently, these can at best be treated as starting points and additional analysis would be required for assessing their budgetary & other impact for customizing these to meet the requirements of Vietnam, should the government decide to consider any of these for implementation.

5.2 Country Case Study: Russia

5.2.1 IT Sector: Contribution to GDP

The Russian economy is estimated to have grown at an average rate of 6.1% during the period from 2001 to 2005 (Source: Goskomstat), with the growth rate marginally slowing down to around 5.6% during 2006. The 2005 GDP was USD$768 billion (RUR before 1998). The economy is expected to continue to grow at around 5% during the period from 2006 to 2010 (Source: Datamonitor).

The growth in the economy has been fuelled primarily by sectors like oil and gas (around 14% of GDP in 2005) and trading (28%). In 2003, around 11% of the global crude oil supply was contributed by Russia. Consequently, consistent increases in crude oil prices during the last 5–6 years has positively impacted GDP and foreign exchange earnings growth. The country had a positive trade balance of USD$143 billion during 2005, with

Figure 29. *Policy Good Practice for IT Sector Development*

Key Issues/Recommended Strategies for Vietnam

- Encourage large global IT hardware companies to establish assembly units for serving global markets

- Encourage direct presence of large global IT services & BPO companies

- Encourage domestic players in IT services & BPO companies to expand existing operations to increase scale of operations

- Development of financial services sector for meeting funding requirements of companies as well as improving levels of corporate

- Enforcement of intellectual property rights for encouraging growth of domestic software market

- Streamline policy implementation mechanisms

Policy Good Practice which can be considered

Fiscal Incentives
- Extend reduced business income tax rates of 10% for export oriented foreign invested IT hardware units even if they are not located in designated Technology Parks/Special Economic zones.
- Introduce specific financing schemes targeted at domestic IT services & BPO companies possibly through state owned banks for supporting them to scale up operations. The government may establish a special fund to refinance bank lending to the sector.
- Exempt business income tax/charging reduced rate of tax on capital gains made from sale of equity in listed domestic IT companies to encourage Venture Capital/Private Equity funds to invest in the IT sector. This is likely to enable domestic IT companies obtain funds to scale up their operations and achieve critical business volumes to partner with global players.

Innovation Policies
- Reimburse part/full initial expenditure incurred by domestic IT companies in obtaining quality accreditation (SEI/CMM/BS 7799) from a special fund established by the government. This scheme may be applicable to those companies obtaining quality accreditation within a specific timeframe, say within next 3 years.
- Establish dedicated tribunal for dealing with disputes relating to infringement of copyright, patents on designs for IT companies. The tribunal to ensure that cases are resolved within a specified timeframe.

Human Resource Policies
- Encourage private sector investments/public-private partnership through income tax concessions in establishing finishing schools to train final year students of graduate courses with requisite skills required for IT services and BPO sector.
- Establish a high level multi-disciplinary committee to track the changing need of IT sector and future demand of skills and recommend changes in curriculum for schools, colleges, and universities. Such a committee should include members from various government departments/ministries such as Ministry of Education, Ministry of Post & Telematics, and Ministry of Science & Technology and industry representatives (e.g., HCMC Computer Association, Vietnam Software Association).

Investment Climate
- Encourage e-commerce in the country through introducing enabling laws for establishing legal validity of electronic signatures, institutionalizing the process of issue and certification of digital signatures, preventing potential abuses of computer systems for enabling e-commerce transactions in line with similar laws enacted in China, India, Malaysia, Korea and Singapore.
- Allow foreign direct investment in telecom sector and remove entry barriers of foreign telecom players for investing and participating in management of existing telecom companies. Special tax concessions like reduced rate of Income tax for specified period, import duty exemptions for capital equipment may be considered for global telecom players willing to invest in telecom infrastructure required for the growth of the IT sector in the country.
- Implement a single window mechanism for providing all benefits, concessions & permits to IT companies. This would require a single agency within government to be identified as the nodal agency, with a presence in all key cities, which would then process applications seamlessly in coordination with other Ministries.
- Extend all the above concessions to local companies, subject to completion of listing on Vietnamese Stock Exchanges within a pre-defined period and extend additional fiscal benefits on successful listing on international stock exchanges.
- Formulate policies for attracting global venture capital and private equity funds like exemption of tax on income from investments and allowing losses to be deducted from other taxable income.
- Deepen existing capital markets through measures such as demutualization, attracting large global financial institutions, and investment banks.

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around 48% of total exports being contributed by crude oil and petroleum products. Machinery, equipment and automobiles accounted for around 39% of 2005 imports.

The services sectors accounted for around 57% of GDP in 2005, with the IT sector contributing USD$11.35 billion, or 1.5% of GDP. While this is significantly lower than countries like China and India where the sector contributes 4%–5% of GDP, the Russian IT sector has shown significant growth during the period from 2001 to 2005, with a CAGR of 29% during this period (please refer Figure 31 below).

5.2.2 IT Sector: Growth, Composition and Trends

The Russian IT industry dates back to 1940s & 50s, when the sector was dominated by the government with little or no private sector involvement and the focus was primarily on military and industrial applications. During the 1960s and 70s, computer hardware compatible with global technology trends were developed but penetration of IT continued to be limited. Even in the eighties, usage of computers was limited to premier research & development institutes and academic institutes.

It was only during the nineties that the extent of IT penetration started increasing rapidly. This decade also saw the emergence of private sector companies, including investment by global players like Sun Microsystems and Motorola. Most of these global players established their offshore R&D centers in Russia in an attempt to leverage the expertise and skill base of Russian professionals from premier Universities and centers of excellence.

The growth of the IT sector has continued in the current decade, with the turnover of the sector estimated at USD$11.35 billion during 2005. According to the Ministry of Information Technology and Communication, the sector is estimated to grow to USD$40 billion by 2010, translating to an expected CAGR of 31%. Key constituents of the sector have been discussed below (please refer to Figure 32 below for details).

- IT hardware, which contributed USD$7.72 billion to overall sector revenues, accounted for

Figure 31. *GDP and IT sector*
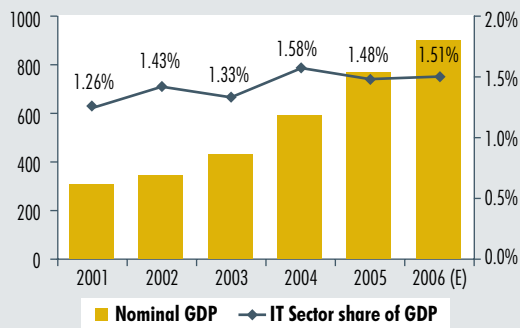
Source: Goskomstat, IDC & WEFA-WII

Figure 32. *Composition of the Russian IT Sector*

Source: IDC Blackbook; Euromonitor

large part of this segment is accounted for by global majors like SAP, Oracle and Microsoft. However, there are also a number of niche local products in areas such as finance & accounting and IT security developed by companies such as Kaspersky Labs, 1C, and Diasoft.

A listing of the top 10 IT companies has been presented in Figure 33 alongside. Most of these companies are located in the three top cities, namely, Moscow, St. Petersburg and Novosibirsk (please refer Figure 34 for details). These three cities housed around 75% of all IT companies in Russia.

As on 2005, 74% of the IT companies present in Russia in 2005 were headquartered in Russia, 10% in other CIS countries, 10% in USA and another 5% in Europe (Source: Outsourcing Russia & Russoft).

5.2.3 IT services exports

Aggregate IT services exports from Russia were estimated at around USD$1 billion in 2005, translating to a CAGR of over 50% during the period from 2000 to 2005 (please refer Figure 35 for details). Some key trends in the exports market have been highlighted below.

■ Key export destinations include U.S. and Canada (38%), Germany (11%), Australia & Switzerland (15%) and Scandinavian countries (6%). IT Services exports to Finland, Sweden, Norway

around 67% of annual IT sector revenues. Global majors like HP, Dell, Lenovo (IBM) dominate the market, with most of them operating through local partners like IBS, R-Style, Croc, Optima, TOPS and Merilon. We understand that other than a few players like Sun Microsystems which undertake direct imports for onward selling within Russia, Most other global players use their local partners for imports. Russia currently has limited chip fabrication activities in the Zelenograd region near Moscow, led by companies like Mikron and Angstrem.

■ IT services, with a turnover of USD$2.36 bn during 2005, accounted for 21% of sector turnover. Many of the hardware resellers like IBS, R-Style, Optima and Croc. have made a foray into this segment by offering system integration (including package implementation) services. However, there are other companies like EPAM, Telma, Galaxy and Opente@ch which focus exclusively on IT services. There is yet a third category of companies comprising global players like Intel, Sun Microsystems, Motorola, Samsung, Intel, and Cadence which have their development center in Russia and contribute to IT services exports.

■ Packaged software (2005 turnover: USD$1.27 billion) contributed 12% to sector turnover. A

Figure 33. *Top 10 Russian IT Companies (2005)*

Company	Revenue, 2005 (mn)	No. of Employees
Merilon	1026.7	970
NCC	838.9	1836
IBS	751.1	4468
Laboratory of New IT	635.6	2500
R-Style	572.6	2270
TechnoServe	562.9	909
Ultra Electrony	535.9	800
Kvazar-Micro	514.4	1300
Verysell	435.9	650
Croc	391.5	851

* 1 USD = 27 Rubles
Source: CNews Analytics, 2006

Figure 34. *Location of IT Companies (2005)*

Others 19%
Kazan 2%
Tomsk 2%
Nizhny Novgorod 3%
Novosibirsk 10%
St Petersburg 26%
Moscow 38%
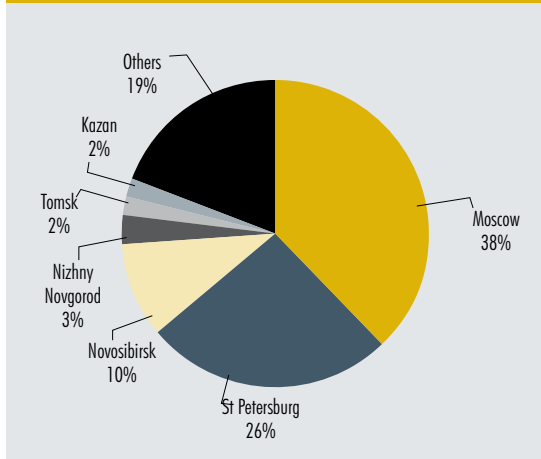
Source: Outsourcing-Russia, Russoft

Figure 35. *IT Services Exports*

126 191 352 546 764 972 1306
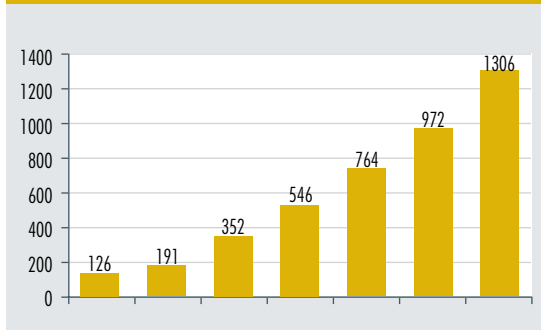
Source: C News Analytics, Russoft & Outsourcing Russia

Figure 36. *Exports by Different Players*

Universities & Scientific Research Institutes 7%
Midsize & Small companies 18%
Informal groups & individuals 4%
Major Russian Companies 50%
International Development Centre 21%
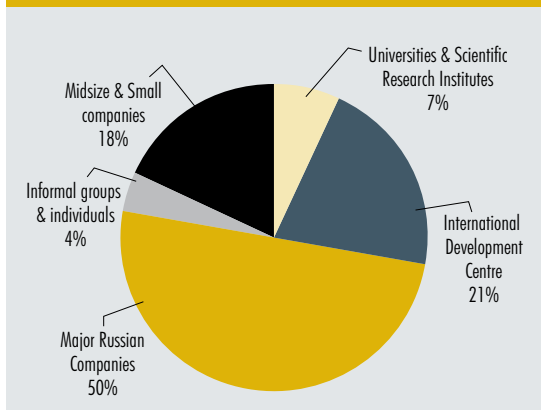
Source: Russoft

were primarily from companies based in St. Petersburg (Source: Outsourcing Russia, Russoft).

- In terms of industry verticals, Telecommunications (30% of total export revenues), Banking & Financial Services (27%) and public sector/government (21%) accounted for around 80% of total exports in 2005.

- Large Russian IT companies like EPAM, Luxoft and Opente@ch Group. accounted for around 50% of total exports in 2005 (please refer Figure 36 for details). The different types of IT Services offered by these players include application development & maintenance and system integration.

- On the other hand, the captive R&D /development centers of global players like Intel, Sun Microsystems and Motorola accounted for around 21% of the exports. From our interactions with some of these companies, we understand that a large number of these centers are involved in high end areas including system software development, wireless technologies, and software quality assurance. Box 17 on the next page details the activities of the captive offshore centers of Intel and Sun Microsystems. The total deployment at these centers is estimated at over 5,000 currently, comprising primarily PhDs and engineers from reputed institutes (please refer Figure 37 for details)

- There are also some midsize and small companies like PROject MT and Reksoft,. which provide IT and BPO services, such as custom application development, package implementation, system integration, payroll processing, translation services to international clients in an off-shore mode.

The total employment in the IT services sector was estimated at around 60,000 at the end of 2005, with around 20,000 people involved in IT services exports. Consequently, the average annual revenue per employee is estimated at USD$50,000 for IT services exports, which is similar to realizations in the domestic market.

5.2.4 Past government initiatives for development of the IT sector

As has been indicated, the IT sector only started gaining momentum during the nineties with a number of global players like Intel and Sun Microsystems setting up operations, and the emergence of local companies which initially started with hardware selling/reselling and gradually expanded into IT services. Consequently, Russia's

key ICT indicators are comparable with countries like China and India (please refer Figure 38 below for details). With physical and virtual infrastructure not being available in a uniform manner throughout the country, given the vast geographical area, the government had, in the past, set up a number of Techno Parks to provide a fillip to research & development with a focus on sectors including nuclear technologies, security systems, electronics, telecommunications, and new materials. Examples include the Science Cities in Obninsk, Puschino and Dubna near Moscow, and in other regions and cities such as Tomsk and Novosibirsk.

However, as was the practice in most other countries, these Techno Parks were not focused on the IT sector in particular. Instead, the focus was applied research with IT being used more as a tool than as an end product or service. Most of these parks developed around prominent academic institutions or centers of excellence to facilitate cluster effects, as they inevitably required close linkages with such institutions. Thus, for example, the Moscow State University Science Park developed around the Moscow State University and Dunba Science Park was developed near the Joint Institute of Nuclear Research, Dubna.

Figure 37. *Manpower Deployment in Captive Development Centers in Russia*

Company	Employees
Intel Russia	1100
Motorola	500
Scala CIS (Epicor Scala)	380
Deutsche Bank	350
Borland	350
Sun Microsystems	350
Quest Software	300
Allied Testing	220
Chrysler	200
Dell	200
Alcatel	200
Nival Interactive Inc.	150
Electronic Microsystems Software Development	100
Ericsson	100
InterSystems	100
EGAR Technology Inc	100
LG Rlrctronics Russian R&D Center (LG Softlab)	100
Cadence Design Systems	100
Siemens	100
T-Systems CIS	78
AVIcode Inc.	50
Samsung Research Center	50
Targem Studio (a part of Nival Interactive Inc.'s Development Center since 2005)	40
Jensen Technologies	38
SmartPhoneLabs	20
Ariasys	18
RD-Software	15

Source: Russoft

BOX 17. *Captive Development Centers in Russia*

Intel

Intel commenced operations in Russia in 1993 by contracting 10 programmers. In 2000, it opened a Development Lab near Nizhny Novgorod to capitalize on the proven talent of mathematicians deployed earlier at the Sarov nuclear weapons research facility. Since then, the company has been expanding its R&D activities in Russia. In 2004, it bought out two technology firms it had been working with earlier, Elbrus and UniPro, bringing its total number of employees in Russia to around 1100. Intel currently has operations in St. Petersburg, Novosibirsk, Moscow, Sarov and Nizhny Novgorod. The Development centers in Russia are used for addressing important research challenges, such as development of software for wireless technologies, optimizers, and compilers closely integrated with the new generation processors being developed by the company.

As discussed with Mr. Steven Chase, President – Intel Russia

Sun Microsystems

Sun Microsystems has been present in Russia since 1994. It currently has two main centers, one in Moscow and the other in St. Petersburg. The Moscow center mainly concentrates on the sales & distribution activities of Sun's products in the CIS region (other than Baltic region). Sun Microsystems Russia sells the entire range of products that the company manufactures including servers, desktop systems, storage devices, and associated software. The products are sold through Russian partners such as Croc, Open Technologies, and Techno Serve and through distributors like Versell and OCS.

In June 2004, Sun Microsystems established its Development Center in St. Petersburg, Russia, with a focus on software engineering efforts in Java™ technologies, developer tools, as well as networking and operating systems. The other global development centers of company are located in Prague (Czechoslovakia), Bangalore (India), Tel Aviv (Israel) and Beijing (China). The company has invested around USD$10 mn in the center in St. Petersburg, which houses more than 300 employees. Its research focus includes Java API development, SPARC™ and AMD Opteron™ compiler enhancement, IDE development, Java and XML compatibility testing & development, and software quality assurance.

As discussed with Mr. Chris Morris, CFO, Sun Microsystems

Figure 38. *Key ICT Indicators for Russia*

Parameters	China	India	Czeck Rep.	Poland	Rumania	Ukraine	Russia	United States
Social Indicators								
Total Population (millions)	1296	1080	10	38	22	48	143	294
Urban Population (%of total population)	40	29	74	62	55	67	73	80
ICT Sector Indicators Access:								
Telephone lines (per 1000)	241	43	331	321	198	230	261	606
Internet users (per 1000)	73	23	265	235	184	62	91	569
Personal computers (per 1000)	40	11	196	127	83	20	113	760
Mobile Subscriber (per 1000)	258	48	1059	603	464	285	517	615
Population covered by mobile Telephony (%)	73	41	99	98	97	75	78	95
Quality:								
Broadband subscribers (per 1000)	16.5	0.6	16.5	32.7	0.7	0.0	0.9	129.1
International Internet Bandwidth (bits/person)	57	4	2450	340	107	17	101	3308
Affordability:								
Price basket for fixed line (US$/month)	3.6	3.2	16.7	17.3	9.6	2.5	7.8	25
Price basket for mobile (US$/month)	3.7	3.2	15.1	7.7	8.8	10.3	6.3	10.8
Price basket for internet (US$/month)	10.1	8.7	20.8	15.7	25.3	16.7	10.0	15
ICT Expenditure (% of GDP)	5.3	3.7	6.5	4.5	2.8	7.0	3.7	8.8

Source: World Bank, UNDP, ITU and others.

While the government initiated a number of measures for overall economic development during the eighties and nineties, like allowing foreign direct investment and privatization of state owned enterprises, these were not focused on any sector in particular. Consequently, unlike many other countries, the IT sector in Russia does not enjoy any additional benefits in terms of favorable fiscal, innovation or human capital policies.

However, in 1997, the government, in its bid to improve transparency and accountability, and augment citizen service delivery, launched e-Governance initiatives across various ministries and functions. Representative programmes include E-Petersburg, E-Altai, and E-Chuvashia initiated by different city governments. Aggregate government spending on IT was estimated at USD$2 billion during 2005, with IT initiatives encompassing key ministries like the Ministry of Finance/State Treasury, Ministry of Education, Ministry of Property/State Land Survey, Ministry of Health. A conscious policy of awarding preference to domestic IT companies has been followed during implementation of the e-Governance initiative. Consequently, many of the large Russian IT companies like IBS, NCC, Kraftway and Optima derive a significant portion of their revenues from government projects/initiatives.

We also understand that the government has recently started to focus specifically on the development of sectors like IT and bio-technology. To this effect, it is in the process of setting up parks focused on these sectors with state of art physical and virtual infrastructure. Some of the existing techno parks like the Moscow State University Science Park (MSU) have also started reorienting themselves to meet the requirements of the IT sector, with many of their recent occupants being new companies focusing on the IT sector. Details on MSU is provided in sub-section 5.2.4.1.

The government is also undertaking a program for setting up Techno Parks in seven locations, namely, Moscow, Novosibirsk, Nizhny Novgorod, Kaluga, Tumen, Republic of Tatarstan and St. Petersburg. In addition to core business facilities, some of these parks are also expected to include ancillary facilities like residential and commercial complexes. These parks are proposed to be constructed during the

period from 2006–2010, with an estimated investment of 100 billion roubles or USD$4 billion. It is understood that these parks would also focus on other high technology sectors such as nanotechnology and biotechnology with the primary focus of the government being on creation of infrastructure to support the development of these sectors.

5.2.4.1 Techno Park case study – Moscow State University Science Park

The Moscow State University (MSU) Science Park was set up in 1992 by the Moscow State University, with sponsorship from the Russian Federation Ministry of Science and Foundation. The mission of MSU is "stimulation of innovation activities in the university and in the region". The main objectives of the MSU science park are to:

- Create favorable conditions for scientists, students and graduates to start business.
- Build a framework for business in cooperation with the University.
- Help start-ups and small and medium businesses in development through providing consulting services.

Capital: The estimated total investment in MSU was around USD$14–15 million. It is managed by a 15 member dedicated management team comprising financial directors, marketing managers, students and other MSU representatives. There are around 45 companies located in the park. Garant, an IT company which translates Russian legislation and markets it online, is one of the main tenants. Other relatively larger players include ISS, which develops security software, Rambler & Aport, which are search engines and Redlab, an IT services company. However, the majority of the occupants are small companies and start-ups. Around 40% of these companies were formed during the last 3 years, with around 60% of occupants focusing on IT services and software development. The remaining occupants are focused on telecommunication, biotechnology, electronics, ecology and new materials. The aggregate turnover of occupants was around USD$130 million in 2005. In addition to the companies present in the MSU Science park, the park management supports around 60 start-ups operating from MSU itself.

Linkage: Being located adjacent to MSU, the companies have strong linkages with the university.

Many of these companies operate as sub-contractors/outsourcers to larger IT services companies such as Alpana, Arsenal, Park, and RSCI. The park management provides a number of value added services to the occupant companies, depending on their level of maturity. MSU organizes workshops & seminars, conducts business plan competitions and provides general consulting services to encourage entrepreneurship in the field of innovation and technology. MSU provides the following services to start-up companies:

- Advice on business & financial planning.
- Guidance on issues relating to technology transfer.
- Assistance in attracting preferential financing (including government allocations), as well as venture (seed) Investment.
- Accounting and auditing services.
- Assistance with searching for strategic partners.
- Assistance in arrangement of exhibitions.
- Training in areas like marketing, accounting and intellectual property requirements.

The park also provides the following value added services to other occupants:

- Assistance in raising funds.
- Advice with respect to business-planning, business evaluation and financial planning.
- Foster cooperation between companies and Moscow State University.

The Park is a member of various associations like Union of Russian Innovation Technology Centers (ITC), Russian Association of Venture Investment and Technopark Association.

Infrastructure: The MSU Science Park is built over an area of around 1 hectare that houses eight 2 storied buildings of 5400 sq. ft. each and one 4 storied building of 80,000 sq. ft. The individual office spaces vary from 100 sq. ft. to 5,400 sq. ft. 70% of the space is categorized as "Class B" office space and the balance as "Class C" office space. The rentals for Class B and C office space is USD$33 and USD$23 per square ft. per year respectively, which is lower than average space rentals of similar space in Moscow. In Moscow, the average rentals for Class A and Class B office space is around USD$66 and USD$42 per square ft. per year respectively. (Source: Russian real Estate: Market Overview,

September 2006, Cushman and Wakefield). MSU also has a large parking space which can accommodate around 90 cars, plus smaller parking areas near every building.

The communication system in the park is of high quality. The occupants use high-speed Internet facilities with a bandwidth of 1 Gbps.

The park also has a conference-hall for 150 persons and 2 negotiation rooms. The park management provides telecommunication services, round the clock security services, parking facilities, park maintenance services and secretarial services.

The park is situated in a prime location of Moscow and is able to leverage the existing urban & social infrastructure of the city. The location map of the park is presented in Figure 39.

People: Around 2,500 people are deployed in the park, with most of them being graduates, under-graduates, graduate students and professors of Moscow State University. While the average salary in Russia for mid-level IT professionals ranges between USD$16,000 to $20,000, many graduate or post graduate students in MSU are paid around USD$6000–$7000 per annum.

5.2.5 Assessment of Critical Business and Policy Enablers

It has been observed that most of the countries that have emerged as global leaders in the IT sector have been able to leverage some key business enablers that have enabled their IT companies to thrive in the global marketplace. Additionally, the governments of many of these countries have consistently supported the development of the sector through a set of fiscal, innovation, people and investment climate policies. The current section details our assessment of some of the critical business and policy enablers which are impacting/are likely to impact the development of the IT sector in Russia.

5.2.5.1 Sources of capital

With most IT companies not having asset intensive operations thereby limiting their ability to raise debt, angel investment, venture capital/private equity funding has played a key role in meeting the investment and growth requirements of these companies. The models have however been different for individual countries. For example, in India, a
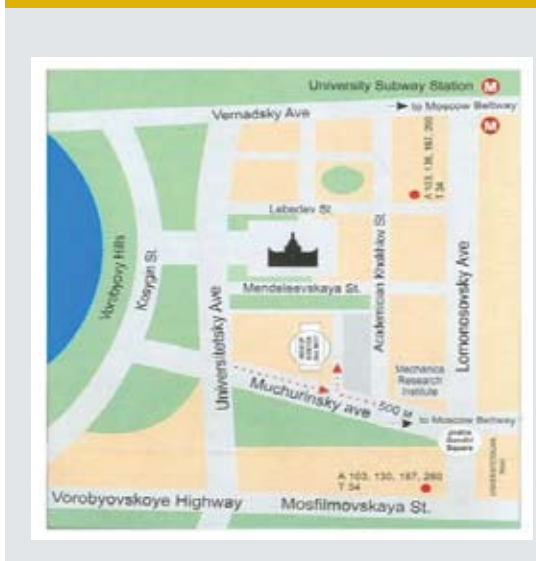
significant part of the resource requirements have been met through global venture capital/private equity funds whereas China has tended to fall back on dedicated local government-administered funds. The scenario for IT Parks has been a bit different, with the developers for these parks depending on loans from banks & financial institutions for funding a significant part of their investment, with the assets(buildings, infrastructure, etc.) being created serving as collateral. For both categories of companies i.e. IT companies as well as IT Park developers, the stock market has served as an important source of finance once they have been able to achieve critical mass.

In Russia, the venture capital/private equity sector is dominated by local investors, despite some global investors like the Carlyle Group having attempted to set up operations. Consequently, Russian IT companies are not able to leverage the international relationship networks of these global funds for further development. The Russian Private Equity & Venture Capital Association (RVCA) estimates that there are currently over 60 private equity funds in the country, with an average fund size of USD$100 mn. The leading institutional fund managers include Alfa

Capital Partners, Baring Vostok Capital Partners, Delta Private Equity Partners and Siguler Guff's Russia Partners. It is estimated that a total of USD$221 million of venture capital/private equity investments were made in Russia during 2004, with the key sectors being IT (27%), retail (26%), telecommunication (11%), financial services (11%) and energy (5%). However, the focus on the IT sector is somewhat recent, with only 8% of the total venture capital/private equity investment of USD$2.6 billion over the last 10 years having gone into the sector. In 2004, only 4% of venture capital/private equity deals represented seed level investments, with another 13% being early stage investments, 73% expansion stage and another 5% being later stage investments.

With the Russian capital markets being at a nascent stage (there are only three listings on the Russian Trading System in 2005 with no additional resources having been raised), there is a dearth of exit opportunities, with 40 exits taking place during 2004, which represents 60% of the total number of exits during the last 10 years. With illiquid stock markets, trade sales and management buy-outs accounted for 90% of the exits. Recently, the Ministry of Economic Development and Trade has initiated the setting up of the Russian Venture Capital Company, with a corpus of USD$0.5 billion. The company will in turn set up smaller venture capital funds with corpuses ranging from USD$22 million–$55 million, with 51 % of the corpus of each fund expected to be contributed by private investors.

There are well-organized banking sectors dominated by state-owned banks like Sberbank, which provide long-term (till 20 years maturity) loans for property development at interest rates of 10%–12% per annum. In the recent past, a number of foreign banks like Citibank and ICICI Bank have commenced operations in the country thereby increasing the level of competition.

5.2.5.2 Anchor investors
In most countries that have performed well in the IT sector, the growth has been contributed partly by domestic companies that have started small and large established anchor investors seeking to expand to newer geographies to increase their competitiveness. Thus, in India, the growth has been led by both Indian multinationals like Infosys, Wipro, TCS as well as global leaders like IBM, GE, SAP and Oracle. In China too, prominent players in the

sector include local companies like the Stone Group, Legend Group, BD Founder Group, together with global companies like IBM and Microsoft.

While Russia too has been able to attract a number of global IT players like Intel, Sun Microsystems and Cadence, their focus has primarily been on high end work. Their impact on other segments of the IT sector such as IT services and system integration which offer much larger opportunities for employment generation and scaling up, has been limited. These segments have been dominated by Russian companies like IBS and TechnoServe. Large global players in areas such as application development and maintenance and packaged software implementation including IBM, Microsoft, and Accenture, currently do not have large development centers in the country. With offshore revenues also being limited, the average deployment level even in the larger Russian IT companies is therefore much lower at around 2,000 people, as against 50,000 in countries like India. One of the possible reasons for these multinational IT companies not setting up development operations in the country is the limited integration between global and Russian practices in the areas of finance and accounting, legal and taxation, human resources, etc., which has led to the dominance by local application developers like Parus, Galactica and Diasoft. However, the market trends seem to be changing, with global application vendors such as SAP and Oracle gradually making headway in sectors including oil & gas, retail, and metals & mining. The growth in the IT services sector in a number of other countries like India and China were driven by the entry of such players, which also led to their global system integration partners like Accenture and IBM setting up operations in the country.

5.2.5.3 Infrastructure
As has been indicated, much of the development in the IT sector has been in and around the three cities of Moscow, St. Petersburg and Novosibirsk. Consequently, IT companies have been able to leverage the existing connectivity, urban and social infrastructure in these cities. We understand that although around 5.4 mn sq. ft. of office space is getting constructed annually in Moscow, annual rent ranges between USD$43 to USD$62 per sq. ft. and there is also a shortage in availability of office space. The situation in St. Petersburg and Novosibirsk is somewhat better. The government is also planning to augment the existing road network

across major cities through public private partnerships. There are a number of prominent private groups like Sistema Hals, Leeds Property and ALM Development involved in developing real estate infrastructure, including commercial and residential real estate. A number of private companies are in the process of setting up IT parks, including local companies like Value Tech, RosEvro Development and foreign companies like Technopolis.

The telecommunication sector in Russia is one of the most dynamic, with significant foreign direct investments having come in. Key service providers include Svyazinvest, Transtelecom, Rostelecom in basic telephony and MTS, Vympelcom and Megaphone in mobile services. Value added services in data transmission are provided by firms like RTKomm.RU, Transtelecom, Golden Telecom and MTU-Intel. As can be seen from Figure 38, internet bandwidth costs in Russia are higher than India but almost equal to China. The extent of Internet usage also appears to be quite limited.

5.2.5.4 Human resources

With the top 100 IT companies employing around 50,000 people in 2005 (source: cNews Analytics, 2006), the total manpower deployment in Russia's IT sector is estimated at less than 100,000. With an estimated annual throughout of over 200,000 employable people (please refer Figure 40 for details), there appears to be significant scope for expanding the employment in this sector. However, we understand that there is stiff competition for graduates in Mathematics, Physics and Engineering from sectors/activities like research & development, oil & gas, petroleum, electricity, transport, telecommunications, most of which are witnessing signifi-

cant growth and offer relatively higher remuneration (source: Rosstat, 2005).

With both the captive development centers of large global companies as well as large domestic companies focusing on candidates with higher qualifications, an increase in off-take of other graduates (other than in Mathematics, Physics and Engineering) is expected to have a positive socio-economic impact. Interactions with various stakeholders in the IT sector also reveals the following key human resources characteristics which have important implications for the current study:

- Preference of most employable resources to locate themselves in the larger cities, namely,Moscow, St. Petersburg and Novosibirsk or their hometowns.
- Relatively low attrition rate ranging between 10% to 15%.
- Need to augment academic knowledge with business related knowledge, e.g., sector trends.

While average salaries in the Russian IT sector for mid-level professionals (please refer Figure 41 for details) are almost double that of countries like India and China, they are significantly lower than other near-shore destinations like Canada and Ireland.

Figure 40.*Throughput*

Yearly throughput	2003	2004
IT engineering graduates	42,138	45,994
Mathematics and Physics graduates	21,577	22,132
Non-IT engineering graduates (capable of entering IT sector)	69,072	76,435
Number of other graduates (capable of entering IT sector)	70,631	81,270
Total	203,418	225,831

Source: Auriga Research

Figure 41. *Comparative IT Salaries*

South Africa	36696
Hungary	25174
Brazil	15935
Canada	43841
Czeck Republic	22500
Russia	21018
Singapore	41512
Malaysia	21823
China	10095
India	9896
Thailand	11340
Philippines	12522
Vietnam	6131
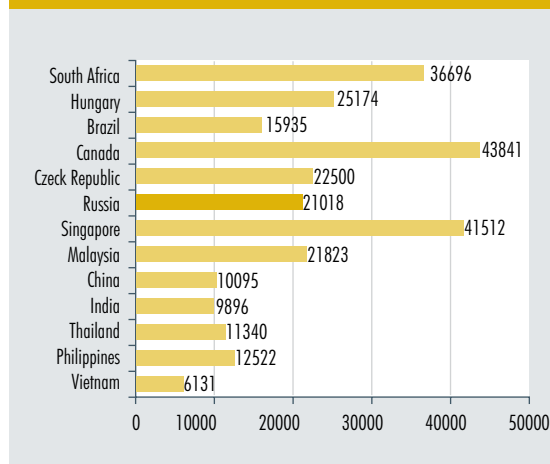
Source: neoIT – Offshore and Nearshore ITO/BPO Salary Report 2006.

5.2.6 Corporate Governance and Management Issues

In most of the countries assessed as part of the study, effective corporate governance has been observed to be one of the consistent hallmarks of well performing economies, including the IT sector. Consequently, almost all the large global IT companies, including those in developing economies like China and India, follow global accounting and reporting principles, are listed on both local and global stock exchanges thereby having to comply with mandatory corporate governance principles, have financing partners in the form of global investment banks, venture capital/private equity funds who are usually represented on the company's Board of Directors and are run by professional management teams. However, in Russia, the situation is a bit different. Most of the larger domestic IT companies are part of private groups, unlisted and hence not subject to the scrutiny of external shareholders.

The financial, accounting, and performance reporting practices followed by many of these companies are also reportedly non-transparent, designed with the primary objective of minimizing statutory payments like social security and other taxes. In addition to the Russian Trading System (RTS) lacking requisite depth and participation of global financial institutions, linkages with the global financial services sector are also weak. It is estimated that there have been only five initial public offers of Russian companies on the London Stock Exchange, with none of these companies being from the IT sector. As has been indicated earlier, the presence of global venture capital/private equity funds has also been negligible, thereby limiting opportunities for sharing of good practice in business understanding & development, corporate governance and performance reporting.

5.2.7 Government Policies and Implementation Mechanisms

We understand that till very recently, the policy regime in Russia did not have any specific provisions for the development of the IT sector. However, the government has recently incorporated specific provisions for the IT sector in the area of fiscal and other policies. A high level assessment of the applicable policies has been presented in Figure 42 on the next page.

In addition to policies for facilitating development of the IT sector, case studies of successful countries like Singapore, China and India have also demonstrated the importance of having efficient implementation mechanisms. There appears to be significant scope for improvement on this front as far as Russia is concerned. Some of the representative areas that present opportunities for streamlining practices have been highlighted below.

■ The climate for business, innovation and investment is considered weak owing to excessive bureaucracy. For example, the process of visa issuance and immigration checks even for business related visits by professionals appears complicated and time consuming, with there being limited scope for preferential treatment. This is corroborated by Russia's ranking in numerous country level surveys like the World Economic Forum, Growth Competitiveness Ranking (2004) and Heritage Foundation/Wall Street Journal Index of Economic Freedom (2004).

■ Absence of formal practices for customs clearance of software, with renegotiations required at the time of every transaction (Source: Russia and Information Revolution, RAND, 2005).

■ Although Russia has a Copyright Protection Act that covers IT software, enforcement needs to be strengthened with almost 90% of all packaged software used in Russia estimated to be pirated.

■ Despite significant budgets for e-Governance programs like Electronic Russia, it is understood that actual expenditure was around 20% of the budgeted amount during 2002–2004 (Source: Russia and Information Revolution, RAND, 2005). It has been observed in other countries like India that government spending on e-enablement of public services largely benefits local IT firms as most governments give preference to domestic organizations at the time of contracting. Such government spending typically boosts SME segment with bulk of the e-governance projects being implemented by them. Given the long term nature of these projects which includes software development, implementation and maintenance, these projects have a major role in development of the local IT services industry.

Figure 42. *Existing Government Policy Instruments*

Broad Classification	Illustrative interventions
Fiscal Policies	■ Software companies having substantial export income and employing minimum 50 employees enjoy lower unified social tax rate of 26% against the normal rate of 35.6% on employee salary cost [Source: Article One, Item 15, Federal Law No. 144- FZ]. ■ Computer equipment acquired by an organization involved in IT activities are allowed full depreciation in the course of one year [Source: Article One, Item 6, Federal Law No. 144-FZ]. ■ IT companies located in Special Economic Zones (SEZ) enjoy fiscal benefits like lower unified social tax rate of 14% [Source: Item 7, Article One, Federal Law No. 117-FZ and Article 241, Part One No. 146-FZ] , 5 year exemption on property tax (normal rate 2.2%) [Source: Item 12, Article One, Federal Law No. 117-FZ and Article 381, Part One No. 146-FZ]. Additionally, these companies also benefit from importing goods without payment of customs duty (normal rates range from 5% to 20%) and value added tax (normal rate 18%) while exports from SEZ are exempt from export duty (normal rate 6.5%) [Source: Article 37, Chapter 8, Federal Law No. 116-FZ]. ■ Local governments provide additional incentives to IT companies. For example, St Petersburg allows IT companies that have invested more than USD$1.8 million in the city to enjoy a reduced profit tax rate of 20% (normal rate 24%) and companies whose investment in the city exceeds USD$5.6 million additionally enjoy 50% concession on property tax [Source: Russian IT Quarterly, October 2006].
Innovation Policies	■ Grants received from specified technological development funds/innovation funds like Russian fund of Techno-logical Development, Fund for the Production of Innovations are not considered as income for the purpose of computing profit tax [Source: Article 251 Part One No. 146-FZ]. ■ Research & Development (R& D) expenses incurred by organizations are considered as allowable expenses while computing profit tax irrespective of whether R&D projects are successful or not [Source: Article 262, Part One No. 146-FZ]. ■ Computer programs, including source code, object code and databases enjoy copyright protection during the lifetime of the author and 50 years beyond [Source: Articles 3 and 6, No. 3523-1 with changes and amend-ments introduced by the Federal Law No. 177-FL]. The implementation authority for copyright protection is the Federal Executive Authority on Intellectual Property. ■ Specific laws on legal protection of the topologies of integrated circuits are in place with an exclusive right of the creator to exploit a protected topology for 10 years [Source: Article 10, No. 3526-1 with changes and amendments introduced by the Federal Law No.82-FL]. ■ Under the E-Russia program government facilitates transfer of existing technologies from government/defense institutions to private institutions engaged in research & development activities, with the private institutions hav-ing the right to retain intellectual property rights to new products developed ■ An exclusive right to a computer program or database created in connection with service relations on a state contract for federal needs or needs of a subject of the Russian Federation, shall belong to an executor (contrac-tor) unless otherwise provided by a State contract that this right shall belong to the Russian Federation or a subject of the Russian Federation, represented by a State customer [Source: Article 12, Law No. 3523-1 with changes and amendments introduced by the Federal Law No. 177-FL].
Human Capital Policies	■ There do not appear to be any specific policies for aligning university curriculum to the requirements of the IT sector. ■ A number of labor practices like seeking an employee's written consent prior to redeployment/relocation within the same organization restrict operational flexibilities [Source: Article 72, Chapter 12, Federal Law No. 197-FZ].
Investment Climate Policies	■ Government is supporting development of IT infrastructure through the Electronic Russia Federal Priority Program, where 33% of the outlay is dedicated to infrastructure development across the country including construction of high-speed internet backbones and peripheral links. ■ Internet penetration across the country mandated by 2003 Law on Communications which states that all towns with a population in excess of 500 to have internet access point [Source: Article 57, Chapter 8, Federal Law on Communications Adopted by the State Duma on June 18, 2003]. ■ Double taxation avoidance treaty with over 60 countries including USA, UK, Japan, Germany, France, Bel-gium, Bulgaria, Hungary, Denmark, Spain and Sweden. [Source: Point 3, Decision of the government of the Russian Federation No. 1605 and Website: http://www.nalog.ru/doceng.php?id=7220&topic=eng_sotrud-nich]. ■ No restriction on foreign direct investment in the IT sector. Foreign investments in excess of USD$37 million or projects with foreign stake exceeding USD$4 million categorized as "priority investment projects" and enjoy exemption from customs duty on imports [Source: Article 16, Federal Law No. 160-FZ]. ■ Federal law on Foreign Investments in the Russian Federation guarantees protection from changes in federal laws which may adversely impact the organization for a maximum period of 7 years like increased rates on specified taxes [Source: Article 9, Federal Law No. 160-FZ].

5.2.8 Potential Growth Opportunities for the Russian IT Sector

Before attempting to identify specific recommendations for development of the IT sector in Russia, it is necessary that the current and potential market opportunities available to companies operating in this sector are identified. Based on our assessment of the sector, the following represent potential opportunities which can possibly be targeted.

Domestic market opportunities

Unlike many other countries like Malaysia, India, and China, realizations on domestic IT services in Russia are currently higher than in IT services exports. There also appears to be significant upside as far as growth in the domestic IT market is concerned, with turnover expected to increase to USD$14.32 billion by 2007 (Source: IDC Blackbook, Euromonitor). In terms of individual market segments:

- The demand for hardware is expected to increase by a CAGR of 16.7% per annum to around USD$10.5 billion by 2007, driven by government spending and industry demand, with many of the customers being in the process of acquiring their first information systems. Based on our assessment of key trends, there appear to be significant opportunities in the semiconductor industry the near term, driven by increasing over demand from IT hardware, telecommunications equipment and the consumer durables sector. Russia may be well placed to leverage its skilled manpower to target specific segments in this market including fab less chip design, semi-conductor packaging, and assembly & testing over the near term.
- IT services, for which the market in 2005 was estimated at USD$1.39 bn, is expected to grow at around 20% per annum to reach USD$2 billion in 2007. With many of the larger companies already having implemented packaged application software such as SAP and Oracle Applications, the growth in this segment is expected to be driven by packaged software implementation and system integration requirements of medium-sized firms in sectors such as food, retail, and real estate. The leading packaged application vendors like SAP and Oracle are already gearing up to meet this demand by launching their small & medium enterprise and application service provider (ASP) versions.

- The packaged software applications market is also expected to increase at 20% per annum to reach USD $1.83 billion by 2007. The demand for packaged software is primarily expected from companies in high growth sectors like oil and gas, energy, metals, communication and retail, where there is increasing competition leading to efficiency pressures.

Export market opportunities

IT export revenues are expected to increase to $USD1.75 billion in 2007, translating to a CAGR of 34%. Based on our assessment, significant opportunities are expected in the following market segments.

- Leveraging the presence of existing global majors in IT and telecommunications like Intel, Sun Microsystems , Cadence Systems, and Samsung for continuing the focus on high-end development activities in the areas of system software development, wireless technologies, etc. Given that many of these companies are also global leaders in semiconductors and telecommunication equipment manufacturing, expansion of their activities in Russia to cover other areas like fabless chip design for IT, telecommunication equipment & consumer durables, chip fabrication/foundry facilities and semi-conductor packaging, and assembly and testing services represents a potential opportunity.
- Given that the salary costs of IT professionals in Russia are almost half that of other countries like Canada, Ireland, and lower than countries like the Czech Republic and Hungary (please refer figure 41) which have successfully positioned themselves as near-shore destinations to countries like US and UK, there appears to be a significant opportunity for Russia to position itself in this space. Countries like India have emerged as preferred offshore locations leveraging lower human resource cost and thus it will be difficult for Russia to compete with them. The existing competencies of the human resource pool in Russia together with its geographical location & relative cost of manpower are expected to serve as key competitive advantages viz. a viz. other countries. Representative offshore activities which can be targeted include the following:

- Packaged application implementation and maintenance through a mix of onsite and offshore services.
- System integration services.
- Software application development for various industry verticals leveraging existing tools.
- IT infrastructure maintenance and support.
- Select knowledge process outsourcing activities like mathematical and econometric modeling for sectors like financial services.

- Unlike the high end IT services market proposed to be targeted primarily through captive development centers, the employment (and turnover) potential of this segment is expected to be significantly higher, thereby providing domestic IT services companies the opportunity to scale up rapidly.

5.2.9 Identification of Issues and Growth Strategies

Having identified the potential growth opportunities for the Russian IT sector, it also becomes necessary to identify market participants who are well placed to drive growth in the respective areas, together with potential strategies for development, based on identified good practice in other countries assessed as part of the study.

5.2.10 Role of It Parks and Proposed Business Models

As has been demonstrated by the case studies, the key requirement underlying setting up of sustainable IT parks is the ability to attract credible occupants to the park, with business models which demonstrate sustainable viability. Consequently, having credible

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Figure 43. *IT Sector Growth Segments & Strategies*

Potential growth segments	Identified issues	Recommended growth strategies
Domestic Hardware	■ Market currently dominated by importer-resellers and assemblers	■ Facilitate direct presence of global majors like IBM, Wipro, HP and CISCO. as this will enable positive rub-off on IT Services, semiconductors & high end captive development ■ Focused targeting of global semiconductor players like Intel, Texas Instruments and Samsung as anchor investors, initially for areas such as design, assembly & testing services.
IT Services	■ Market currently dominated by local companies with inadequate scale of operations	■ Facilitate entry/expansion of global IT services companies like IBM, Microsoft, Accenture, Cap Gemini, Infosys, Wipro and TCS possibly through participation in ongoing e-Governance program—is expected to lead to positive impact on IT sector employment opportunities ■ Encourage domestic companies to partner with global companies for sharing of good practice, receiving quality accreditations like SEI CMM.
Packaged applications	■ Large companies opting for global packaged applications ■ Applications in finance & accounting, payroll, etc. from local software developers	■ Encourage use of established packaged application software to facilitate compliance to good practice in performance management & reporting, offer standardized training platforms to IT professionals which can then by leveraged for export markets ■ Facilitate setting up of development centers by global packaged application majors like SAP, Oracle for country level customizations
Exports High-end services like system software, semiconductor fabrication, packaging, assembly & testing	■ Existing captive development centers primarily an outcome of initiative by the respective global player (e.g., Intel, Sun Microsystems.) ■ Semiconductor design, fabrication, assembly & testing carried out on a limited scale primarily by domestic companies	■ Proactive Government support for expansion of existing development centers of global companies, together with focus on additional high-end services such as chip design and assembly & testing. ■ Two pronged approach comprising a) facilitating entry of global leaders in the semiconductor industry (like Intel, Texas Instruments and ST Micro-electronics) possibly with an initial focus on design, packaging, assembly & testing and b) supporting local companies in R&D for fab less design
IT Services including application development & maintenance, and system integration.	■ Primarily carried out by local companies with inadequate scale of operations	■ Facilitate entry of global IT services companies with a focus on meeting near-shore export opportunities in Europe and United States – expected to have positive rub-offs on domestic IT services companies and IT sector employment opportunities.

anchor investors in the park has been identified as an essential prerequisite for success both in developed as well as developing countries. In the current section, we have attempted to present our assessment of the critical business enablers for IT Parks in Russia, based on the case studies of parks in other countries as well as ground realities in Russia.

The generic critical business enablers which are likely to feature, in the expectations of all categories of IT companies, have been highlighted below.

- Location of the park in an area which permits it to leverage the existing urban and social infrastructure of the three key cities, namely, Moscow, St. Petersburg and Novosibirsk, as availability of the right quality of human resources is expected to be a problem in any other region.
- Simplified policy implementation mechanisms in terms of single window approval facilities in areas including operating license, sanction of building plans, and tax & customs duty registrations. so as to cut down significantly on the time for setting up new/expansion operations.
- High quality physical connectivity and infrastructure in terms of air (both international & domestic), road and rail connectivity, a combina-

tion of multi-tenant buildings with contemporary facilities and build to suit options, adequate road & other surface transport connectivity with the adjoining city, intra-park roads, sewerage and electricity.
- Lease or sale of land for built-to-suit facilities at rates lower than those prevailing in the adjoining city.
- State of art virtual connectivity in terms of data & voice infrastructure including international connectivity.

In addition, there are a number of potential value drivers which are expected to impact specific types of IT companies, with the level of interest also expected to vary across different categories of IT players (please refer Figure 44 below for details).

One of the probable tenants in the IT Parks are local hardware assemblers. As highlighted in figure 44, the key motivating factor for local hardware assemblers to be located in IT parks is the incremental fiscal concessions that they might enjoy. Such incentives will help these companies increase their realizations. However, the primary discouraging factor for such companies to be located in IT parks is the investment that they have incurred in the existing facilities. Moreover, for the local hardware assemblers being located in proximity to clients is

Figure 44. *IT Parks – Segment Specific Drivers*

Type of IT companies	Key value proposition of IT Parks, if any
Local hardware assemblers	■ Motivating factors: Incremental fiscal concessions, if applicable ■ Delimiters: Existing investments in infrastructure; proximity to clients
Global hardware players, including semiconductor companies	■ Motivating factors: Reduction of time to market, for new entrants; Fiscal concessions, if applicable; Built to suit options for custom facilities like wafer fabrication plants; Need for state of art facilities for facilitating accreditation; Linkages with centers of excellence for R&D support; Lower investments in ancillary infrastructure & facilities management ■ Delimiters: Existing investments in infrastructure for players with existing development centers; proximity to domestic clients
Local software & IT services companies	■ Motivating factors: Reduction of time to market for expansions; Fiscal concessions, if applicable; Built to suit options for custom development centers; Need for state of art facilities for facilitating accreditation; Domestic venture capital/private equity support; Lower investments in ancillary infrastructure & facilities management ■ Delimiters: Existing investments in infrastructure for players with existing development centers; proximity to domestic clients
Global software & IT services companies	■ Motivating factors: Reduction of time to market for new entrants/expansions; Fiscal concessions, if applicable; Built to suit options for custom development centers; Need for state of art facilities for facilitating accreditation; Lower investments in ancillary infrastructure & facilities management ■ Delimiters: Existing investments in infrastructure for players with existing development centers; proximity to domestic clients

one of the key requirements. If the IT Parks are located in remote locations, far from the client location, then it will be difficult for these companies to operate from such locations.

The other segment of IT players which might be interested to be located in IT Parks are Global hardware companies, including semiconductor companies. Typically the capital investments of such companies are huge and thus the associated risks are higher. One of the key factors which will motivate such players is fiscal incentives, since that will help these companies reduce financial risks. Other specific value proposition that the IT parks can offer to these companies is providing built-to-suit options for custom facilities like wafer fabrication plants. Moreover, these companies need state of art facilities for facilitating accreditation. These companies might be motivated to locate in IT Parks if the park provides such state of the art facilities. Many of these companies need strong linkages with R&D institutes or universities for developing new products. IT Parks which offer such linkages will be preferred by such companies. Additionally, another important incentive for these companies to get located in IT Parks will be lower investment in ancillary infrastructure & service management, which can be shared with other companies like canteen, parking and conference facilities. Further, for global hardware companies which are new entrants in Russian markets, the key motivating factor to get located in IT parks is reduction of time to market the products. Such reduction in time will help these companies capture a minimum market share in short period of time and thus reach financially sustainability.

However there are a number of de-motivators for these companies to be located in IT Parks. One of the key de-motivators for global hardware companies are the investments already incurred in the existing facilities. Additionally, if the IT park is located in remote location away from their clients, then such a location might act as a negative catalyst for the global hardware companies.

The key factors that will motivate the global and local software & IT service companies to get located in IT Parks are (a) the fiscal concessions which will enable them to obtain better realizations and (b) reduction in time to market for expansions given that the IT parks will provide quality space with plug & play facilities. Moreover, the IT parks will provide state of the art facilities which are key requirements for these companies to secure quality accreditations. Additionally, the shared services like conference facilities, shared telecommunication infrastructure, parking, eateries and security services will enable these companies to lower investments in ancillary infrastructure & facilities management. Since many of these companies would like to move to their own facilities with the park on a later date, the parks which offer built to suit facilities for custom development centers will be preferred. For the small companies, additional motivator will be the park management providing support to enable them get access to venture capital or private equity.

However, as in the case of the hardware companies, the key de-motivators for global as well as local software & IT services companies to be located in IT parks are (a) the investments already made in the existing facilities and (b) proximity to domestic clients, in case the IT Park is situated in a remote location.

The IT Park case studies and primary interactions with various stakeholders clearly seem to demonstrate a case for management of the IT Parks to be vested with private sector players for ensuring adequate accountability and efficient service. Possibly, as has been the case in many other countries, existing facility management companies like C B Richard Ellis and Bovis Lend Lease can be considered for this purpose.

As regards investments into and ownership of the parks, there seem to be a number of private real estate companies like Sistema Hals, Rosevro Development, Leeds Property and Technopolis with the requisite financial wherewithal for developing such projects. Given that good Practice in other countries clearly indicates the need for management control of the park development company to vest with the private sector for higher efficiency & productivity. Consequently, a facilitation role is recommended for the government other than in situations where the land is owned by it. In such situations, the government can possibly pick up an equity stake in the development company, given that financial returns on IT parks have been fairly attractive.

5.2.11 Policy Good Practice That can be Leveraged

In almost all the countries assessed under this study, it has been observed that government policies have played a pivotal role in development of IT sector. The role of government in most countries has also been observed to evolve over time, with a more direct role during the initial stages of sector development gradually moving to a facilitative role with the picking up of private sector led growth.

The current section of the report highlights policy good practice that can be leveraged, given the existing scenario in Russia, based on the countries analyzed as part of the study. For purposes of analysis, the good practice have been categorized into i) policies for developing the IT sector in the country and ii) policy good practice for development of IT Parks. Figures 45 and 46 below outline relevant policy good practice for facilitating development of the IT Sector and IT Parks respectively. As has been assessed during the study, IT Park occupants are offered a set of additional benefits over and above those available to IT companies not operating out of IT Parks. Consequently, the policy good practice highlighted for IT sector development would also be applicable to IT Park occupants, other than in cases where additional concessions have been envisaged in a specific area.

The measures outlined below only represent good practice adopted by other countries covered as part of the study. Consequently, these can at best be treated as starting points and additional analysis would be required for assessing their budgetary & other impact for customizing these to meet the requirements of Russia, should the government decide to consider any of these for implementation.

Following the analysis of the Russian IT sector in the previous sub-sections 5.2.1 to 5.2.7, the key issues as summarized in Figure 45, are:

■ Russia is well placed to attract more global IT players, focusing on segments such as IT services and system integration. Therefore, it is necessary to encourage direct presence as well as expansion of large global hardware and IT services companies including semi-conductor companies to improve average scale of operations.

■ Leveraging the two significant core competencies of Russia (i) expertise & skill base and (ii) the comparative lower salary costs as compared to other near shore countries like Canada & Ireland. The combined effect of these factors should create a significant opportunity for Russia to focus on captive R&D centers, semi-conductor assembly and testing services and near shore IT services for exports.

■ Excessive bureaucracy and unclear guidelines in areas such as visa, customs, and taxes shows there is scope for the government to streamline policy implementation mechanisms.

■ Improvements should be made to develop the financial services sector for meeting funding requirements of companies as well as improving levels of corporate governance and global linkages.

Countries that are emerging as global leaders in the IT sector have consistently supported the development of the sector with fiscal, innovation, human capital and investment climate policies. These areas form the basis for Policy Good Practice as adopted by the other countries analyzed in this study. Further, such policies can be segregated as (i) policies for developing IT sectors and (ii) specific policies for developing IT Parks.

Fiscal Incentives as identified from the good practice study which Russia can adopt include rationalizing customs duty as well as consolidating export/import duties and simplifying procedures should help attract global hardware companies. Additional Fiscal incentives include providing tax breaks as well as more specific incentives related to customs duties have been mentioned in Figure 45. These are policies which can be implemented in the short term with the immediate benefits being available to prospective investors.

Innovation policies, which have been identified from benchmarking other countries for IT sector development, include providing tax breaks to encourage investment in Research and Development (R&D) as highlighted in Figure 45. Although, there have been recent amendments to many of the copyright related legislation in Russia, the enforcement of such legislations need to be strengthened. Such strengthening could be through the creation of a dedicated tribunal on

Figure 45. *Policy Good Practice for IT Sector Development*

Key Issues/Recommended Strategies for Russia	Policy Good Practice which can be considered
■ Encourage direct presence as well as expansion of large global hardware & IT services companies, including semi-conductor companies to improve average scale of operations ■ Focus on captive R&D centers, semiconductor assembly and testing services and near shore IT services for exports ■ Streamline policy implementation mechanisms ■ Development of financial services sector for meeting funding requirements of companies as well as improving levels of corporate governance and global linkages	**Fiscal Incentives** ■ Rationalizing customs duty on hardware viz. a viz. components, with simplification of import procedures for attracting global hardware companies. ■ Providing tax breaks like exemption from export taxes for an initial period of 5 years for facilitating increase in exports. ■ Providing specific fiscal incentives to semi-conductor companies like: – Exempting raw materials, equipment imported for fabrication, assembly & testing from customs duty. – Rationalization of VAT on all semi-conductor products to a lower percentage. – Allowing accelerated depreciation rate for profit tax purposes (up to two times higher than the standard statutory rates). **Innovation Policies** ■ Providing tax breaks to encourage investments in research & development such as – 100% exemptions on customs duty for equipment and goods imported for research & development purpose. – 100% income tax deduction on capital expenditure with respect to scientific research. – Any amount exceeding a certain percentage of VAT paid on sale of software products to be refunded provided it is used for R&D purposes. ■ Strengthening enforcement of copyright & patent legislations through creation of a dedicated tribunal for dealing with disputes on copyright & patent related issues. ■ Encouraging quality accreditations like CMM5 and BS7799 by providing incentives or grants for reimbursing a part of the expenditure incurred for obtaining such quality certificates or for filing patents. **Human Resource Policies** ■ Encouraging development of management & business aptitude in engineering & other students through establishment of finishing schools. These schools could be structured as public-private partnerships, with infrastructure being provided by government (in case of inadequate private interest) and course development & faculty being provided by companies in the IT sector. ■ Developing English language proficiency of the human resource pool through policy interventions like introducing compulsory English education from primary level. ■ Setting up Committees comprising both government officials and IT industry representatives for assessing requirements for changes to existing curriculum. ■ Simplifying visa & associated regulations for IT professionals from other countries traveling on business-related purposes. ■ Strengthening training infrastructure for meeting IT sector manpower requirements through partnerships with global IT training companies. **Investment Climate** ■ Implementing a single window mechanism for providing all benefits, concessions & permits to IT companies. This would require a single agency within government to be identified as the nodal agency, with a presence in all key cities, which would then process applications seamlessly in coordination with other Ministries. ■ Consolidating the existing policies applicable to IT companies, together with implementation mechanisms, and communicating them in a transparent manner to existing & potential IT sector investors. Possible options include online publishing on the Minsvyaz website with links from websites of industry associations like Russoft and Ankit. Necessary processes for regular updating of these policies would also be required. ■ Extending all the above concessions to local companies, subject to completion of listing on RTS within a pre-defined period and extending additional fiscal benefits on successful listing on international stock exchanges. ■ Formulating policies for attracting global venture capital and private equity funds like exemption of tax on income from investments and allowing losses to be deducted from other taxable income. ■ Deepening existing capital markets through measures such as demutualization and attracting large global financial institutions and investment banks.

copyright & patent related issues and encouraging acquiring quality accreditations by linking fiscal incentives to them as mentioned in figure 45.

Changes in human resource policies that will benefit development of the IT sector fall under three main categories—education, immigration and labor Laws.

Figure 46. *Policy Good Practice for IT Park Development*

Key Issues/Recommended Strategies for Russia

- Global IT companies primarily in IT Services are expected to constitute a key target segment on account of reduced time to market through availability of ready infrastructure, potential fiscal incentives & commercial benefits, need for state of art infrastructure & connectivity and simplified policy implementation mechanisms, if available

- Large domestic IT services companies facing growth pressures and with a focus on exports are also likely to consider IT Parks for their future expansions with the drivers being identical to global IT companies

- Given the existence of large real estate companies and promotion of private sector IT Parks, it may be possible to attract private developers for IT Park development

Policy Good Practice which can be considered

Fiscal Incentives
- Providing fiscal incentives to potential IT Park occupants, which are at least at par with the existing incentives available to IT companies located in Special Economic Zones (Policy reference nos. 116-FZ, 117-FZ, 144-FZ, etc.), to ensure adequate attractiveness of IT Parks.
- Providing land owned by government for development and to IT Park occupants at subsidized rates, depending on level of employment generation.
- Supporting IT Park developers by subsidizing rentals for plug & play infrastructure and land lease rates for an initial period (say 3 years), so that a part of these subsidies can be passed on to potential occupants, thereby creating a differentiation viz. a viz. normal office/commercial infrastructure.

Innovation Policies
- Provide incubation facilities & space with world class plug & play infrastructure within the techno parks to start-ups and small & mid-sized IT companies at subsidized rentals for the initial period

Investment Climate
- Permitting mixed land use in IT Parks by earmarking a proportion of the total land for commercial use (say 70 %) and residential use(say 30 %), thereby improving project viability.
- Implementing a single window mechanism for fiscal concessions & benefits, as well as all required statutory approvals, with a physical presence in the Park.
- Extending all the above concessions to local companies, subject to completion of listing on RTS within a pre-defined period and extending additional fiscal benefits on successful listing on international stock exchanges.
- Extending special concessions to all financial entities like banks, financial institutions, venture capital & private equity funds located in the IT Park. Representative concessions/benefits include exemption of tax on income on such units for a initial period (say 5 years).

In terms of education, the development of English competencies and management and aptitude skills are of utmost importance. Policy changes addressing the skills levels in these areas are detailed in Figure 45.

Immigration procedures for obtaining visa permits into Russia are confusing to foreigners and pose an obstacle to the development of the sector. Simplification of visa & associated regulations for IT professionals traveling on business-related purposes are recommended. The one-stop-shop run by the Jordan Investment Board (JIB), which has simplified procedures for issuing visas and residency approvals for foreign investors and professionals, is an example of such simplification.

Implementing a single window mechanism for providing all benefits, concessions & permits to IT companies, would be a key measure for improving the Investment Climate for the sector. The process and benefits of this single agency have been highlighted in Figure 45. It is intended that a designated nodal agency with adequate empowerment be the single point of contact for communications relating to existing policies & regulations and providing assistance to existing & potential IT sector investors for obtaining necessary clearances/approvals for commencing/expanding operations in the country.

In order to improve corporate governance and transparency in local companies, measures could be taken to extend all concessions to local companies which complete their listing on RTS within a pre-defined period and extending additional fiscal benefits on successful listing on international stock exchanges. Further measures, which would support the Investment Climate of Russia regarding capital markets, have been stated in Figure 45.

In figure 46, we present the Policy Good Practice that can be adopted for developing the IT parks in Russia.

Based on our assessment the following categories have been identified as likely occupants for IT Parks:

- Global IT companies primarily engaged in IT services
- Large domestic IT services companies

Based on case studies on IT Parks in various countries, it is recommended that private sector developers be involved in promoting the IT Parks in the country.

The policies listed below have been identified as being key to promote investment/involvement in development of IT Parks in Russia.

Currently, a number of Fiscal Incentives are available to residents of Special Economic Zones, including a five-year exemption on the assets of organizations and land tax and decreased rates of Unified Social Tax. Extending similar benefits to occupants of IT Parks will be a key consideration for IT Companies on deciding to relocate/locate to IT Parks. Further incentives concerning subsidized land rates and rentals have been highlighted in Figure 46. However, it is important to note that all such incentives should be applicable for a specific time-frame and should possibly be linked to minimum employment generation & investment stipulations.

Successful Innovation Policies for IT Parks include providing business incubation services to start-up companies, including initiating contact with venture capitalists similar to those offered by Singapore Science Park. Similar policies in the Russian context have been highlighted in Figure 46.

Permitting mixed land use like commercial and residential in addition to core IT office space/facilities in IT Parks is one of the investment climate policies which would stimulate IT Park develop-ment given that return on investments from ancillary facilities like residences, retail & entertain-ment are usually higher than returns on core IT Park facilities. Developers of Hitec City, Hyderabad and CFZ, Malaysia, are in fact mandated to develop such parks having designated zones for housing and commercial end use which have increased the returns on investments in developing the IT park as compared to the returns from a standalone IT Park. Similar mixed land use policies may be adopted while developing Russian IT Parks as an incentive for private sector participation in development of IT Parks in the country.

Other stimulators for providing investment climate for development of IT Parks include special financial concessions for Russian IT Park residents, which have been highlighted in Figure 46, along with the concept

of Single window mechanisms applicable for both real estate players and IT companies & other occupants. It is felt that such a nodal agency would simplify investment and rental/leasing procedures in IT Parks thus improving the investment climate.

As mentioned under the strategy for IT sector development, all of the above concessions should be extended to local companies as well, subject to completion of listing on RTS within a specified timeframe. Additional fiscal benefits can be offered on successful listing in international stock exchanges. This provides an effective system of corporate governance and management, essential to a well performing economy as it provides an assurance for potential investors and ensures sustainability of the sector.

5.3 Country Case Study: Jordan

5.3.1 IT Sector: Contribution to GDP

The Jordanian economy is estimated to have grown at an average rate of 6.1% during the period from 1996 to 2003 (Source: Department of Statistics, Jordan). The growth in the economy has been fuelled primarily by sectors like finance and banking (around 18% of GDP in 2003) manufacturing (15%) and trading (9%).

The services sectors accounted for around 49% of GDP in 2003, with the IT sector contributing USD$295 million, or 2.9% of GDP. While this is significantly lower than countries like China and India where the sector contributes 4%–5% of GDP, the IT sector in Jordan has shown significant growth during the period from 2001 to 2004, with a CAGR of 37% during this period (please refer Figure 47 below).

5.3.2 IT Sector: Growth, Composition and Trends

Compared to other developing countries Jordan has been a late starter in developing its IT sector. The IT industry in Jordan, though active since early 1990s, came into the fore only after the Regulatory Framework, Estate, Advancement Programs, Capital, Human Resource Development (REACH) Initiative was launched by the government in 1999. However, the country is considered to be one of the

Figure 47. *GDP and IT Sector*

Figure 48. *Composition of the Jordanian IT Sector*

pioneers in the Middle East Region as far as development of IT sector is considered.

The REACH Initiative was started with the mandate of transforming Jordan into a regional leader and a global exporter of IT products and services. It was a 5 year iterative plan which set targets of creating 3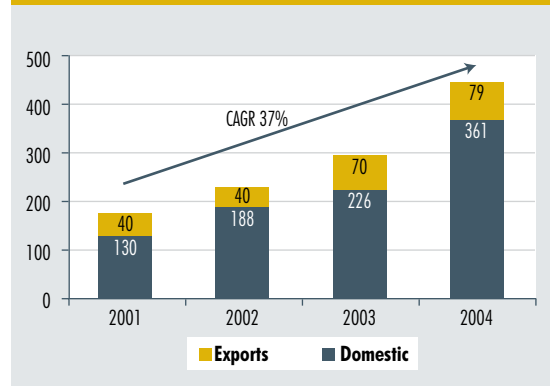0,000 IT-related jobs, generating annual export revenues of USD$550 million and attracting USD$150 million of Foreign Direct Investments by 2004 in the IT sector.

While none of the targets set under REACH could be met, the industry generated total revenues of USD$440 million in 2004 as compared to USD$170 million in 2001 and recorded a Compounded Annual Growth Rate (CAGR) of 37% in revenues during this period. Key constituents of Jordan's IT sector have been discussed below (please refer Figure 48 below for details).

- IT services with a turnover of USD$204 million during 2004 accounted for nearly 46% of the sector revenues. IT consulting, training, application support services and network solutions are the major revenue earners for the industry with as much as 72% of the IT services turnover contributed by these services. However, none of the large global IT companies are currently present in Jordan. Domestic majors like the Ideal Group, Integrated Technology Group and Estarta solutions earn a significant proportion of theirrevenues from implementing packaged applications solutions offered by

Microsoft and Oracle and system integration. Almost 15% of IT services revenues are generated from service delivery centers like technical assistance centers and call centers.
- Software solutions like packaged software development, system development and web design account for nearly 37% of the sector revenues. However nearly 15% of software solutions revenues are generated from resale of off the shelf packaged application solutions offered by global companies like Microsoft and Oracle.
- IT hardware which contributed USD$71 million to the overall sector revenues, accounted for around 16%. However, the entire hardware

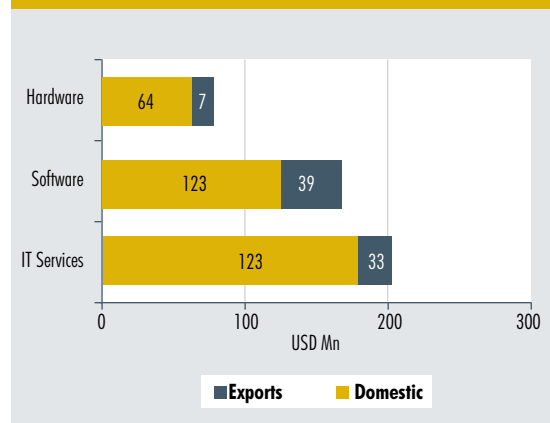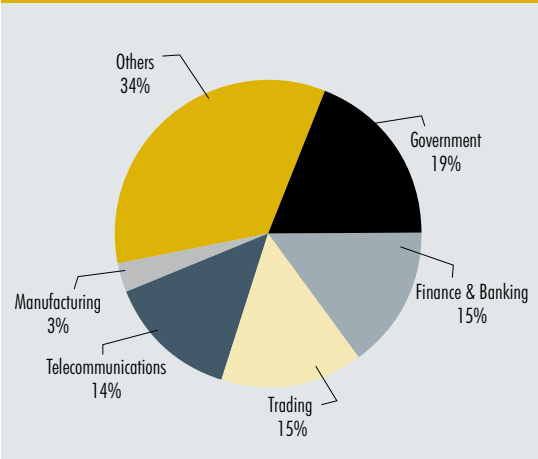Figure 49. *Composition of Revenues (2004)*

Figure 50. *Revenues by Industry Sectors (2004)*

Others
34%

Government
19%

Finance & Banking
15%

Trading
15%

Telecommunications
14%

Manufacturing
3%

Source: Int@j

revenues is from trading or reselling as the country does not have any manufacturing or assembly operations.

In the domestic market, the government acts as the largest client for the industry accounting for nearly 20% of overall domestic revenues. Government spending on education, healthcare and the e-Governance program offer a large market for the local players. Other industry sectors which act as major markets for the industry include financial services and telecom.
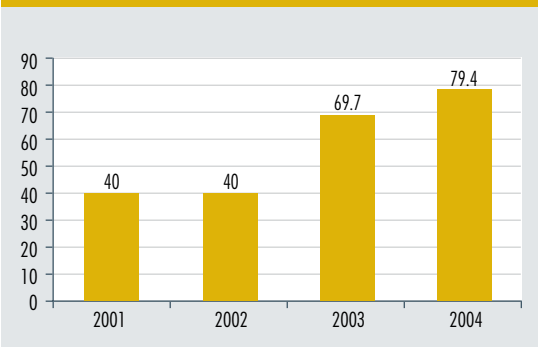
As on 2006, all IT companies present in Jordan were located in and around the capital city of Amman.

5.3.3 IT Exports

Although export revenues have increased at a CAGR of 26% from USD$40 million in 2001 to USD$80 million in 2004, exports accounted for only 20% of the overall sector revenues (please refer Figure 51 for details). Some key trends in the exports market have been highlighted below.

- Key export destinations include other Gulf countries, which account for nearly 70% of total exports with Saudi Arabia being the largest market followed by UAE and Iraq. Other export destinations include USA, UK. Germany and North African countries like Egypt, Morocco and Yemen.
- In terms of industry verticals, Banking & Financial Services (32 % of total export revenues) Telecommunications (15%) and Public Sector/Government (13%) accounted for around 60% of total exports in 2004.
- Out of the total export revenues of USD$80 million in 2004, nearly 49% is accounted by IT services and 42% by software solutions.

5.3.4 Past Government Initiatives for Development of the IT Sector

As has been indicated earlier, the IT sector in Jordan gained momentum during the late nineties after the

Figure 51. *IT Exports*

	2001	2002	2003	2004
	40	40	69.7	79.4

Source: Int@j

Figure 52. *Exports by Destination (2004)*

Others
28%

Saudi Arabia
24%

UAE
15%

Iraq
9%

USA
8%

UK
7%

Syria
5%

Bahrain
4%
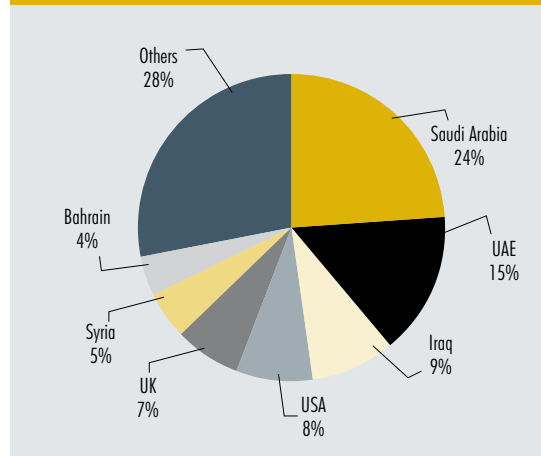
Source: Int@j

REACH initiative was launched by the government. Consequently, Jordan's key ICT indicators are not comparable with countries like Singapore, India & China (please refer Figure 53 below for details). Even though the voice based communication infrastructure has improved significantly with liberalization of the telecommunication sector in 2000, the infrastructure for data communication has not developed in a uniform manner throughout the country. As a result the government had, in the past attempted to develop IT parks in Jordan to provide an impetus to the IT industry in the country.

Under the REACH initiative, it was resolved that three IT parks would be developed in different parts of Jordan to improve the infrastructure available to the IT industry. These IT parks were to be developed within 2003 following different public private partnership models with the private sector bringing in investments and the government providing the necessary policy support. However despite attempts, Jordan currently does not have any operational IT parks.

Some past initiatives include CyberCity in Irbid and the Hashemite University Technology Park in Zarqa. Even though CyberCity was commissioned by end 2001, till date it does not house any IT companies.

The Hashemite University Technology Park was planned to be developed as a joint venture between the Hashemite University and Hillwood, a USA-based real estate company. However, as on date, the park is yet to commence operations.

As an outcome of the REACH Initiative, in April 2002, the government created the Ministry of Information and Communication Technology (MoICT) by restructuring the Ministry of Post and Communication with the mandate of articulating policies for information technology and telecommunication. In September 2003 the MoICT promulgated the first comprehensive ICT policy of Jordan, Statement of Government Policy on the Information & Communication Technology Sectors and Postal Sectors and The National Strategic Plan, 2004–2007 on the Information & Communication Technology Sectors and Postal Sectors.

The Jordan Education Initiative (JEI) was launched by the government in June 2003 to support educational reforms in Jordan bridging the gap between the curriculum in local universities and the requirements of the IT industry. Under this program the government is building a nationwide high speed broadband network connecting schools, colleges and universities.

Figure 53. *Key ICT Indicators for Jordan*

Parameters	Saudi Arabia	UAE	China	India	Turkey	Kuwait	Jordan	Singapore
Social Indicators								
Total Population (millions)	23	4	1296	1080	72	2	15	4
Urban Population (%of total population)	88	85	40	29	67	96	79	100
ICT Sector Indicators Access:								
Telephone lines (per 1000)	159	277	241	43	267	202	117	430
Internet users (per 1000)	95	397	73	23	78	237	86	559
Personal computers (per 1000)	137	117	40	11	45	122	55	565
Mobile Subscriber (per 1000)	395	860	258	48	494	855	272	891
Population covered by mobile Telephony (%)	99	99	73	41	68	99	99	100
Quality:								
Broadband subscribers (per 1000)	0.4	13.1	16.5	0.6	0.8	5.4	0.9	118.2
International Internet Bandwidth (bits/person)	56	543	57	4	40	120	29	5699
Affordability:								
Price basket for fixed line (US$/month)	11.7	5.0	3.6	3.2	10.3	10.3	10	6.7
Price basket for mobile (US$/month)	9.6	3.5	3.7	3.2	6.4	7.4	9.4	5.7
Price basket for internet (US$/month)	34.7	13.1	10.1	8.7	19.8	24.7	26.3	11
ICT Expenditure (% of GDP)	2.5	—	5.3	3.7	7.3	1.7	8.7	10.4

Source: World Bank, UNDP, ITU and others.

In the course of our interactions with policymakers and industry associations it has emerged that the government is planning to develop another IT park in Jordan. This park would be located in the outskirts of Amman and would be developed under a public private partnership model with the government providing land at subsidized rates while a private sector real estate company would develop the facilities and market the space. The government is considering offering fiscal incentives like tax breaks to IT companies locating in the park. However, no additional details are available at this point of time.

5.3.4.1 IT Parks in Jordan

One of the key action points identified under the REACH Initiative for improving the infrastructure available to the industry was developing IT parks in Jordan. As per the initiative it was suggested that these IT parks were to be developed within the next 3 years following different public private partnership models with the private sector binging in investments and the government providing the necessary policy support. However in spite of a few initiatives in the past, Jordan currently does not have any operational IT parks. Some of these initiatives include CyberCity in Irbid and the Hashemite University Technology Park in Zarqa. The Hashemite University Technology Park was planned to be developed as a joint venture between the Hashemite University and Hillwood, a USA based real estate company. As on date the park is yet to commence operations.

CyberCity, Irbid

CyberCity is located near Irbid in north Jordan, 85 kms from the capital city of Amman. The project was initially conceived in 1999 as a self sustained township which will provide state of the art infrastructural facilities to IT companies complete with residential, commercial and recreational facilities. However sustained efforts by the developer to attract IT companies have proved unsuccessful. Even though the park was commissioned in 2001, till date it does not have any IT companies as occupants.

Applying the CLIP framework to CyberCity, Irbid

Capital: CyberCity is owned and managed by CyberCity Industrial and Information Technology Parks Development Company. The company is a joint venture between the Jordan University of Science and Technology (JUST), a Abu Dhabi based

investment company named Al Bountain Investment Group, Arab Land Investment Ltd, Prosper World Group Ltd and two individual investors. JUST holds 33% shares of the company with the balance being equally shared amongst the other investors. In this project, JUST was responsible for providing the land with the private sector investors responsible for the construction of the park and marketing the facilities.

- The park is spread over an area of 4 sq kms. The park is now in its first phase utilizing only one fourth of the total area. Around 36,000 sq meters of space is built up as industrial, residential and commercial facilities.
- Currently the industrial area of the park is occupied by manufacturing companies only. The occupants include 8 garments manufacturing companies and 1 printing press. Out of the 9 occupants, 7 are foreign companies which run their manufacturing facilities mainly using foreign labor.
- CyberCity Industrial and Information Technology Parks Development Company is responsible for managing the entire park and provides services including peripheral security, backup electric supply, municipal services, maintenance, and transportation services.
- In addition to construction of the industrial and residential space, the promoter has also developed the internal roads and other necessary infrastructure (e.g., electricity, water connections) inside the park. To date the developer has invested around USD$20 million in developing the park.

The principal revenues streams for the developer are:

- *Sale/Lease of land*: The developer sells plots of land at the rate of around USD$4/sq ft. The lease rentals, however, vary depending on the area of land leased, period of lease, etc. In case of lease, the developer enters into agreements with the lessee usually for a period of 3 years after which the lessee has the option of buying the land.
- *Sale/Lease of built up space*: The developer sells built up space in the park at a rate of around USD $11/sq ft. However, in case of built to suit facilities the rates depend on the requirements of the customer. For leasing built up space the developer enters into lease agreements with the occupants and usually charges a rental of USD$2.5/sq ft.

■ Facilities Management Fees: The developer is responsible for internal security and providing all municipal services in the park. However, it has outsourced most of these services. The developer charges management fees of USD $0.02/sq ft/month. However electricity cost is charged to the customer on actual consumption.

Linkages: Given that CyberCity was envisaged as an IT park focusing mostly on IT products and software development, linkages with universities, research & development institutes and centers of excellence is critical. The park is located adjacent to the campus of Jordan University of Science and Technology and is very close to the Yarmouk University and Irbid University. However the park does not seem to have any apparent linkages with these universities, given the nature of operations of the current occupants.

The park does not have any dedicated incubators supported either by government or the developer and has not been able to attract local SMEs or start-up companies who do not find any incentives to relocate in CyberCity. Also the promoter of the park being real estate developers does not offer any value added services in areas such as marketing support, business development assistance, or technical assistance.

Infrastructure: Irbid is the 2nd largest city in Jordan after Amman with a population of around a million.

■ Cybercity is located on the outskirts of the city on the Amman-Irbid highway. It is 1 hour from Amman, the capital of Jordan. It is located 30 minutes from the international borders with Syria, 45 minutes from Israel and 2hours from Iraq.
■ In the absence of any railway network the only mode of transportation between Amman and CyberCity is by road. The quality of road network in and around the park is good. Primary and subsidiary roads support medium and heavy car and truck movement. Public transport system in this area is not well developed and the developer has to operate its own bus service for the locals working in CyberCity.
■ The nearest international airport is the Queen Alia International Airport in Amman.

The park has a robust electricity supply with power being supplied by Irbid District Electricity Company Limited through 33 kva underground cable system from the nearest power station at Al Hassan Industrial Estate just 9 kms from CyberCity. The developer has installed back up generator sets to ensure uninterrupted power supply in the park.

Even though it was planned that the park will have three water wells within its boundaries, currently it depends entirely on supplies from local contractors.

BOX 18. *CyberCity – Reasons for Failure*

At the time of its inception, CyberCity was planned as a Qualified Industrial Zone dedicated to the IT industry. However, even 4 years since its inception the park does not have any IT companies among its occupants. Some of the main reasons for failing to attract IT companies to CyberCity are:

■ Locational Disadvantage: The remote location of the park, 85 kms from Amman has acted as a deterrent in attracting local companies to CyberCity. Amman is the largest city of Jordan, which has the highest concentration of IT companies and IT professionals.
■ Absence of specific incentives: In the absence of any specific incentives linked to locating operations in the park other than those offered to the IT industry, local companies do not find it attractive to relocate to CyberCity.
■ Political instability in the region: The political instability of the Levant region and the proximity of the park to war torn countries like Iraq and Syria has deterred multinational IT companies from considering CyberCity as a possible location for their Jordanian operations.
■ No anchor investor: In spite of sustained efforts by the developer and its marketing offices in different countries, the park has failed to attract any large multinational IT companies.
■ Inadequate government investments: Inadequate government investments in utility services like water, road and public transport system has affected the infrastructure of the park and has increased project cost for the developer.
■ Lack of government support: Even though the land was contributed by JUST, a public university, the project did not receive any subsidy or grants from government to fund infrastructure development. Consequently, the company has made huge investments in infrastructure leading to internal cashflow problems for the developer.

(as discussed with Mr. Khaldoun Awamleh, CEO, CyberCity Industry and Information Technology Parks Development Company)

Initially it was envisaged that CyberCity will have its own underground communication network of optical fibre cables. While the basic infrastructure was to be provided by the developer, the cost for the last mile was to be borne by the occupants. However, currently the optical fibre network is not in place and the park is dependant on leased line connections for network facilities.

The initial land-use plan of the park allowed for construction of residential, commercial and recreational facilities to provide the necessary social infrastructure for the occupants of the park. Currently the park has around 12,000 sq meters of built up residential space which is primarily let out to the occupants to accommodate their foreign laborers. The park does not have any commercial facilities other than a small convenience store. The quality of life in and around the park is affected by the lack of any recreational facilities in the area and is highly inadequate to attract or retain young professionals who form the bulk of the work force for IT companies.

People: In the absence of any IT company, the park does not provide employment to any IT professionals. Currently around 6,000 people are employed in the park out of which about 3,500 are foreign laborers mostly from India, China and Bangladesh. The balance of the labor force are locals from the neighboring cities including Irbid, Ramthan, and Jarash, who mainly reside outside the park.

In the course of our interactions with policymakers and industry associations it has emerged that the government is planning to develop another IT park in Jordan. This park is proposed to be located in the outskirts of the capital and the park would be developed under a PPP model with government participation limited to contributing land at subsidized rates. It is envisaged that specific fiscal incentives like tax breaks for locating operations in the proposed IT park will be available to occupants in addition to those available to the IT sector.

5.3.5 Assessment of Critical Business and Policy Enablers

It has been observed that most countries which have emerged as global leaders in the IT sector have been able to leverage some key business enablers which have enabled their IT companies to thrive in the global marketplace. Additionally, the Governments

of many of these countries have consistently supported the development of the sector through a set of fiscal, innovation, people and investment climate policies. The current section details our assessment of some of the critical business and policy enablers which are impacting/are likely to impact the development of the IT sector in Jordan.

5.3.5.1 Sources of capital

The country has around 160 companies operating in the IT sector with none of the companies recording annual revenues in excess of USD$20 million. Almost all the IT companies in Jordan are concentrated in and around the capital city of Amman. Most of these companies are small and medium enterprises funded through promoters contribution. With bank finance in Jordan linked primarily to mortgages and collateral securities, it is difficult for IT companies to access debt. In the absence of any dedicated venture capital fund for the IT sector, the industry is facing challenges in providing the necessary risk capital for start-up ventures. However, there are plans to set up two venture capital funds under the Jordan Upgradation and Modernization Program, namely the Jordan Venture Fund and Jordan Seed Fund with an initial corpus of USD$20 million and USD$5.6 million respectively. The country has an active and liquid capital market in the form of Amman Stock Exchange which had a market capitalization of USD$38 bn in 2005, one of the highest in the region. However, out of the 224 companies currently listed in the exchange none are IT companies.

Even though the investment promotion laws of the country allow 100% FDI in the IT sector, the industry has managed to attract only USD$83 million FDI till the end of 2004 as compared to the initial target of USD$150 million set under the REACH initiative. However FDI inflows to the sector have increased from USD$60 million in 2001 to USD$83 million in 2004. Sustained efforts by the Jordan Investment Board (JIB) and other investment promotion agencies to attract large global IT companies to Jordan have not succeeded.

One of the key issues which emerged during our interactions with key stakeholders is the relative size of some of the major local players. The industry is largely a diffused and fragmented one even the larger companies generating revenues of less than USD$20 million and employing not more than 200 employ-

ees. None of the local companies have attained the critical mass to compete on a global scale or bid for large projects internationally. This has adversely impacted the industry as the local market is small and growth opportunities lie only in exports.

5.3.5.2 Anchor investors

In most countries which have performed well in the IT sector, the growth has been contributed partly by domestic companies which have started small and large established anchor investors seeking to expand to newer geographies to increase their competitiveness. Microsoft and Cisco have taken up equity stakes in local companies like Estarta Solutions and Rubicon. However they do not have any product/software development centers or manufacturing facilities in Jordan. Large global IT hardware companies such as Intel and Apple only have limited trading operations in Jordan.

5.3.5.3 Infrastructure

Amman, the largest city in Jordan has the largest concentration of IT companies, followed by cities like Irbid, Zarqa and Balqa.

■ Amman is the capital of Jordan with a population of around 2 million. The Greater Amman Municipality (GAM) is in charge of the city and provides all the municipal services in and around Amman. GAM is in the process of adopting the Amman Master Plan to address issues like land use and urban infrastructure in the wake of unplanned growth of the city and the sudden increase in the population of the city.

■ The nearest international airport is the Queen Alia International Airport which is around 35 kms from the city center. The airport is served by 24 international airlines in addition to Royal Jordanian Airlines and handles around 2.3 million passengers every year. Other international airports in the country include the King Hussain International Airport in Aqaba and the Marka International Airport.

Jordan has almost no indigenous energy resources and energy imports account for nearly 10% of the GDP. However, over the last decade, the sector has undergone significant transformation. Towards the end of the last century the country's power sector was privatized and deregulated. Currently, the country has one transmission company and 3 distribution companies. The Central Electricity Generating Co., a state owned company is the main generation company with a total installed capacity of 1,636 MW. Jordan Electricity Company is responsible for electricity distribution in the city of Amman.

Since the telecommunication sector was liberalized in 2000, a number of private players have entered the market. Prior to the liberalization of the sector fixed line telecom services were provided by Jordan Telecom, a government company which has since been privatized. However in May 2005, the Telecomm Regulation Commission granted the second fixed telecom license to Batelco, a privately owned company. In the mobile telecom sector, the country has 4 privately owned companies. Competition has driven down prices resulting in increased mobile penetration rates (nearly 270 out of every 1000 people).

Currently there are 8 Internet Service Providers in Jordan which offer dial up internet, leased line, Asymmetric Digital Subscriber Line (ADSL) services up to 2mbps speed and Integrated Services Digital Network (ISDN) services. International connectivity is available through submarine optical fibre cables provided by FLAG Telecom with a landing station at Aqaba and 3 earth stations. In the year 2004 the country invested nearly USD$150 million in developing and upgrading communication infrastructure. The government in partnership with the private sector has embarked on building a nationwide high speed broadband network connecting all the public schools and universities in the country as

part of the Jordan Education Initiative. While the network infrastructure available in Jordan is not at par with best in class developing countries, the local industry is largely satisfied with the quality and cost of the services.

This is primarily because most of the companies are into software and product development or system integration and do not require telecommunication facilities for transmitting large volumes of data. However, greater investments need to be made in upgrading the network infrastructure if Jordan expects to be a major player in voice or data based outsourcing.

5.3.5.4 Human resources

Jordan has a total population of nearly 5.5 million and a literacy rate of around 90%, one of the highest in the region creating a large talent pool for the IT industry. Jordan has around 24 universities, 10 public, 14 private and 60 community colleges which offer different courses to nearly 150,000 students. More than 15 universities offer IT related courses in Jordan with more than 5,000 IT students graduating every year from these universities. Currently the industry employs more than 16,000 people.

The average annual salary offered to Jordanian IT professionals ranges between USD$5,700 to USD $13,900. This is among the lowest in the region due to which the local industry is facing problems of high attrition, losing resources to other gulf countries such as UAE and Saudi Arabia. IT salaries in Jordan are comparable to India and China, and much lower than countries like Ireland, Canada, Israel and East European countries like Czech

Figure 55. *Comparative IT Salaries*
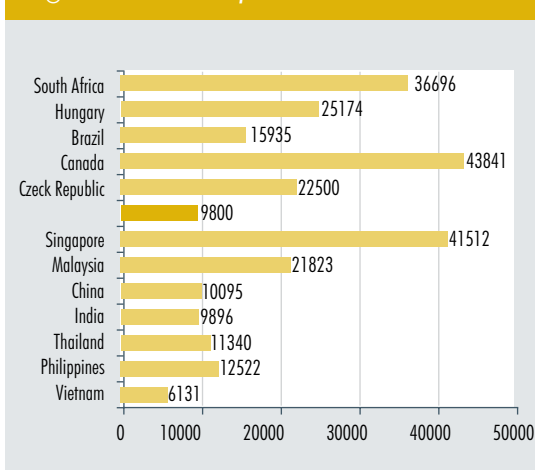
Source: neoIT – Offshore and Nearshore ITO and BPO salary report

Republic and Hungary, which have emerged as popular outsourcing hubs.

However, local IT companies are facing challenges in terms of the quality of talent available locally and are not satisfied with the quality of fresh graduates. The education curriculum of some of the privately owned universities are not contemporary and often do not meet the demands of the industry. Consequently most IT companies incur significant expenses on training initiatives and certification programs for their employees. The government has started a number of reforms program like the Jordan Education Initiative to bridge the gap between the education curriculum of the local universities and the requirements of the industry. Since its inception, JEI has supported the development of 5 e-curricula, trained teachers and introduced various new models of classroom teaching focusing on the softer skills.

With English being part of the curriculum in primary and secondary education levels, most of these students are proficient in both English and Arabic. According to reports published by Int@j as much as 90% of the IT professionals are proficient in English. 30% of the total population is within the age group of 15 to 30, providing a large pool of young human resource. This pool of young English speaking talent available at a comparative low cost is ideal for BPOs and call centers.

Figure 54. *Average IT Salaries 2004*

Skill level	Monthly Salary (USD)
System Architect; System Analyst	1160
Database Administrator	910
Software Quality assurance	775
System Administrator; Internet Programmer; Database Designer; Technical Writer; Web Site Designer; Software Quality Controller; Application Programmer; Telecommunication Engineering	620
Multimedia Specialist; Network Engineering; Web Site Developer	480

Source: Int@j

5.3.6 Government Policies and Implementation Mechanisms

The Ministry of Information and Communication Technology (MoICT) created in 2002 has the mandate of formulating policies governing the IT industry in the country. Since its inception, the ministry has issued a number of policy guidelines including the National ICT Policy (Statement of Government Policy on the Information & Communication Technology Sectors and Postal Sectors), the National Strategic Plan, 2004–2007 on the Information & Communication Technology Sectors and Postal Sectors and the e-Government Strategy. MoICT is also responsible for ensuring effective utilization of IT by government departments and ministries and is in charge of running different e-governance programs in Jordan.

The ICT Advocacy Council (ICTAC) created within the MoICT acts as an interface between the local industry players and the policymakers. It functions as an advisory body to the Minister and provides critical inputs on policymaking, e-governance programs and other key issues impacting the industry. The ICTAC includes among its members the Chairman and CEO of Int@j, the principal trade association for the IT sector in Jordan and acts as an important link between the industry and the government.

A high level assessment of the applicable policies has been presented in Figure 56.

In addition to policies for facilitating development of the IT sector, case studies of successful countries like Singapore, China and India have also demonstrated the importance of having efficient implementation mechanisms. There appears to be scope for improvement on this front as far as Jordan is concerned. For example, while the IPR laws in Jordan are in line with Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS), the enforcement mechanism is weak and awareness is low. Consequently, IPR infringements are quite common in the country.

5.3.7 Potential Growth Opportunities for the Jordan IT Sector

Before attempting to identify specific recommendations for development of the IT sector in Jordan, it is imperative that the current and potential market opportunities available to companies operating in this sector are identified. Based on our assessment of the sector, the following represent potential opportunities which can possibly be targeted.

Domestic market opportunities

At present the industry is mainly dependant on the domestic market with exports contributing only 20% of the revenues. However, the domestic market in Jordan is limited in size having grown by only USD$260 million during FY 2001–2004. According to reports published by Int@j, the domestic IT market in Jordan is expected to grow from USD$440 million in 2004 to USD$550 million by end of 2006. The inherent size of the local economy may not be adequate for sustaining growth of an IT sector comprising 160 companies. Despite the government, as the principal domestic client for the industry, is implementing a number of e-governance projects, growth opportunities for the industry appear to be limited.

Export market opportunities

IT export revenues have grown at a CAGR of 26% during FY 2001–FY 2004. Based on our assessment, significant opportunities are expected in the following market segments.

- Near shore BPO service provider for countries like the U.S. and UK, given Jordan's geographic location and with salary costs of IT professionals in the country being comparable with China, India, Philippines and Thailand, and much lower than countries such as the Czech Republic, Hungary, and Ireland.
- Given that the salary cost of IT professionals in Jordan is lower than in other Middle East countries like Saudi Arabia (nearly USD$18,000 per annum), it can position itself as the outsourcing destination for the Middle East. Since Jordan shares a common language (Arabic) with other countries in the region, it enjoys an added advantage in providing voice based outsourcing services for the Middle East market. The outsourcing market in Saudi Arabia, which represents one of the largest countries in the region, is estimated at nearly USD$400 million and is expected to grow at 13% over 2006 to 2010. The existing competencies of the human resource pool in Jordan together with its geographical location are expected to serve as key competitive advantages viz. a viz. other countries.
- Representative outsourcing activities which can be targeted include the following:

Figure 56. *Government Policy Instruments*

Broad Classification	Illustrative interventions
Fiscal Policies	■ IT companies are classified under "Industry" and are subject to a corporate tax rate of 15% as compared to other services or banks and financial institutions which are subject to tax rates of 25% and 35% respectively. ■ Profits earned from export income are exempt from tax. Export sales are also exempt from a 16% sales tax. However this provision is applicable to all exports and not just export of IT products and services. ■ The Investment Promotion Law No. (16) of 1995 offers a number of incentives and exemptions to 6 identified sectors including IT. This includes duty free import of "Fixed Assets" for a period of 3 years by qualified "Projects". ■ Under the Investment Promotion Law, the country is divided into three development zones. Qualifying "Projects" located in these development zones are eligible up to 75% exemption from income and social service taxes for a period of 10 years starting from the date of commencement of such projects. Any IT company selected as a "qualified project" would enjoy these benefits.
Innovation Policies	■ Under the National Science and Technology Policy, the Higher Council for Science and Technology (HCST) offers financial support to R&D projects in a number of fields including IT, through funds like the Industrial Scientific Research and Development Fund and the National Fund for Enterprises Support. ■ In the Strategy of The Higher Council for Science and Technology, 2005–2010, ICT and Nanotechnology have been identified as priority areas for providing additional funds and seed capital to start-up companies operating in these sectors. ■ Since Jordan joined WTO in April 2000, a number of IPR related laws, have been enacted. Existing IPR laws like the Copyright Law, Patents of Invention Law and the Trademark Law have been amended to align the IPR regime of the country with TRIPS.
Human Capital Policies	■ Jordan Education Initiative (JEI) was launched to initiate educational reforms in the country through programs like the Education Reform for Knowledge Economy Program which aims to redesign exiting curricula to meet the requirements of the IT industry. ■ Even though the country does not have any preferential visa regulations for the IT industry, the One Stop Shop run by JIB has simplified procedures for issuing visas and residency approvals for foreign investors and professionals. ■ The labor laws of the country allow local companies to recruit foreign professionals and allows multiple shifts including night shifts.
Investment Climate Policies	■ Jordan Investment Board (JIB), offers a number of fiscal benefits to IT companies under the Investment Promotion Law. To facilitate investment in Jordan, JIB has established a One Stop Shop which acts as a single window clearance agency for prospective investors ■ Currently Jordan has DTAAs with 19 countries including major IT players like UK, France, Canada and India and is in the process of entering into similar agreements with 14 other countries including Russia, South Africa, Switzerland and Saudi Arabia. ■ Although, the Electronic Transactions Law was enacted in 2002, it does not have any regulations relating to digital certificates, licensing certification authorities, or cyber crimes. ■ The Competition Law enacted in 2004 promotes private entrepreneurship and foreign direct investments in the country. The law attempts to protect small and medium enterprises by prohibiting cartels and monopolies. ■ In Jordan there are no restrictions in FDI in IT. Foreign investors can invest and operate in any sector in Jordan other than mining, trade, retail and construction where foreign ownership is limited to 50%.

■ Data-based outsourcing activities related to back office operations such as accounting, payroll processing, insurance payment/claim processing, and internal audit related services. Given that the accounting policies and practices followed in Jordan are aligned to international accounting standards and Jordan already has a mature financial services sector, it may have inherent advantages in the area of finance and accounting.

■ Voice-based outsourcing activities such as technical assistance centers and call centers.

5.3.8 Identification of Issues and Growth Strategies

Having identified the potential growth opportunities for the Jordan IT sector, it also becomes necessary to identify market participants who are well placed to drive growth in the respective areas, together with potential strategies for development, based on identified good practice in other countries assessed as part of the study.

Figure 57. IT Sector Growth Segments & Strategies

Potential growth segments	Identified issues	Recommended growth strategies
Exports Data & voice based outsourcing	■ Market currently dominated by local companies with inadequate scale of operations ■ It may be relatively difficult to attract global players to set up operations, given the limited size of the domestic market and political instability in the region ■ Present data communication infrastructure may be inadequate for large scale international outsourcing operations	■ Supporting larger local companies in targeting BPO market in the Middle East initially, followed by Europe and the United States ■ Facilitating indirect presence of global players such as Microsoft and Cisco through joint ventures with local companies ■ Encourage private telecom companies to invest in augmenting international data networks with countries in the Middle East initially, followed by Europe and the United States

5.3.9 Role of IT Parks and Proposed Business Models

It has been demonstrated by the case studies that the key requirement underlying setting up of sustainable IT parks is the ability to attract credible occupants to the park, with business models which demonstrate sustainable viability. Consequently, having credible anchor investors in the park has been identified as an essential prerequisite for success both in developed as well as developing countries. In the current section, we have attempted to present our assessment of the critical business enablers for IT Parks in Jordan, based on the case studies of parks in other countries as well as ground realities in Jordan.

The generic critical business enablers which are likely to feature in the expectations of any IT company have been highlighted below:

■ Location of the park in an area which permits it to leverage the existing urban and social infrastructure of the capital city of Amman as availability of the right quality of human resources is expected to be a problem in any other region.
■ Lease or sale of land for built-to-suit facilities at rates lower than those prevailing in the adjoining areas.
■ High quality physical connectivity and infrastructure including air (both international & domestic), road and rail connectivity, a combination of multi-tenant buildings with contemporary facilities and build-to-suit options, adequate road & other surface transport connectivity with the adjoining city, intra-park roads, sewerage, and electricity.
■ State-of-the-art virtual connectivity in terms of data and voice infrastructure including international connectivity.
■ Simplified policy implementation mechanisms in terms of single window approval facilities in areas such as operating license, sanction of building plans, and tax and customs duty registrations so as to cut down significantly on the time for setting up new/expansion operations.

In addition, there are a number of potential value drivers which are expected to impact specific types of IT companies, with the level of interest also expected to vary across different categories of IT players (please refer Figure 58 below for details).

The IT Park case studies and primary interactions with various stakeholders clearly seem to demonstrate a case for management of the IT Parks to be vested with private sector players for ensuring adequate accountability and efficient service. Possibly, as has been the case in many other countries, existing facility management companies can be considered for this purpose. Good practice in other countries clearly indicate the need for management control of the park development company to vest with the private sector for higher efficiency & productivity. Consequently, a facilitation role is recommended for the government other than in situations where the land is owned by it. In such situations, the government can possibly pick up an equity stake in the development company, given that financial returns on IT parks have been fairly attractive.

Figure 58. *IT Parks – Segment Specific Drivers*

Type of IT companies	Key value proposition of IT Parks, if any
Local software, IT & BPO services companies	■ Motivating factors: Reduction of time to market for expansions; Fiscal concessions, if applicable; Built to suit options for custom development centers; Need for state of art facilities for facilitating accreditation; Domestic venture capital/private equity support; Lower investments in ancillary infrastructure & facilities management
Global software, IT & BPO services companies	■ Delimiters: Existing investments in infrastructure for players with existing facilities; Limited growth pressures on account of small size of domestic market and small size of export market opportunities ■ Potential growth opportunities for export oriented BPO services companies seem to be higher ■ May not constitute an immediate target segment, given political instability in region and limited size of domestic market

5.3.10 Policy enablers

In almost all the countries assessed under this study, it has been observed that government policies have played a pivotal role in development of IT sector. The role of government in most countries has also been observed to evolve over time, with a more direct role during the initial stages of sector development gradually moving to a facilitative role with the picking up of private sector led growth.

The current section of the report highlights Policy Good Practice which can be leveraged given the existing scenario in Jordan, based on the countries analyzed as part of the study. For purposes of analysis, the good practice have been categorized into i) policies for developing the IT sector in the country and ii) Policy Good Practice for development of IT Parks. Figures 59 and 60 below outline relevant Policy Good Practice for facilitating development of the IT Sector and IT Parks respectively. As has been assessed during the study,

IT Park occupants are offered a set of additional benefits over and above those available to IT companies not operating out of IT Parks. Consequently, the Policy Good Practice highlighted for IT sector development would also be applicable to IT Park occupants, other than in cases where additional concessions have been envisaged in a specific area.

The measures outlined below only represent good practice adopted by other countries covered as part of the study. Consequently, these can at best be treated as starting points and additional analysis would be required for assessing their budgetary & other impact for customizing these to meet the requirements of Jordan, should the government decide to consider any of these for implementation.

Figure 59. *Policy Good Practice for IT Sector Development*

**Key Issues/
Recommended Strategies**

- Encourage local IT companies to improve scale of operations through BPO Services exports, initially with a focus on the Middle East, followed by Europe and the United States

- Encourage private telecom companies to invest in augmenting international data connectivity

- Augment talent pool for finance & accounting and other BPO Services

- Further development of the financial services sector for meeting funding requirements of local IT companies

- Streamline policy implementation mechanisms

Policy Good Practice which can be considered

Fiscal Incentives
- Allowing local IT companies duty-free import of capital goods for use in IT & BPO Services exports.
- Providing fiscal incentives like import duty exemptions on capital equipments, investment subsidy to private telecom companies on investments made in augmenting international data connectivity, initially with a focus on the Middle East, followed by Europe and United States.

Human Resource Policies
- Establishing finishing schools through public private partnership to train students in managerial and business aptitude, with the infrastructure being provided by government and curriculum & faculty being provided by IT companies.
- Constituting a committee comprising government officials and IT company representatives to assess the existing curriculum for specific courses, based on requirements of IT companies.
- Providing fiscal incentives to companies for training employees like tax breaks on training costs.
- Encouraging local universities to increase intake of students in finance & accounting and motivating students to pursue this area through targeted financial support.

Investment Climate Policies
- Implementing a single window mechanism for providing all benefits, concessions & permits to IT companies. This would require a single agency within government to be identified as the nodal agency, with a presence in all key cities, which would then process applications seamlessly in coordination with other Ministries.
- Extending all the above concessions to local companies, subject to completion of listing on Amman Stock Exchange within a pre-defined period and extending additional fiscal benefits on successful listing on international stock exchanges.
- Supporting listing of IT companies on Amman Stock Exchange through measures such as lower threshold of paid up capital requirements and reimbursing initial listing fees.
- Formulating policies for attracting global venture capital and private equity funds like exemption of tax on income from investments and allowing losses to be deducted from other taxable income.

Figure 60. *Policy Good Practice for IT Park Development*

**Key Issues/
Recommended Strategies**

- Local companies involved in IT & BPO Services exports driven by growth pressures constitute the primary target segment, with potential motivators including incremental fiscal benefits, if available and lower rent/lease rentals

- Given the existence of private real estate companies, it may be possible to attract private developers for IT Park development

Policy Good Practice which can be considered

Fiscal Incentives
- Providing incremental fiscal incentives to potential IT Park occupants like corporate tax holidays for an initial period (say 5 years).
- Providing land owned by government for development and to IT Park occupants at subsidized rates, depending on level of employment generation
- Supporting IT Park developers by subsidizing rentals for plug & play infrastructure and land lease rates for an initial period (say 3 years), so that a part of these subsidies can be passed on to potential occupants, thereby creating a differentiation viz. a viz. normal office/commercial infrastructure.

Innovation Policies
- Provide incubation facilities & space with world class plug & play infrastructure within the IT parks to start-ups and small & mid-sized IT companies at subsidized rentals for the initial period.

Investment Climate
- Permitting mixed land use in IT Parks by earmarking a proportion of the total land for commercial (say 70 %) and residential (say 30 %), thereby improving project viability.
- Implementing a single window mechanism for fiscal concessions & benefits, as well as all required statutory approvals, with a physical presence in the Park.
- Extending all the above concessions to local companies, subject to completion of listing on local stock exchange within a pre-defined period and extending additional fiscal benefits on successful listing on international stock exchanges.
- Extending special concessions to all financial entities like banks, financial institutions, venture capital & private equity funds located in the IT Park. Representative concessions/benefits include tax exemption on income of such units for an initial number of years (say 5 years).

Appendices

Indicative Internal Rate of Return for Select IT Parks

Multi tenanted building in Hitec City, Hyderabad

Internal Rate of Return

Year	1	2	3	4	5	6	7	8	9	10	11
Cash Inflows:											
Sale proceeds		6600000	3300000	3300000							
Rentals		2745468	2855287	2969498	3088278	3211809	3340282	3473893	3612849	3757363	4057952
Maintenance Charges		60000	60000	60000	60000	60000	60000	60000	60000	60000	64800
Cash Outflows:											
Repairs and Maintenance		876872	876872	876872	876872	876872	876872	876872	876872	876872	876872
Cost of Provision of services		54000	54000	54000	54000	54000	54000	54000	54000	54000	58320
Initial investment	14000000	14000000									
Terminal Value of Land											
Net Cash Inflow	−14000000	−5525404	5284414	5398626	2217406	2340937	2469409	2603021	2741976	2886490	3187559

Internal Rate of Return

Year	12	13	14	15	16	17	18	19	20	21	22
Cash Inflows:											
Sale proceeds											
Rentals	4382588	4733195	5111850	5520798	5962462	6439459	6954616	7510985	8111864	8760813	9461678
Maintenance Charges	69984	75583	81629	88160	95212	102829	111056	119940	129535	139898	151090
Cash Outflows:											
Repairs and Maintenance	876872	876872	876872	876872	876872	876872	876872	876872	876872	876872	876872
Cost of Provision of services	62986	68024	73466	79344	85691	92547	99950	107946	116582	125909	135981
Initial investment											
Terminal Value of Land											
Net Cash Inflow	3512714	3863881	4243141	4652742	5095111	5572870	6088849	6646107	7247945	7897930	8599915

Multi tenanted building in Hitec City, Hyderabad

Internal Rate of Return

Year	23	24	25	26	27	28	29	30	31	32
Cash Inflows:										
Sale proceeds										
Rentals	102218612	11036101	11918989	12872509	13902309	15014494	16215653	17512906	18913938	20427053
Maintenance Charges	163177	176232	190330	205557	222001	239761	258942	279657	302030	326192
Cash Outflows:										
Repairs and Maintenance	876872	876872	878872	876872	876872	876872	876872	876872	876872	876872
Cost of Provision of services	146860	158608	171297	185001	199801	215785	233048	251692	271827	293573
Initial investment										
Terminal Value of Land										18121801
Net Cash Inflow	9358058	10176852	11061150	12016192	13047637	14161598	15364675	16663999	18067269	37704602

IRR 15.62%
All figures in USD
Area of land: 6 acres; Build-up area: 600,000 sft
(Based on secondary research and expert opinions)

Residential building in Hitec City, Hyderabad

Internal Rate of Return

Year	1	2	3	4
Land Cost	2173913			
Construction Cost	2708868	6772171	4063302	
Revenue from Sales		4209728	7367024	9471889
Cash Flows	−4882781	−2562442	3303722	9471889
IRR	25%			

Values in USD
Land area: 5 acres; Built-up space: 545,000 sft
(Based on secondary research & expert interviews)

Indicative Internal Rate of Return for Select IT Parks

Multi tenanted building at CFZ, Malaysia

Internal Rate of Return

Year	1	2	3	4	5	6	7	8	9	10
Land Cost	648649									
Contruction Cost	3824324	5258446								
Revenue Realization			478041	795945	1002891	1228542	1474250	1741458	1991067	2133286
Terminal value										
Cash Flows	-4472973	-5258446	-478041	795945	1002891	1228542	1474250	1741458	1991067	2133286

Internal Rate of Return

Year	11	12	13	14	15	16	17	18	19	20
Land Cost										
Contruction Cost										
Revenue Realization	2239950	2351948	2469545	2593022	2722674	2858807	3001748	3151835	3309427	3474898
Terminal value										
Cash Flows	2239950	2351948	2469545	2593022	2722674	2858807	3001748	3151835	3309427	3474898

Internal Rate of Return

Year	21	22	23	24	25	26	27	28	29	30
Land Cost	3648643									
Contruction Cost	10209459									
Revenue Realization	3648643	3831075	4022629	4223760	4434948	4656696	4889530	5134007	5390707	5660242.7
Terminal value										15869702
Cash Flows	3648643	3831075	4022629	4223760	4434948	4656696	4889530	5134007	5390707	15869702
IRR	15%									

All values in USD
Land area– 40,000 sft & built-up space 100,000 sft
Life of the project assumed to be 30 years
Based on secondary research & expert interviews]

Residential building at CFZ, Malaysia

Internal Rate of Return

Year	1	2	3	4	5	6	7	8	9	10
Land Cost	1216216									
Contruction Cost	709459.5	3547297	2837838							
Rentals				1352720	1623265	1917481	2125208	2348915	2466360	2589678
Terminal value										
Cash Flows	-1925676	-3547297	-2837838	1352720	1623265	1917481	2125208	2348915	2466360	2589678

Internal Rate of Return

Year	11	12	13	14	15	16	17	18	19	20
Land Cost										
Contruction Cost										
Rentals	2719162	2855120	2997876	3147770	3305159	3470417	3643937	3826134	4017441	4218313
Terminal value										
Cash Flows	2719162	2855120	2997876	3147770	3305159	3470417	3643937	3826134	4017441	4218313

Internal Rate of Return

Year	21	22	23	24	25	26	27	28	29	30
Land Cost										
Contruction Cost										
Rentals	4429229	4650690	4883225	5127386	5383755	5652943	5935590	6232370	6543988	6871187.5
Terminal value										8310810.8
Cash Flows	4429229	4650690	4883225	5127386	5383755	5652943	5935590	6232370	6543988	15181998
IRR	22%									

All values in USD
Land Area 100,000 sft and built-up area 200,000 sft
Life of the project assumed to be 30 years
(Based on secondary research & expert interviews)

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