

Strategy to Encourage Innovations through the Development of the Information and Technology Industry in Ukraine

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Content

Introduction	Page
	2
Part I. The Experience with Special Economic Zones in Ukraine: Lessons Learned	4
Part II. International Practices with Special Economic Zones and Strategies to Develop a National Information and Communication Technology Industry (ITC)	7
Part III. A Strategy to Develop ITC and High Technology Industry in Ukraine	19

Introduction

Special economic zones (SEZ) have gained popularity in developing countries as mechanisms to promote economic growth and encourage foreign direct investments. A general rationale behind the creation of SEZs is to boost investment activities through the establishment of territories with more developed industrial infrastructure, liberalized business regulations and preferential tax treatment. Typically, SEZ are implemented in countries where the institutional capacity is weak and where the country has limited resources (oil producing countries may represent a rare exception). Because of these limitations, these countries are unable to provide adequate infrastructure and rapidly liberalize the business environment in the entire economy. As a result the potential to capture the country's competitive advantages in the international markets can not be adequately advanced. Under this environment, properly designed SEZs can be successfully used to promote investment activities and to serve as a catalytic for country-wide economic liberalization. SEZs can be effectively used as a pilot that could be replicated in the entire country.

International experience with SEZs reveals the following factors behind the governments' motivation to establish special economic zones:

- **Promote economic growth and regional development through foreign direct investments in a friendly business environment.** Governments of the developing countries frequently treat SEZs as *the engines of economic growth* on the basis of foreign capital. Through SEZs countries can create the environment for investors to establish enterprises primarily financed by the foreign capital. In fact, large-scale economy-wide liberalization and deregulation of business activities is a long-term and frequently controversial policy initiative, especially in the countries with poorly developed and unstable democratic institutions and strong local vested interests. At the same time, liberalization of taxation and business regulations within isolated territories is a less problematic and lengthy process; therefore, it can be an alternative option to attract foreign capital when overall business climate in the country remains rather weak.
- **Encourage the transfer of modern industrial technologies and managerial practices.** Foreign investor oriented SEZs open access to advanced technologies and advanced managerial skills.

- **Restructure domestic industry to meet global competitive pressures.** Due to strict budget constraints of both public and private sectors many developing and transition economies face a serious challenge to restructure and upgrade their outdated industrial profiles. For this reason, SEZs can serve as a mechanism to allocate investments into R&D and high technology sectors which otherwise lack adequate degree of growth and development. SEZs that target high technology sectors can boost total factor productivity and strengthen the long-term sustainability of economic growth.
- **Enhance competitive advantages of the country at the international markets.** Due to unsatisfactory business climate, developing countries often fail to attain the entire potential of country-specific comparative advantages. Low-cost, skilled and disciplined labor force is frequently a key domestic resource that can be of interest to the international business community. SEZs are an efficient instrument to open access to foreign investors to domestic labor resources. Furthermore, growing domestic employment is one of the most important outcomes of the SEZs, as it notably advances the quality of the human capital and improves the social welfare of population.
- **Capture geographical advantages of the country.** SEZs are frequently set up on the territories that host important international and regional transportation hubs and ports or are located within immediate proximity to dense consumer markets of the developed countries. Such geographical placement allows benefiting from lower transportation costs, developed transportation facilities and easy access to international markets.
- **Develop vital industrial infrastructure.** Availability of industrial infrastructure and facilities is of key importance to the successful development of SEZs. Typically such infrastructure projects require large-scale and risky investments. However, clustering of industrial companies in SEZs permit to provide cost-effective infrastructure facilities. The government may facilitate such investments either by providing vital infrastructure components or through public private partnerships, which assume efficient sharing of risks and financing between private and public parties.

Many SEZs established by the governments of developing countries attempted to achieve these developmental objectives. However, not all countries that undertook this policy experiment were successful with their SEZs. In many countries, SEZs have failed to attract sizable foreign investments and trigger fast and sustainable economic growth (Russia, North Korea, Ukraine). These failures illustrate the crucial importance of policy design with respect to SEZs as well as governments' capacity to improve overall business climate.

Tax holidays and concessions are normally provided by governments to enhance the attractiveness of SEZs for foreign investors. Usually the taxation systems in the developing countries are overburdened with excessive and cumbersome regulations and high tax rates. If the government offers various tax privileges, the private returns on equity increases, thereby expanding the number of profitable projects that can be financed by investors. However, if the SEZs are not adequately regulated, which is very likely in an environment of high corruption

and weak institutions, domestic businesses may massively migrate to special economic zones only to benefit from lower taxes. Furthermore, the government may face fiscal budget constraints and run sizable budget deficit due to the subsidies provided. As a result, the introduction of SEZs will not be sustainable in the long-run as it deprives the government from budget revenues and has a minimal impact on economic development. This argument sheds some light on why SEZs have failed in Russia and Ukraine. Both countries offered generous tax breaks and free trade regimes to companies operating in SEZs, yet they lacked the capacity to enforce transparent and consistent regulation of SEZs. SEZs were utilized merely to extract advantages from tax privileges. As a result, SEZs led to huge budget losses and had a limited influence on foreign direct investments.

Although, the contribution of tax holidays could be positive for the development of SEZs, the cost of this policy for the governments in terms of lost budget revenues and administrative expenses tends to outweigh its impact on investments.¹ The consistency of the government in implementing business liberalization, enforcing rule of law and maintaining macroeconomic stability appears to be much more critical. Therefore, efficient governance of SEZs is a key success component. In addition to various tax concessions, the best functioning special economic zones provided quick and convenient registration and licensing of companies, installed autonomous and transparent administration of SEZs, liberalized business regulations and eagerly enforced market competition. The extension of these practices to the entire territory of the country usually requires more active policy efforts, yet the success of isolated SEZs, as in case of China, proved to be a powerful driver to catalyze overall advancement of the country's business climate.

In addition, the availability of key public infrastructure and industrial facilities is a central factor that contributes to the development of SEZs. The governments of developing and transition countries frequently lack the resources to maintain adequate infrastructure that facilitates the implementation of profitable business projects. On the other hand, infrastructure projects that are undertaken in SEZs are less costly and can be co-financed and managed by private parties through public-private partnerships and contracts.

Part I. The Experience with Special Economic Zones in Ukraine: Lessons Learned

1. Special Economic Zones in Ukraine

Ukraine passed the Law on special economic zones in 1992 which established two types of special economic zones Ukraine: free economic zones (FEZ) and priority development territories (PDT). However, the actual creation of these SEZs was postponed till 1999-2000.

¹ McKenzie Global Institute (2003), "New Horizons: Multinational Company Investment in Developing Countries." According to the survey of 30 executives of companies using outsourced labor in India, various financial incentives (in terms of tax concessions and other privileges) ranked as the least important factor. Availability of infrastructure, skilled labor and the quality of regulatory environment are the most significant determinants of the decision to invest into the country.

Free Economic Zones. According the Law, a free economic zone is a part of the Ukrainian territory (marked in accordance with the rules) with a special economic regime. If companies, established in FEZs, complied with a predetermined set of investment obligations they were entitled to several regulatory, financial, customs, and tax preferences.

In 1996, the first experimental free economic zone, *Sivash*, was established in Northern Crimea. Although this zone has registered some success in terms of jobs created and the completion of several investment projects, its overall performance was rather weak. Infrastructure was not notably upgraded while the widespread use of barter transactions did not improve the profitability of the participating companies. The real boom of FEZs came in 1998 after the adoption of the Law “On Special Economic Zones and the Special Investment Activity Regime in Donetsk Oblast”. This led to the creation of the *Donetsk* and *Azov* free economic zones. In 1998-2000 eleven FEZs were established in Ukraine. The creation and operation of each zone was regulated by the separate law. As a result, the set of tax benefits and other preferences was not uniform and was approved individually for every zone. Such procedures led to the significant distortions within the regulatory incentives between various zones as well as endowed local authorities with a possibility to exercise their vested interests. As a result, many FEZs in Ukraine were frequently referred to in connection with the massive abuses of zones’ privileges and tax holidays.

Table 1: Free Economic Zones in Ukraine

Free Economic Zone	Year of Creation	Region	Granted Preferences					
			Special customs regime	Income tax	Freedom to retain foreign exchange earnings	No payments to some budget funds	No rental payments for land	No tax on investments
<i>Zakarpattya</i>	1998	Zakarpattya oblast	X	20%	X	X		
<i>Donetsk</i>	1998	Donetsk oblast	X	20%	X	X	X ⁽¹⁾	X
<i>Azov</i>	1998	Donetsk oblast	X	20%	X	X	X ⁽¹⁾	X
<i>Kovel Interport</i>	1999	Volyn oblast	X	20%	X	X	X ⁽²⁾	
<i>Truskavets Resort Area</i>	1999	Lviv oblast	X ⁽⁴⁾	X ⁽⁵⁾	X		X ⁽³⁾	X
<i>Yavoriv</i>	1999	Lviv oblast	X ⁽⁶⁾	X ⁽⁷⁾	X	X	X ⁽⁸⁾	
<i>Slavutych</i>	1999	Chernihiv oblast	X ⁽⁶⁾	X ⁽⁵⁾	X	X	X ⁽⁹⁾	X
<i>Reni</i>	2000	Odessa oblast	X	20%	X	X		X
<i>Mykolayiv</i>	2000	Mykolayiv oblast	X ⁽⁶⁾	X ⁽⁵⁾	X		X ⁽²⁾	X
<i>Porto Franko</i>	2000	Odessa oblast	X	X ⁽⁵⁾	X			X
<i>Port Krym</i>	2000	Crimea	X	20%	X	X	X ⁽²⁾	X

⁽¹⁾ during the period of project development

⁽²⁾ during 5 years

⁽³⁾ during the period of development and half of the existing rate for the following 10 years

⁽⁴⁾ no customs payments or VAT

⁽⁵⁾ no income tax for 3 years and half of the official rate for the following 3 years,

⁽⁶⁾ no customs payments and VAT for 5 years

⁽⁷⁾ no income tax for 5 years and half of the official rate after than

⁽⁸⁾ for 5 years and half of the existing rate after than

⁽⁹⁾ for 3 years and half of the existing rate for the following 3 years

Source: *SigmaBleyzer*

The operations of free economic zones raised many questions. The discussions about their effectiveness and transparency even led to a six-month moratorium on the registration of new investment projects in FEZs in 2004. Finally, the government carried out a comprehensive review of the FEZs and abolished them in 2005. Weak compliance with investment obligations and limited impact on the country’s economic performance were the

principle arguments for the elimination of the FEZs. None of FEZs had managed to meet their investment targets in terms of the investment volumes and the number of new jobs created. In fact, 11 FEZ and 9 PDT together attracted a modest 12.2% of the projected investments and created only 35.5% of the targeted jobs. The total volume of investments in Ukrainian SEZs was rather small and approached \$2.1 billion, while the amount of granted tax preferences surged to \$1.6 billion. By comparison, 14 special economic zones in Poland raised \$4.8 billion with only \$480 million in tax preferences.

Priority Development Territories. In Ukraine, a priority development territory (PDT) is an area within the specific administrative unit (city or region). PDTs were designed to identify priority industrial sectors located on these territories and endow them with certain fiscal and regulatory privileges. As a result, all enterprises belonging to the selected industry or sector were entitled to these privileges. PDTs were established on the same legal basis as free economic zones. Originally, the concept of PDTs was designed to develop the regions lagging economic development and experiencing high unemployment rates. Contrarily to this intention, the PDT status was not assigned exclusively to undeveloped regions. Furthermore, the set of industries entitled to privileges was rather extensive due to the aggressive lobbying by various industrial and regional groups.

Finally, PDTs were frequently blamed for the deterioration of competition in the Ukrainian industry. Despite the government’s initial target on depressed sectors and regions, large and profitable industrial companies gained substantial financial benefits from the PDTs’ privileges as well. Companies, located outside of PDTs, did not obtain competitive advantages and additional profits generated by more liberal taxation. Moreover, by inefficient management of PDTs the government has undermined the revenue basis of the state budget as many profitable companies were effectively using PDTs as tax shelters. As in the case of FEZs, the implementation of PDTs concept in Ukraine was characterized by the rather weak design and a failure to take into consideration the sustainability of this developmental policy in the long-run, which, eventually, led to the liquidation of PDTs.

Table 2: Priority Development Territories in Ukraine

Priority Development Territory	Year of Creation	Granted Privileges					
		Income Tax	No tax on investments	Special customs regime	Freedom to retain foreign exchange earnings	No payments to some budget funds	No rental payments for land
Luhansk oblast	1999	X ⁽¹⁾	X	X ⁽²⁾		X	X ⁽³⁾
Donetsk oblast	1998	X ⁽¹⁾	X	X ⁽⁴⁾		X	
Crimea	2000	X ⁽¹⁾	X	X ⁽²⁾	X	X	X ⁽³⁾
Kharkiv	2000	X ⁽¹⁾	X	X ⁽²⁾			X ⁽³⁾
Chernihiv oblast	1999	X ⁽¹⁾	X	X ⁽²⁾			X ⁽³⁾
Shostka	1999	X ⁽¹⁾	X	X ⁽²⁾			X ⁽³⁾
Zhitomyr oblast	1999	X ⁽¹⁾	X	X ⁽²⁾			X ⁽³⁾
Volyn oblast	2001	X ⁽¹⁾	X	X ⁽²⁾		X	
Zakarpatya oblast	1998	X ⁽¹⁾	X	X ⁽²⁾		X	

(1) no income tax for 3 years and half of the official rate for the following 3 years

(2) no customs payments or VAT for 5 years

(3) no rental payments for land for 5 years

(4) no customs payments or VAT

Source: SigmaBleyzer

2. Causes of SEZs' Failure in Ukraine and Ongoing Policy Initiatives

Improper establishment and regulation of free economic zones have nurtured institutional environment prone to corruption and poisoned by serious administrative flaws. The fundamental origins of SEZs failures are rooted in:

- **Poor legal framework and a lack of strategic vision.** Despite numerous regulations on free economic zones, the framework Laws were excessively unclear, ambiguous and contradictory. Supplementary government regulations merely inflated this confusion and created corruption-enabling environment. The government failed to form and implement a consistent vision of country's development through SEZs.
- **Weak institutional environment.** Overall business climate and state institutions in Ukraine were not particularly strong. The government did not manage to (i) maintain the appropriate level of the rule of law and competition enforcement, (ii) reduce red tape, (iii) protect property rights and (iv) fight corruption.
- **Ineffective SEZs management.** In many cases, various state agencies both drafted the legal framework for the zones and directly participated in internal management and administration. In addition, separate committees were frequently established to select and approve investment projects designated for SEZs. However, these committees were consistently accused of corruptions and abuses of power.
- **Lack of transparency.** During the entire period of SEZs operation, information about their activities and performance was not publicly available.
- **Poor infrastructure.** The government believed that preferences granted to the SEZs would attract investors and encourage them to develop the infrastructure. However, SEZs proved to be very ineffective in attracting large foreign investors. As a result, the quality of infrastructure remained inferior.

In 2006, the government indicated its intention to restore privileges for the previously established free economic zones. Currently, the parliament is working on the new Law on special economic zones, which is supposed to eliminate priority development territories, leaving Ukraine with free economic zones only. The issues of regulation, transparency and institutional environment, however, remain open.

Part II. International Practices with Special Economic Zones and Strategies to Develop A National Information and Communication Technology Industry (ITC)

1. Pure export-oriented industrial platforms

Traditional SEZs were mostly designed as pure export-oriented platforms hosting foreign companies that used duty-free imported inputs and low-cost domestic labor to manufacture labor-intensive consumer goods and then export these products abroad. The design of such SEZs allowed for a mix of various *regulatory* and *fiscal* incentives to foreign companies. Typical examples of good regulatory incentives are:

- 100% foreign ownership is permitted while various sector restrictions are considerably eased or eliminated;
- All activities performed in SEZs are licensed through either self-certification procedures or one-stop registration office;
- Quick processing of applications to invest in SEZs;
- An autonomous zone regulatory body is established and administers the relationships between SEZs' residents and the government;
- Significantly reduced red-tape, clear and transparent regulations of business activities and promotion of competition;
- On-site customs offices;
- FDIs into the real estate are permitted;
- Liberalized regulation of labor markets.
- Freedom to retain foreign exchange earnings;
- Freedom to transfer profits and dividends abroad.

Fiscal incentives, in turn, represent various tax concessions to companies investing in SEZs and are more controversial as their influence on investments is still under debate:

- Income tax exemption and tax holidays on export profits;
- Duty free regimes for imports of inputs and equipment;
- Land tax exemptions and subsidized lease and rental rates;

The best example of such SEZs is the installment of *maquiladoras* in **Mexico** starting 1965 as clusters of mostly foreign-owned export-oriented manufacturing plants constructed along the US-Mexico border. Companies operating in these SEZs were granted duty-free and tariff-free regimes for materials and equipment imported to assembly final products and then re-export them, usually to the US. Furthermore, even before the NAFTA agreement came into force the US government exempted from import duties the value added of inputs of US origin used to manufacture products shipped from maquiladoras to US. Although these customs privileges strengthened competitive advantages of Mexico's SEZs, foreign companies actively invested in Mexico due to the very liberal regulations, close proximity to the United States and low costs of labor. Despite the fact that maquiladoras have recently experienced a slowdown as a response to the aggressive competition from the Chinese SEZs (which offered cheaper labor), they continue to be an important source of economic growth in Mexico. Currently, there are over 2,817 companies operating in these Mexican SEZs, employing about 1.2 million workers and generating about 10% of GDP and over a half of country's export revenues.² In addition, about 45% of all FDI received by the manufacturing sector of Mexico are absorbed by maquiladoras.

Chinese special economic zones are an excellent example of the efficient implementation of SEZs that are evolving from export-oriented industrial platform into the areas that are most conducive for the growth and development of the high technology industry. Shenzhen SEZ is a remarkable success story. Since the time when it was established in 1980 its economy has been growing by 28% a year. In 2005 the value of exports from

² Source: Maquila Portal. www.maquilaportal.com

Shenzhen amounted to \$101.5 billion or about 13% of total exports from China. Despite the fact that wages have increased dramatically in Shenzhen, which reduced the incentives to set up labor intensive plants in this area, the high quality of market infrastructure, availability of skilled labor and various government's R&D grants have facilitated the start ups of high technology venture companies in this area. The success of SEZs in China is largely explained by the willingness of the government to liberalize business environment for foreign investors. Although, duty free regimes, liberal taxation as well as the proximity to regional and international transportation hubs were key design features of Chinese SEZs, the readiness of the government to adhere to market-oriented regulations of SEZs and provide crucial infrastructure components, for example transportation and telecommunication networks, (that were poorly developed in the mainland China) were important drivers of the SEZs' expansion and growth.

Duty-free and tariff-free regimes are one of the key features of export-oriented industrial platforms. Since material and equipment are imported on different terms to country's SEZs and regular custom territory, it is necessary to establish an effective and transparent custom regulation within the zone to avoid smuggling of goods and abuses of zone's customs preferences. Aqaba Special Economic Zone (ASEZA) in **Jordan** is an example when improperly enforced customs regulations may create a serious weakness to SEZs' performance. This zone was created in the port city area of Aqaba as a duty and tax free zone to encourage economic development and attract FDI. The Aqaba Special Economic Zone Authority made a decision to establish a separate and autonomous customs office to operate inside ASEZA in an attempt to provide a focused and specialized level of service to the residents of the zone. Although ASEZA was successful in attracting large FDI, insufficient trust and cooperation between the zone's and national customs administrations generated various administrative bottlenecks, lack of coordination, and poor control over the smuggling of goods from the zone. The experience of Jordan provides a very instructive lesson for policy makers in other developing and transition countries. In order to manage duty and tariff free regimes, these countries need to improve the overall administration of national customs offices. If corruption and weak governance of country's customs administration continue to flourish, customs preferences to SEZs may have a rather negative impact on economic performance and budget revenues. At the same time, successful implementation of free trade regimes inside SEZs may catalyze the upgrades and modernization of the entire customs system in the country.

The success of China and Mexico in building export-oriented manufacturing sector is impressive; however the concept of pure export-oriented industrial platforms has several potential limitations. By design these SEZs are established to open access to foreign investors to inexpensive national labor resources. Although the short-term gains (in terms of higher employment and export revenues) are obvious, in the long-run the country's reliance on labor-intensive manufacturing sector poses serious threats to the productivity growth and sustainable economic developments. As in the case of maquiladoras, the establishment and liberalization of Chinese SEZs have put a strong pressure on the Mexico's manufacturing sector to compete with less expensive Chinese labor. This challenge has to be met by improving the quality of human capital and repositioning the industry toward high technology

sectors. At the same time, the long history of successful industrial SEZs has huge benefits as well. Developed market and industrial infrastructure, liberal institutional and regulatory frameworks, a good knowledge of western business culture and strong linkages with international business community considerably facilitate the restructuring of traditional industrial SEZs.

Many developing and transition countries lack such experience. Fortunately, there are numerous international examples that allow reflecting on the best strategy to develop domestic ITC and high technology industry. Before reviewing this experience it is necessary to distinguish between the key drivers of the growth and expansion of the ITC industry. In the developed market economies the clustering of high technology companies in technology parks and districts was engineered by the private sector and shaped by the intense collaboration between the private companies, universities and venture investment funds.³ At the same time, many successful domestic ITC industries, both in the developing and developed countries, were established with a strong support of the governments. One of the reasons for such government involvement was the insufficient size of the domestic software and high technology markets to trigger fast, private sector-led growth of these sectors. In addition, the liberalization of domestic telecommunications and FDI regulations was often inadequate to develop software and high technology industry without the active role of the state. Therefore, it is fundamental to understand what government policy actions can be applied to develop national ITC sectors and what country-specific factors facilitate this development.

2. Building Domestic ITC and High Technology Industry: International Experience

Countries, that were able to build a strong economic capacity to export ITC and high technology products can be classified into several groups.⁴ The most successful group of countries consists of economies that export billions of dollars worth of information technology (IT) products and services. Ireland, Israel and India are icon examples. The second group includes countries like China and Russia. Both countries have good technological infrastructure, relatively high clustering of software developers located in technology and science parks and rapidly rising volumes of software exports. The third group represents emerging exporters of IT products and services and comprises of countries like Ukraine, Philippines, Korea, Brazil, Bulgaria and Poland. Export revenues from software products are rather low in these countries while exported products and services usually represent projects of relatively modest scale and scope. The rest of the countries either do not compete at the international market for software and high technology products or have such industry in its infant stage of development.

There are several widely recognized factors that define county's ability to promote its software and high technology industry and exports capacity. While the principal focus of this paper is on the government's polices its instructive to briefly review all of them to get an

³ Silicon Valley in the United States is the best example.

⁴ Carmel, Erren (2003). Taxonomy of New Software Exporting Nations. The Electronic Journal on Information Systems in Developing Countries, No. 2, Vol. 13.

insight on the way government's policies may enhance country specific competitive advantages in ITC industry:

- **Global demand for IT products and services.** Countries, exporting IT products and services have considerably benefited from the rapidly rising IT global demand. Although, domestic demand usually expands slower than the global demand for IT products and services, China is a good and, probably, unique example where strong local software industry was able to grow on expanding domestic demand. For this reason, policy makers in the developing countries should prioritize the development of software and high technology industry with a strong focus on international markets. This, in turn, requires these countries to be more market-oriented in their treatment of multinational companies and foreign investors as well as more open and liberal in the regulations of domestic IT and telecommunication markets.
- **Government's vision of the high technology industry and the strategy of its development.** Successful countries have designed and promoted a clear and consistent strategy of software and high technology industry development. Tight cooperation with private sector was always a key component both at the stage of design and implementation of this strategy. The important element of this strategy is the identification and strengthening of factors that enable the country to preserve its market share in the long-run. Since various state actions have a different impact on ITC industry the government should be wise in choosing its policy instruments. For example, if the government places the highest priority on venture capital financing, innovations and R&D the industry may be adequately shaped to develop new products, while if the government eagerly provides attractive incentives to multinational companies, the industry might quickly evolve to offer product customization and localization as well as IT enabled services outsourcing (for example call centers).
- **International linkage and trust.** The development of close client-developer relationships is of principal importance to reduce the risks that are endemic to the outsourcing of IT services to remote locations. The principle risk is the inferior quality of exported products and services. Although, developing countries are chosen by multinational companies and foreign investors because of the lower costs of labor, quality considerations are frequently the first priority. Fortunately, there are plenty of trust-building measures that can facilitate effective cooperation between the domestic software industry and international business community. The government should actively address such issues as software piracy and copyright protection, promote domestic software developers and invest into the image building of the national high technology sectors. In Ireland, for example, the government allocated special funds to support overseas expansion of local software developers and to assist them in opening subsidiaries in US. In addition, many governments willingly support the international certification of domestic ITC companies.
- **The structure of the software and high technology industry.** Competition, clustering and collaboration are key features of national software industry that support its expansion and growth. Government has a direct impact on all three dimensions. In all successful countries, the state was able to support clustering of software developers

in technology and science parks which allowed providing modern infrastructure at lower costs, improving competition and advancing cooperation between software developers (many of the OECD member states have developed clusters in ITC industry⁵). In addition, the governments assisted in the creation of various software industry associations to promote knowledge and technology diffusion within the sector.

- **Domestic factor inputs and infrastructure.** *Human capital* is one of the fundamental success factors. Availability of high skilled personnel and educational systems that place an emphasis on the cultivation of modern IT and software related skills proved to be of critical importance. In addition, *business and cultural norms* play a vital role in promoting domestic software industry. The success of Ireland, India and Israel can be largely attributed to the widespread usage of English as well as excellent familiarity with western business practices. Correspondence of domestic *technological infrastructure* to international standards is probably as important as the availability of skilled workers. Successful countries were able to ensure the quality infrastructure at the same level as in the countries to which software products were exported. Government policies with respect to infrastructure development included: (i) the liberalization of telecommunication industry and the permission of foreign investors to participate in infrastructure development (ii) duty-free regimes for imports of technological equipment, (iii) the promotion of industry clustering to capitalize on the economies of scale in infrastructure provision and (iv) active development of infrastructure components financed either by the government or through public-private partnerships. *Financing* of the start up companies is one of the key drivers of innovations in the economy. The governments were actively involved in the promotion and support of new software and IT businesses by (i) offering various tax holidays, (ii) encouraging private sector and foreign companies to invest into the domestic industry by improving business climate, liberalizing regulations and reducing red tape and (iii) creating state-sponsored venture capital funds to provide seed capital for entrepreneurs. In addition, high technology business incubators were massively cultivated to provide advisory and infrastructure support for new entrants. Finally, in all successful cases the governments offered a wide range of R&D grants and assistance, improved incentives for local companies to finance R&D activities and provided high quality public infrastructure and utilities.

Ireland. The initial intention of the Irish government was to develop domestic software and high technology industry by creating incentives to foreign investors, and, in particular, large high technology multinational corporations (MNC). The motivation behind this initiative was a necessity to reverse the trend of rapid immigration of high skilled workers abroad. A solid and consistent national strategy on the development of high technology industry and stimulation of innovations was a major achievement. The key component of the fiscal incentives within this strategy was a reduced corporate tax rate, while the list of country-specific advantages included highly educated English speaking labor force, low telecommunication rates, modern technological infrastructure and the proximity to Europe.

⁵ Emilia Romagna in Italy, Baden-Württemberg in Germany, Cambridge in the United Kingdom and Sophia Antipolis in France are some of the examples.

Government's policies were extremely successful in attracting large foreign companies and triggering the clustering of software and high technology companies in technology parks⁶. At the same time, the initial strategy was less effective in promoting the expansion of the national software developers. Most of the activities of the Irish MNC subsidiaries were centered on the package localization and customization as well as the provision of IT services like call centers and software testing. To trigger the growth of the domestic high technology businesses, Enterprise Ireland was created in 1993 as a *state developmental agency*. The key programs, introduced by this agency, included a venture capital program to support software entrepreneurship and a broad R&D program to encourage technology innovations. As a result, the domestic software industry grew very rapidly as Irish-owned companies accounted for more than EURO 1.6 billion of exports in 2005 or about 11% of total software exports from Ireland.⁷ The experience of Ireland sheds some light on the potential limitations of the excessive focus on the export-oriented high technology industry. It appeared that policies exclusively promoting exports of software products by MNC were relatively slow to boost spin-offs of ITC companies, technological innovation, adoption and knowledge diffusion within the country.

Israel. Israel is one of the leading exporters of software and high technology products and services.⁸ One of the initial key advantages of Israel was the availability of state-of-the-art technological infrastructure and knowledge as well as close cooperation between the military, private sector and research centers in the creation of new products. For this reason, the principal market niche of Israel is the development of new software products which allowed the country to climb to the top level of value chain in software development. In addition, the government was very successful to initiate commercialization of the military and scientific research projects as well as to encourage the involvement of the military scientific and research personnel in the private sector. Furthermore, the country has greatly benefited by the massive inflow of highly educated immigrants from the former Soviet Union and other countries. An emphasis on the technology infrastructure, business incubators and clusters is central to government's policies. In addition, one of the principal success factors is the availability of developed investment banking facilities. Israel has an extensive network of venture capital investments funds and an open access to US public offerings. There are strong fiscal incentives as well, including (i) up to ten years of tax free status for approved companies, (ii) venture capital investment incentives and (iii) risk-free government loans. The ITC industry is clustered in the three major Israeli cities: Haifa, Tel Aviv and Jerusalem. These areas have the advantage of a large pool of operating technology companies, including large MNC; plentiful supply of highly educated labor, excellent telecommunications infrastructure as well as the immediate proximity to major educational and research centers.

India. India is the world's largest exporter of IT products and services.⁹ Although, the initial expansion of IT industry in India was driven by *body shopping* – the allocation of

⁶ Dublin is now recognized as the "Silicon Valley of the Europe."

⁷ Source: Thomas Crosbie Media (2006). Irish Examiner, 19 May 2006.

⁸ According to the government of Israel, the value of software exports amounted to USD 3 billion in 2004.

⁹ In 2005, software exports account for about 20% of the country's total exports, and the industry accounts for 4% of India's GDP.

relatively inexpensive Indian IT professionals to temporary consultancy projects (mostly in the US), the recent trends in the Indian software industry reveal higher significance of IT services outsourcing as well as faster advancement along the value chain of software development. In 2005 the value of exports approached \$23.7 billion including over \$6.7 billion in exports of information technology enabled services and business process outsourcing (ITES/BPO).¹⁰ The key advantages of India are (i) inexpensive labor force, (ii) highly educated English speaking workers (iii) especially strong educational tradition and (iv) active government's policies to encourage IT industry clustering and growth. About 88% of all exports of software are generated in the software technology parks (STPs). STPs are managed by the *autonomous government agency* and offer foreign investors high quality infrastructure and regulatory and fiscal incentives to set up export-oriented production units. Principle incentives consist of:

- Single window clearance, licensing and certification support;
- A separate agency managing relationships between the parks' residents and the government;
- Provision of high quality telecommunications infrastructure;
- Corporate income tax and custom duties exemptions;
- Start up assistance through business incubators and financial support;
- Various state programs to encourage collaboration with educational institutions.

Poor public infrastructure is one of the key obstacles to business development in India. Yet, STPs managed to provide high quality public utilities infrastructure, ensure stable power supply and telecommunication networks and maintain good incubation facilities for new business that include complete physical infrastructure as well as a wide range of business advisory services. Furthermore, the government designed and implemented strict anti-piracy and copyright protection legislation and assisted private sector in obtaining international licenses and certificates. These measures were very effective to raise the level of trust into the domestic software industry. Finally, the government has been heavily investing into education and research facilities to boost human capital and built modern telecommunication networks.

Ireland, Israel and India are the best examples of the governments' efforts to encourage technological innovations and industrial restructuring. Although these countries have largely benefited from favorable initial conditions and financial assistance from either US or European Union, their governments should be given a credit for the ability to consolidate efforts on the adoption and implementation of the national strategies of ITC industry development. Through various regulatory and fiscal incentives, these countries managed to catalyze the clustering of IT companies in science and technology districts to gain from synergies generated by close cooperation between the private companies, universities, research facilities and financial institutions. Furthermore, these countries initiated broad policy measures to improve the quality of human capital and spur innovations and R&D activities.

¹⁰ Source: Indian Electronics and Computer Software Export Promotion Council.

China. China is an example of the developing country where software industry grew on the back of expanding domestic market.¹¹ Starting 1990 the Chinese government established science technology industrial parks (STIPs) in 53 major Chinese metropolitan areas as a part of its policy initiative (Torch Program) to promote technology innovations, knowledge transfers and diffusion. The objective was to trigger a concentration of high-technology companies through various policy incentives such as tax concessions and R&D grants and financing. The government offered various incentives to companies investing into the technology parks, including (i) an exemption from corporate income tax for ten years, (ii) license-free imports of materials and equipment and (iii) a permission to add the value of intangible assets, such as intellectual property rights, into the company's registered capital. The geographical choice of parks' location favored large and densely populated cities with developed educational and research facilities as well as strong industrial and infrastructure capacities. The program generated impressive results. In 2003 STIPs produced about 18% of country's GDP and employed 3.5 million workers.

Russia. Russia has a strong potential to expand its high technology industry on the basis of highly skilled workers and developed educational and research facilities.¹² Although, the performance of technology parks is rather modest as compared against the country's potential, the government has recently adopted an ambitious strategy to develop national ITC industry by the creation of large science and technology parks (with an active involvement of foreign technology parks developers) on the sites of major universities and the introduction of government sponsored venture capital investments funds. However, excessive red tape, cumbersome regulations, corruption and weak protection of intellectual property rights are the principle bottlenecks of Russia that considerably constrain rapid growth of ITC industry.

Malaysia. The Multimedia Super Corridor (MSC) is the Malaysia's policy initiative to develop the national ICT industry. The MSC is a 50 square kilometers zone, stretching from the center of Kuala Lumpur to the newly built Kuala Lumpur International Airport. It consists of several administrative, industrial and technological and research clusters including (i) the newly built facilities of the federal government, (ii) an intelligent city which hosts multimedia industries and various research centers and the Multimedia University, (iii) technology park Malaysia, located in the center of the MSC, providing engineering and IT infrastructure to entrepreneurs, investors and industries. Previously launched industrial development projects such as SEZs, manufacturing hubs in Kuala Lumpur and the city's financial centers were also integrated into the MSC. The MSC project envisioned three phases, namely:

- 1) attraction of the multinational corporations to set up their subsidiaries in the MSC, the launching of several key IT applications including electronic government and telemedicine, as well as the establishment of the two intelligent cities, Putrajaya and Cyberjaya;
- 2) creation of the networks between the MSC and other clusters in the country, attraction of more foreign companies and implementation of other key operations;

¹¹ In 2005 the value of software exports from China amounted to USD 3.69 billion or about 8% of total software industry revenues in the country.

¹² In 2006, Russian software exports are estimated to exceed USD 1 billion.

- 3) establishment of Malaysia as a knowledge-based society linked to the global information super highway.

In 1996 the government created the Multimedia Development Corporation (MDC) to oversee the implementation and development of the MSC. The MDC serves as a one-stop center for companies applying for MSC status, supplies MSC residents with advisory services in areas such as training and development of the personnel, legal assistance, grants and other funds as well as issues relating to licenses and certifications. It also facilitates the cooperation between the local and international companies, establishes business incubators and maintains infrastructure that provides venture capital and public listings for smaller companies. Various government incentives include:

- a five year exemption from the income tax renewable to 10 years or a 100% Investment Tax Allowance;
- duty-free import of equipment;
- the eligibility for R&D grants and support for the majority of Malaysian owned MSC companies;
- freedom to source capital globally for MSC infrastructure development
- an unrestricted employment of skilled foreign workers;
- 100% foreign ownership is allowed;
- a strong intellectual property protection and a comprehensive framework of effective cyber laws;
- the provision of world-class physical, IT, and telecommunications infrastructure;
- complete and free of censorship Internet access;
- high quality urban infrastructure developments;
- R&D facilities.

United Arab Emirates. Jebel Ali Free Zone (JAFZA) in Dubai is one the most successful economic zone in the world. JAFZA was created in 1985 as an area with virtually no taxation, minimal regulatory restrictions, and permission for 100% foreign ownership. The zone is located within immediate proximity to the 10th busiest port in the world and provides excellent public and industrial infrastructures. JAFZA is a home to more than 6,000 companies and handles the majority of non-oil foreign trade.¹³ In 2006 it accounted for about USD 15.7 billion in exports. The government of UAE has been actively investing into the innovation and technology parks as well. For example, Dubai Silicon Oasis (DSO) is a 100% state-owned free economic zone located at the 7.2 square kilometers area and offering the world class telecommunication networks, office facilities, R&D and industrial zones, educational institutions, residential apartments and a full range of social infrastructure and public utilities. Since its launch in 2002, DSO as well as other SEZs in Dubai have been very popular with international investors due to the generous fiscal and regulatory incentives granted by the Dubai's government:

- no personal income taxation and corporate profit taxation;
- duty-free and tariff-free regimes;

¹³ In 2005, JAFZA generated 70% of all exports from the eight Dubai's free economic zones.

- 100% foreign ownership is allowed;
- business friendly government;
- rigorous IP laws and support;
- large pool of skilled, low cost IT personnel;
- high quality IT infrastructure and cheap telecommunication tariffs;
- developed transportation infrastructure and reliable public utilities;
- single window procedures for business registration and licensing;
- on-site visa processing and immigration offices.

It is necessary to acknowledge that the location of the Dubai's SEZs is particularly favorable for the raising of funds to finance zones' infrastructure and development. High liquidity in the region and ample government's funds of the oils producing countries facilitate the allocation of investments into the zones' facilities as well as allow the government to provide large tax concessions on a sustainable basis. According to the Dubai Silicon Oasis Authority the zone has already attracted \$3.81 billion since its first phase was launched in 2002.

3. Science and Technology Parks (STPs) in Ukraine

STPs in Ukraine are regulated by the Laws of Ukraine on (1) "Special regime for innovation activities of technology parks", (2) "Priorities for the development of science and technology" and (3) "Priorities of innovation activities in Ukraine". Supplementary regulations include the Laws of Ukraine on various technology parks, which define the key regulations of STPs financed by private investments. The law establishes fifteen technology parks in Ukraine¹⁴ and envisions the following privileges¹⁵:

- A Special SIT regime will be in effect for 15 years under which the state provides support through R&D grants and financial assistance to encourage technological innovations;
- Each eligible investment project undertaken in the STPs is granted special regime for five years;
- The state budget allocates funds to the program that supports innovations in STPs through (i) complete or partial (50%) financing of investment projects with interest-free government loans, (ii) complete or partial coverage of interest payments for private loans used to finance investment projects in STPs;
- Special subsidies to STPs residents, including (i) duty-free imports of equipment and materials, (ii) VAT promissory notes for qualified imported equipment (to be met within 720 days) and materials (to be met within 180 days) (iii) corporate income tax payments by STPs' residents are accumulated at the special accounts of the STPs' administration and are used to finance innovation activities
- Accelerated schemes of amortization deductions;

¹⁴ The parliament of Ukrainian, Law No. 3333-IV. Most of the parks are locate on-site of major educational and research institutions. Seven of the STPs are in Kyiv, three in Donetsk, and one in Odessa, Sumy, Dnepropetrovsk, Herson, and Yavoriv.

¹⁵ At the same time, the law eliminates VAT exemptions on the products of STPs.

- Freedom to retain foreign exchange earnings.

Despite these benefits, there are several weaknesses of Ukrainian STPs that seriously restricts their growth potential. The *clustering* of innovation and high technology companies is still weak which does not generate synergies and the environment enabling fast and efficient transfers and exchange of knowledge and technology. The industrial and IT *infrastructure* of STPs is rather obsolete while little investment is allocated to modernize existing and build new facilities. The capacity of the national research industry to *commercialize* its inventions is not properly developed as many STPs lack necessary skills to manage investment projects effectively. *Seed capital financing* for start up companies remain a major bottleneck. Domestic private sector still faces strict liquidity constraints while state financial assistance is inefficient in terms of allocation procedures and magnitude. *Fiscal incentives* granted by the government are modest in comparison with rival developed and developing economies, while the lack of regulatory transparency and corruption frequently lead to the abuses of these privileges and tax evasion. Protection of *property rights* and intellectual property rights lack strong institutional foundations. Furthermore, the government is notably slow to enhance the rule of law and achieve consistent enforcement of legislation and regulations.

Table 3: Selected IT Environment Rankings of Ukraine

Index	Value/Rank	Source
Technology and Innovations		
Global Innovation Index 2007 (rank)	75 out of 106	INSEAD
Overall Score on Technology Index 2004 (rank)	85 out of 104	World Economic Forum
Innovation Sub Index (rank)	39 out of 104	
Information and Communication Technology Sub Index (rank)	76 out of 104	
Networked Readiness Index 2007 (rank)	75 out of 122	
ICT Diffusion Index 2005 (rank)	81 out of 180	United Nations Conference on Trade and Development
access sub index (value/percentile rank*)	0.543 / 57.5	
connectivity sub index (value/percentile rank)	0.141 / 55.3	
Human development Index 2004 (rank)	77 out of 177	United Nations
Education Sub Index (value)	0.94 (max 0.99)	
Estimated trade losses due to copyright piracy 2006		Intellectual Property Alliance
USD million	320	
Rank	10 out of 61	

*percentage of surveyed countries performing worse than Ukraine

Although Ukraine has several weaknesses that impede the growth of ITC industry, it nevertheless possesses key resources that, under adequate management, can trigger successful development of innovation activities. These success factors include:

- Highly educated and low cost labor force;
- High enrollment rates in universities and exceptionally strong educational and research potential in engineering, cybernetics, programming and mathematics;
- Growing global demand for IT products and services;
- Close proximity to the European Union and Russia which can facilitate IT services outsourcing from these regions;
- Mostly foreign-owned and liberally regulated telecommunication industry;
- The wiliness of the government to implement the strategy of county’s economic development through public investments into innovation activities. In 2007, the

state budget has a heavy bias toward investment projects and programs that support technology innovation and adaptation;

- Government's eagerness to accelerate WTO accession and enter into the Free Trade Agreement with the European Union;
- Accelerated public investments into the transportation infrastructure that complies with international standards.

Part III. A Strategy to Develop IT and High Technology Industry in Ukraine

The government of Ukraine should place the highest priority on the development of national ITC and high technology industry since in the contemporarily global environment the sustainable growth of productivity and social welfare can be successfully ensured through *innovations backed by foreign investments*. Such strategy must rely on the broad and comprehensive vision of country's development both in the short- and long-term.

Although, the global demand for IT outsourcing is on the upward trend, the global competition for foreign investors and multinational companies is growing as well. Many developing and developed countries are offering generous fiscal privileges and modern infrastructure and are financially viable to sustain such preferences in the long-run. Ukraine, however, lacks budget funds to come up with equivalent policy incentives. Furthermore, established leaders of IT outsourcing have a strong first-mover advantage. Ukraine, in turn, has a huge potential to match these advantages by developing its indigenous competitiveness powers. However, establishment of SEZs and technology parks is not sufficient by itself. Such process requires strategic policy measures to improve the quality of education, encourage infrastructure investments, enhance the quality of business environment and public institutions, and trigger the growth and clustering of high technology enterprises.

In particular, policies that target growth and development of high technology clusters should be designed based on the following crucial considerations:

- **A comprehensive national vision on science and technology parks (STPs).** The government should actively cooperate with the private sector, potential foreign investors, domestic and international education and research institutions to shape a feasible strategy of STPs creation and operation. Such strategy should be designed to derive the maximum benefits from country-specific advantages, including (i) the choice of location, (ii) adequate assessment of infrastructure availability, needs, and requirements, (iii) projections for the product specialization and diversification that correspond to country's profile of skills and expertise, (iv) flexibility to expand and adjust to future dynamics at the global markets and ensure proper regional diversifications of exports.
- **STPs management.** The management of each STP should be entrusted to an autonomous government-private partnership. This STPs' administrative authority will offer qualifying STPs' applicants single window services for hassle-free business registration and licensing and will oversee all relationships between the parks'

residents and the national government. This agency should manage public infrastructure of STPs and actively promote parks' residents interests at the local and international levels.

- **STPs tax concessions.** Although, tax holidays are widely used to expand the pool of potential investors, the magnitude of the impact (unless tax concessions are extremely generous) is rather modest. Investors prefer to have stable regulatory and taxation rules to tax holidays that may not be sustained in the long-run. Thus, a better option for the government is to provide part of the initial infrastructure needed for the STPs and liberalize taxation procedures instead of maintaining STPs tax preferences that may be infeasible under tight state budget constraints.
- **STPs technology infrastructure.** The government must gain the commitment of domestic and foreign investors to co-invest with the government into the parks' infrastructure. Public-private partnerships and contracts can be effectively used to manage risks and funding of these infrastructure projects. It is critical to allow private investors to develop and manage the infrastructure assets of STPs as the private sector is best equipped to construct cost-effective infrastructure facilities and run them profitably. The government, in turn, must insure that parks' infrastructure meets international quality standards. In addition, the government should provide vital public infrastructure (for example, transportation networks and public utilities) as well as guarantee and maintain its quality and reliability.
- **Special customs regimes in STPs.** The establishment of duty-free and tariff-free regimes within STPs should be accompanied by adequately designed administrative procedures. Although, the quality of Ukraine's customs administration has recently been strengthened, corruption and regulatory transparency are still a pressing issue. A separate customs authority can be established within STPs, however its efficiency is heavily conditional on the ability to establish tight cooperation and conflict-free environment between the parks' and national customs offices. Yet, Ukraine's capacity to create such administrative units is still rather weak. Therefore, it is preferable to spell out consistent and clear customs regulations for STPs that minimize corruption, smuggling and the abuse of customs preferences.
- **Regulatory incentives.** Excessive red tape, bureaucracy and regulations should be eliminated. The government must create business enabling environments within the STPs that promotes entrepreneurship and attracts foreign investors.
- **Facilitate start ups of innovation companies.** Commercialization of scientific and research projects must be advanced. STPs should contain functioning incubation facilities that encourage collaboration between educational centers and private sector in their efforts to set up new businesses based on the scientific inventions. Financing of the seed capital for such companies is of key importance and can be organized through both R&D grants and venture capital programs sponsored by the government as well as the development of financial infrastructure that attracts foreign venture capital investments.
- **International promotion of STPs.** Many countries position domestic STPs as the key assets of their economies. The public interest and familiarity with Ukrainian STPs is scarce even within the country. Therefore, the government should take more aggressive advertising stance to promote STPs by subsidizing parks' authorities to

engage in relevant activities as well as through the creation of specialized state agency to which STPs promotion will be delegated. In addition, the government should assist STPs' residents in obtaining international certificates and promoting their businesses abroad. This component of STPs development is especially critical. The government must actively target the wide range of potential foreign investors to communicate the competitive advantages of Ukraine as a leading innovation center. Trust building is a direct outcome of the well designed advertisement campaign. Foreign investors take into consideration the quality of IT outsourcing as much as they care about the costs of labor. Without tight international linkages and openness to global business community the perception of Ukraine as a high technology hub will not be drastically enhanced.

In addition to policy measures enabling STPs creation, the government should simultaneously and vigorously implement strategic policies promoting sustainable expansion of the ITC industry in the long-run:

- **Develop comprehensive national innovation strategy.** A well structured long-term vision on the government's mission in the development of ITC industry is the first necessary step to communicate the strength of government's commitment to both domestic and international business communities.
- **Improve Ukraine's investment climate.** This process encompasses a wide set of policy measures aiming to (i) upgrade the capacity of public administration to design and implement policy reforms; (ii) maintain macroeconomic stability while reforming the tax system; (iii) strengthen the legal/judiciary system and protect property rights; (iv) liberalize and deregulate business activities; (v) enhance corporate governance; (vi) liberalize international trade and capital; (vii) strengthen the financial sector; and (ix) fight corruption and actively promote investment opportunities in Ukraine to international business community.
- **Heavily invest into the human capital.** Although school enrolments in Ukraine are high, there is a need to improve the quality of educational institutions with an emphasis given to ITC related skills and English training. Collaboration between domestic and international universities and research centers should be established. In addition, the government should facilitate commercial R&D activities through various research grants and subsidies.
- **Encourage knowledge transfers through industrial clusters.** Policies that promote the clustering of industrial activities should be of the highest priority to the government. The long-term success of Ukraine is highly conditional on the economic capacity to generate productivity growth on a sustainable basis. Industrial clusters are highly effective in promoting technology diffusion and advancing industrial competitiveness. Thus, the developmental approach of the Ukrainian government must extend beyond a narrower concept of special/free economic zones and treat industrial clusters as a principle industries' organization that secures Ukraine's competitiveness at the international arena.
- **Proceed with the liberalization of the telecommunications industry.** Properly organize and complete the privatization of Ukrtelecom (state-owned monopoly)

providing fixed line phone services) and improve incentives for foreign companies to invest into the national ITC industry.

- **Advance integration of Ukraine into the global economic community.** WTO membership and the Free Trade Agreement with the European Union should be top priorities for Ukraine.
- **Build trust of international business community into Ukraine.** Continue to develop and enforce efficient legislation on intellectual and private property rights protection. Maintain political stability and energetically promote country's business opportunities.

Next Steps

As the initial step in the implementation of the IT strategy recommended by this paper, it is proposed that the government should establish a working group composed of relevant government agencies and concerned private enterprises to develop an action plan for the implementation of the strategy. This Action Plan would include a more detailed presentation of the country's IT strategy, relevant government agencies and private companies entrusted with the implementation, identification of financing requirements and sources of finance and a time-frame for implementation.