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ARMENIAN INFORMATION TECHNOLOGY INDUSTRY GROWTH MODEL



The report was prepared by the Economy and Values Research Center commissioned by Enterprise Incubator Foundation

Purpose: To build the Armenian IT Industry economic model to forecast key economic indicators over the medium-term period.

Key Trends in Global IT Industry and Armenia`s Challenges

The global outsourcing market is expected to grow substantially by 2010-2015, the major flow going from advanced to developing countries. The competition for getting offshore outsourced contracts among developing countries will become much more intense. In the short-run, the rising salaries of IT specialists in the developing countries as a result of maturing local IT industries will put additional pressure on major countries competing in outsourcing markets. The quality of IT education is becoming a key factor for major outsourcing destinations to move to new lucrative segments and capture specific niches that are less cost-sensitive in the long-run.

The Armenian IT Industry experienced a rapid growth in the last decade and has become one of the most dynamic and internationally competitive sectors of Armenian economy. The Armenian IT industry, the growth of which was spurred mainly by cost-driven outsourcing, is currently facing maturity and significant competitive pressures. This may put Armenia into a trap of losing to other destinations over the long-run, if the competitive model is not modified.

Given the global trends and current challenges, the industry development path will be largely dependent on strategic choices that the key industry stakeholders will make

now. The choices should be based on the understanding of major factors influencing the growth of the industry and different possible scenarios.

Armenian IT Industry growth scenarios

In order to develop the IT industry's scenarios, we developed an econometric model of the software and service sector. The model used company level cross section data. Two sub-sectors (Internet services (ISP) and software and services) were considered separately. The driving forces and key "production factors" are different for the two mentioned sectors.

Software and Services Sector

The empirical revenue generating model for the software and services sector was constructed and applied under different scenario estimating key industry parameters in 2011 based on supply side factors and company characteristics.

The model employed the following major input factors:

- labor
- company size
- ownership type
- employee training

Despite the remarkable increase in the number of IT department graduates, the workforce still remains the impending factor of further industry expansion. The quality of IT education does not comply with internationally recognized standards and even the needs of local companies. It forces companies to make additional investments in the labor force.

The government may consider the costs of the funding of higher education students in the IT field as investments in human resource development and the return on investments will take the form of tax payments calculated per employee of the IT sector companies. The calculations showed that the government's investments in the education of today's IT students will have a certain payoff in just 7 years' time and start to generate net profit thereafter. A three-fold increase in the annual per-student spending will still leave the government with a gain in terms of tax amounts in a 10 year time frame.

Labor force supply forecast and possible future developments in the IT industry (FDI attractions, investments in education, etc.) were considered to construct 3 possible development scenarios of software and services sector titled as follows: **Trap of current model, Maneuvering in the niche market and Strategic positioning.**

Internet Services Sector

The following four key drivers will influence the ISP sector development in medium-term

1. Complete liberalization of the market expected in 2007
2. Market Expansion

3. Industry re-shuffle through investments, acquisitions and alliances
4. Expansion of new technologies and transformation of market boundaries

Taking into consideration future possible developments regarding the above mentioned factors, Armenia's Internet penetration rate was benchmarked against CEE and CIS average rate to forecast ISP market size and key sectors indicators in 2011 under 3 development scenarios titled as follows: **Stuck in Digital Negligence, Bottleneck Removal, E- society Leadership**

Based on development scenarios key indicators of the Armenian IT industry were estimated for 2011

Indicators	Current state 2006	Scenario 1- Pessimistic 2011	Scenario 2- Base 2011	Scenario 3- Optimistic 2011
Total industry revenue million USD Revenue CAGR, 2006-2011	71	115 10.0%	171 19.2%	248 28.3%
Number of companies Number of companies CAGR, 2006-2011	150	172 2.8%	205 6.4%	224 8.4%
Number o employees Number of employees CAGR, 2006-2011	4156	7201 11.6%	8037 14.1%	9506 18.0%
Taxes, million USD Taxes, CAGR, 2006-2011	12	26 17.0%	33 22.6%	42 29.2%
Productivity, USD	17143	15903	21303	26103

Impact assessment of cross-cutting factors

The development of IT sector is also influenced by industry-wide(not company-specific) factors in particular, availability of skilled IT specialists, the quality of political, regulatory and infrastructural environment , venture capital availability and the quality of education. The influence of these factors on the growth of the IT sector has been tested through constructing an IT export model based on aggregated country-level data for major IT exporting countries. The model includes 68 countries together exporting about 90% of the world IT export. The model results showed that different factors have different impact on various countries depending on digital opportunity index.

Given the current stage of domestic ICT development, most important enabling factors for the growth of Armenia's IT export and overall IT industry are the supply of quality IT specialists and the general regulatory environment. However as Armenia moves to the next stage of ICT development, it needs to focus on different factors that ensure the success of countries in more developed and mature stages. One of the key factors will be the establishment attraction and effective functioning of venture capital funds and R&D centers (techno parks, technology business incubators), which will fund and support innovative projects in Armenia

Successful development models and Armenia's choice

Based on the analyses of the experience of the countries that succeeded in developing IT industries in relatively short periods of time we highlighted three competitive development models labeled as follows:

1. **Platform for regional expansion (e.g. Ireland, Egypt)**
2. **High tech power center (e.g. Israel)**
3. **Information society(e.g. Estonia)**

Platform for regional expansion model implies that countries following this model have successfully positioned themselves in the global market as platforms for global players to penetrate into large regional markets. They provide advantages for global companies to serve targeted regional markets more effectively. Through creation of a favorable business environment, provision of highly skilled labor and the development of necessary infrastructure they managed to become attractive investment destinations for mostly market seeking FDI's in regional markets. This was leveraged by various types of fiscal and financial incentives.

High tech power center implies developing advanced technology and science-based clusters and infrastructure. The value proposition to leading technology MNCs includes unique and sophisticated competences for their global value chains. The model, to a large degree, rests on the creation of a highly skilled workforce pool able to develop and design innovative and sophisticated products and services. Creation of world-class science and technology schools, improvement of quality of math and science education in public schools and heavy investment in R&D are the most critical factors determining the success of this model. Government initiatives such as fiscal and financial incentives for R&D and high-tech export oriented products development coupled with business development skills through technology incubator programs attract global venture capital to fund risky innovative start-ups. Solid and effective financial markets (especially stock markets) should be in place to support business initiatives and particularly venture capital exit strategies.

Information society model implies a clear positioning as an ICT enabled tools/applications development or processing center. The IT sphere initially develops as a result of internal infrastructure growth and domestic demand. The main drivers of the model are government-led initiatives such as e-governance, so-called e-society projects, heavy investment in ICT and telecom infrastructure and promotion of ICT use in the country through school connectivity internet access centers and computer literacy trainings etc. Legislative changes are necessary regarding adoption of e-business practices and use of on-line government services. The increase o local demand drives the future of the IT sector and development of new innovative ICT-enabled services and products that later are marketed in foreign markets. The general computer literacy and Internet/PC penetration rate of the society determine the level of the success of the model