Armenian Information Technology Sector

2011 State of Industry Report Software and Services

ARMENIAN INFORMATION TECHNOLOGY SECTOR
Software and Services
2011 State of Industry Report

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FOREWORD

Information Technologies (IT) industry has grown to one of the key sector of the Armenian economy, which promotes the technological innovation and productivity in the country. IT and Telecommunications industry is among the rapidly growing segments, which has been recognized by the Government of Armenia as the primary constituent of the economic progress.

Due to the rich research and educational traditions and skilled human resources, Armenia has attracted numerous global hi-tech firms. The R&D centers of various hi-tech companies from Europe, Russia and the USA are already based in Armenia. These facilities work on cutting edge technologies and tools employed by many corporations around the world to develop products and services or solve a variety of business problems.

A new comprehensive IT industry strategy adopted by the Government of Armenia in 2008 focuses on developing telecommunications and business incubation infrastructure, improving the quality and increasing the number of technical graduates, expanding support and financing mechanisms for technology start-ups, and developing other areas important for the growth of the Armenian IT industry. On behalf of the Government I would like to express our belief that the successful implementation of this strategy will strongly contribute to the competitiveness of the Armenian IT industry and ranking thereof amongst other hi-tech nations of the world.

Sincerely,

Tigran Davtyan
Minister of Economy of the Republic of Armenia

Enterprise Incubator Foundation is a business development and incubation agency supporting IT companies in Armenia. Our objectives are to improve competitiveness of Armenian IT companies in the global marketplace, build linkages with business communities in key technology markets, improve access of local companies to knowledge and information on best practices and experience, and assist Armenian firms with attracting local and foreign investors.

The Report is based on our surveys of the sector conducted in 2004 through 2011. The goal of this Report is to promote deeper understanding of Armenian IT sector, its main needs, as well as gain insights on possible solutions to its key problems. It covers key aspects of the industry including history, revenues, productivity, workforce, educational sector, policy developments, and others.

In 2011, the Armenian IT industry recorded a number of achievements, including the growth in total turnover and export, new local and foreign start-ups, as well as the efforts in furtherance of the overall industry progress such as the Microsoft Innovation Center, the Armenian-Indian Center for Excellence in ICT, Regional Mobile Applications Laboratory for Eastern CIS, South Caucasus and Central Asia and others.

The Report could not have been prepared without numerous interviews with managerial and professional staff of IT companies, faculty of educational institutions, representatives of development organizations and others. We are immensely grateful to all those individuals for their time and help.

Sincerely,

Bagrat Yengibaryan
Director of Enterprise Incubator Foundation

ARMENIAN IT SECTOR AT A GLANCE

Historically, Armenia was on the forefront of high-tech research, development, and manufacturing. Since early 1950s, Soviet Armenia has been a main hub of USSR's critical scientific and R&D activities in a number of technology industry segments such as mainframe and industrial computing, electronics, semiconductors, software development, and others. After the independence of 1991, the industry switched its focus to the software development, outsourcing, and IT services.

The software and services segment really gained its momentum during the last 12 years, during which the sector grew at 27% per annum.

COMPETITIVE ADVANTAGES OF ARMENIA

- World-class R&D capabilities in engineering, computer science, physics, and mathematics,
- Well-educated and talented workforce with high technical skills and English language proficiency,
- Strong university programs with specializations in IT and related sciences,
- Highly competitive cost of labor and low operating costs,
- Solid Government support of the sector and commitment to improve the investment climate,
- Sustainable and continuous growth of IT sector,
- Strong and successful Diaspora in Europe and North America,
- Extensive experience with large multi-national companies,
- Sound laws and regulations for IP protection.

2011/2008 Main Indicators

	2011	% from Industry	2008	% from Industry	% change 2011/ 2008	CAGR 2011/ 2008
Operating Companies						
Industry total	281	100%	175	100%	61%	17.1%
Local firms	174	62%	119	68%	46%	13.5%
Foreign branches	107	38%	56	32%	91%	21.1%
Industry Revenues, million USD						
Industry total	$205.1	100%	$111.3	100%	84%	22.6%
Local firms	$87.0	42%	$50.1	45%	73%	20.2%
Foreign branches	$118.1	58%	$61.2	55%	93%	24.5%
Industry average revenue per company	$0.73	100%	$0.64	100%	19%	9.0%
Local firms	$0.5		$0.42		10%	4.7%
Foreign branches	$1.10		$1.09		16%	7.6%
Domestic market	$115.4	56%	$41.9	38%	175%	40.2%
Exports	$89.7	44%	$69.4	62%	29%	8.9%
Software and IT consulting	$143.1	70%	$96.0	86%	49%	14.2%
Internet Services	$62.0	30%	$15.3	14%	304%	59.3%
Productivity (average output per technical employee, excluding ISPs), USD						
Industry total	$36,311	100%	$26,100	100%	39%	11.6%
Local firms	$36,508	93%	$22,400	86%	63%	17.7%
Foreign branches	$36,115	107%	$29,800	114%	21%	6.7%
Human Resources (persons)						
Industry total	6,760	100%	4,890	100%	38%	11.4%
Technical professionals	5,226	83%	4,250	87%	23%	7.1%
Management and administrative	1,534	17%	640	13%	140%	33.8%
Local firms	3,154	46%	2,460	50%	20%	6.2%
Foreign branches	3,606	54%	2,430	50%	20%	6.3%
Students in IT related specialties at major Armenian universities (2011)	6,970	100%	6,800	100%	0%	0.0%

INDUSTRY OVERVIEW

There are two principal stages in the development of Armenia's technology sector: period under the Soviet rule and post-Soviet independent Armenia.

HISTORY

SOVIET ARMENIA (1920-1990)

The roots of the industry can be traced back to the period before and during World War II when a heavy industrial expansion was underway in the USSR. The latter required educated technical specialists in different fields of economy leading to the establishment of two primary educational institutions in Armenia: Yerevan State University (YSU) in 1919 and Yerevan Polytechnic Institute (currently State Engineering University of Armenia, SEUA) in 1933. Armenian Academy of Sciences (currently National Academy of Sciences, NAS) was formed in 1935. Foundation of YSU, SEUA, and NAS was a starting point in the long history of the development of science and technology in Armenia.

Era of computers and software development began in 1956 with the launch of Yerevan Scientific Research Institute of Mathematical Machines (YerSRIMM). The institute was specifically created by the decision of the Soviet Government to design and build electronic computers and related equipment. Already in 1959, YerSRIMM designed the first generation computer "Aragats" running on vacuum tubes; in 1961, the second generation computer "Hrazdan" on semiconductor elements was ready. During early 1960s, the Institute started to design mainframes, automated control systems, as well as operating systems, networking and application software. YerSRIMM was the leading institution of the former USSR specialized in the development of microprogrammed computer systems "Nairi", which was granted more than 40 patents and was presented at 20 international exhibitions. YerSRIMM designed and produced at its own production plant dozens of computers, some of which were compatible with PDP of Digital Equipment and IBM mainframe series. The institute was well known for the development of IBM-360/370 compatible ES series of computer systems widely used in scientific and industrial applications throughout the Soviet Union. A significant achievement of YerSRIMM was a project to design a telecommunication system for the mission to the moon. In 1980s, YerSRIMM alone employed around 10,000 people, more than twice the size of the whole IT workforce today.

A number of production companies were established oriented towards R&D and manufacturing of electronics and semiconductor devices. "Transistor" semiconductor R&D and manufacturing plant (1958) was a USSR leader in the production of transistors and amplifier diodes. In 1964-65, "Sirius" radioelectronics plant making radio-electronic components and "Posistor" microelectronics factory producing diodes and hybrid integrated circuits were constructed in the city of Abovyan. Institute of Microelectronics, Scientific Research, and Technology (1966) was developing microelectronic circuits,

automated measurement devices, and other advanced electronic devices. Yerevan Telecommunications Research Institute (YeTRI) established in 1978 was involved in the production of integrated circuits and other products based on silicon thin film technology. In 1986, Ashtarak semiconductor and electronics manufacturing plant was constructed with total investment of $120 million. The plant focused on the production of semiconductor wafers, circuit boards, solar cells, and other electronic devices. Another major manufacturing facility, "Mars" integrated circuits and electronics plant ($300 million investment) was built in 1988 to make printed circuit boards and integrated circuits.

After the liberalization of the Soviet economy in late 1980s, a number of new firms were created to provide system integration and custom software development services. Those companies focused mostly on services to the domestic market with very few of them doing business with foreign clients. Major areas of specialization at the time were accounting and financial applications targeted at the local customers, hardware assembly and sale, and some outsourcing services. The first private IT company in Armenia, "Armenian Software", was established in 1987. As of 1990, there were around 40 large technology oriented R&D institutes and production companies in Armenia. During this period, Armenia was considered a leading center of electronics and information technologies of the Soviet Union.

INDEPENDENT ARMENIA (1991-2011)

On September 21, 1991 Armenia declared independence from the Soviet Union. Break-up of USSR and start of the era of personal computers led to the collapse of the Armenian technology sector that for many years had been concentrated primarily on large-scale manufacturing and R&D. The fact that major client of the industry – the giant Soviet military-industry complex – was no longer available, exerted great pressure on the industry to shift its focus from large-scale military applications to market and customer driven solutions and services. Thus, gradually new companies evolved to fill emerging opportunities locally and in foreign markets. The potential created during past years was the major force, which enabled entrepreneurs and investors to start new business ventures in the fields of high tech and IT.

In 1990s, a new age in the industry development started when several US-based software businesses opened branches in Yerevan including Boomerang Software (internet applications), Credence Systems (semiconductor design-to-test solutions), Cylink (network security products and VPN solution), Epygi Technologies (IP PBXs), HPL Technologies (yield management software and test chip solutions), Virage Logic (advanced embedded memory IP), and others. Diaspora played a key role in the formation of Armenia's fledgling software industry and was the primary factor behind the early establishments of many foreign companies in Armenia.

Starting late 1990s, the industry received a new impulse for growth stemming from successes of the previously formed companies, overall recovery of the economy, and unprecedented growth of the worldwide IT industry. The potential of Armenia's IT industry

drew attention of a larger number of investors, policy makers, and professionals. The industry started offering higher paying jobs to the young generation encouraging them to pursue careers in the technology fields.

Growing importance of IT industry led the Government of Armenia to declare ICT as one of the priority sectors of Armenian economy in 2000. Other key initiatives in the policy field included preparation of Armenia's ICT Master Strategy and formation of Information Technologies Development Support Council (ITDSC) in 2001 and launch of Enterprise Incubator project in 2002. Union of Information Technology Enterprises (UITE), Armenian IT association was established in July 2000 by the private sector to consolidate industry advocacy efforts, facilitate business, and encourage advancement of research in the ICT sector. In 2008, the Government adopted a new industry development strategy focused on infrastructure, workforce, education, venture financing, e-society, and other areas. In 2010 the Government of Armenia approved E-Society Development in Armenia Concept.

Existing strong scientific and educational base formulated the significant success of the semiconductor design industry, which grew into a large revenue generating segment within the IT industry and attracted a number of large foreign direct investments. In 2000, US-based LEDA Systems Inc., founded by a graduate of State Engineering University and specialized in design of integrated circuits and components, started a branch in Armenia. One of the key initiatives of the company was the formation of a specialized training center in cooperation with SEUA. At the center, students had an opportunity to receive quality engineering practice in the design of integrated circuits, related software and components. Armenia's considerable expertise in the field of chip design attracted Synopsys Inc., a global leader in EDA and VLSI design. The company acquired Armenian operations of LEDA Systems and Monterey Arset (systems on a chip) in 2004, HPL Technologies in 2005, and Virage Logic in 2010. Currently, Synopsys is the largest software firm in Armenia employing more than 500 professionals. Following the success of Synopsys and Virage Logic in Armenia, Mentor Graphics Inc.[1] established a presence in Yerevan through the acquisition in May 2008 of Ponte Solutions Inc, a California-based developer of solutions for the manufacture and design of semiconductors with a major R&D center in Armenia.

In early 2000s, more foreign businesses launched development locations attracted by highly qualified labor force and competitive costs: CQG (analytics software and trading solutions), EPAM Systems (offshore software development), Lycos Europe (pan-European online network), Luxoft (software development and outsourcing), and others. Such major brands as Alcatel, Siemens AG, Microsoft Corporation, and Sun Microsystems Inc. operate representative offices in Armenia and are involved in various industry specific and educational initiatives.

In 2007, National Instruments, an Austin, Texas based corporation with over 4,300 employees and operations in 40+ countries, started an engineering and R&D office in Yerevan, Armenia. National Instruments manufactures automated testing equipment and develops virtual instrumentation software employed by engineers worldwide to design

[1] Mentor Graphics Corporation (NASDAQ: MENT) is a US-based firm established in 1981. The company is a world leader in electronic hardware and software design solutions, providing products, consulting services and support for the world's most successful electronics and semiconductor companies. Company has an annual turnover of over $825 million and employs 4,300 people worldwide. Source: http://www.mentor.com/.

solutions for a variety of industries such as aerospace, automotive, communications, electronics, energy, industrial measurement and control, life sciences, semiconductors, and others. Today, NI Armenia is offering conceptual solutions for engineering firms engaged in the development of products and turn-key solutions for different industries, including aerospace.

In 2007, Sun Microsystems and Enterprise Incubator Foundation started a joint project aimed at establishing training laboratories at several major Armenian universities and a solution development and R&D center. The project was co-financed through the USAID/Armenia's Global Development Alliance initiative, which supported public/private programs focused on democracy, economic growth, workforce development, education, and environmental issues.

Within the framework of Memorandum of Partnership between the Government of Armenia and Microsoft Corporation the Microsoft Innovation Center was founded in Yerevan, in May 2011, the intention whereof was to create an environment through application of tools and software of Microsoft Corporation to attain the development of professional knowledge and skills, improvement of entrepreneurial abilities, and production, testing and promotion of innovative ideas. The project is implemented by the Enterprise Incubator Foundation, and supported by the Government of Armenia, Microsoft, the USAID and the SEUA. The Microsoft Innovation Center promotes the development of key knowledge and expertise at small/medium enterprises through trainings, workshops, competitions, consulting and coaching by applying advanced and effective methods. The Microsoft Innovation Center is the largest in the region and serves as a model for establishment of similar centers particularly in Central Europe.

In November 2011, the Armenian-Indian Center for Excellence in ICT was founded at Yerevan State University. The Center is the joint enterprise of the Governments of Armenia and India and is implemented by the Enterprise Incubator Foundation (Armenia) and C-DAC Center (India), and is the largest ICT investment of the Indian government in the region. The main mission of the project is to establish a specialized infrastructure for delivery of ICT-related training and R&D programs to create new opportunities for world-class workforce development in Armenia, and will serve as a R&D center for High Performance Computing. The center is equipped with the Indian PARAM Supercomputer, which will enable test and evaluation works in biotechnology, meteorology, seismology, ecology and other related areas.

Due to the selection of the Enterprise Incubator Foundation as the winner of the competition announced jointly by the Government of Finland, Nokia and the World Bank for the CIS countries, in 2011 the Regional Mobile Application Laboratory was founded in Armenia for Eastern Europe, South Caucasus and Central Asia. It intends to become one of the five basic laboratories worldwide and will be a focal point to provide favorable environment for innovative mobile applications, commercialization of concepts and products, development of technical and business skills, establishment of contacts between regional enterprises and specialists and attraction of investments.

In 2011, one of the major engineering companies of the world, the Singapore Technologies Kinetics Ltd (ST Kinetics) officially announced its entry into Armenia. ST Kinetics opened a branch in Armenia, which would be primarily aimed at creation of R&D laboratory and the platform for stand-alone machinery and off-line equipment. The algorithms developed there will be applied worldwide.

In 2010, CISCO Systems Network Academy started functioning in Armenia, and currently is implementing training programs in CCNA(Cisco Certified Network Associate) and CCNP (Cisco Certified Network Professional). In 2011, Memorandum of Partnership was signed between the Government of Armenia and CISCO Systems. Within the framework of Memorandum, CISCO Systems will support the implementation of a number of projects, particularly the establishment of CISCO Lab.

INDUSTRY BACKGROUND

Armenian IT sector has two distinct segments of companies: companies with local ownership and with foreign ownership. Characteristics of the businesses from each segment such as number of employees, salaries, revenues and other are noticeably different.

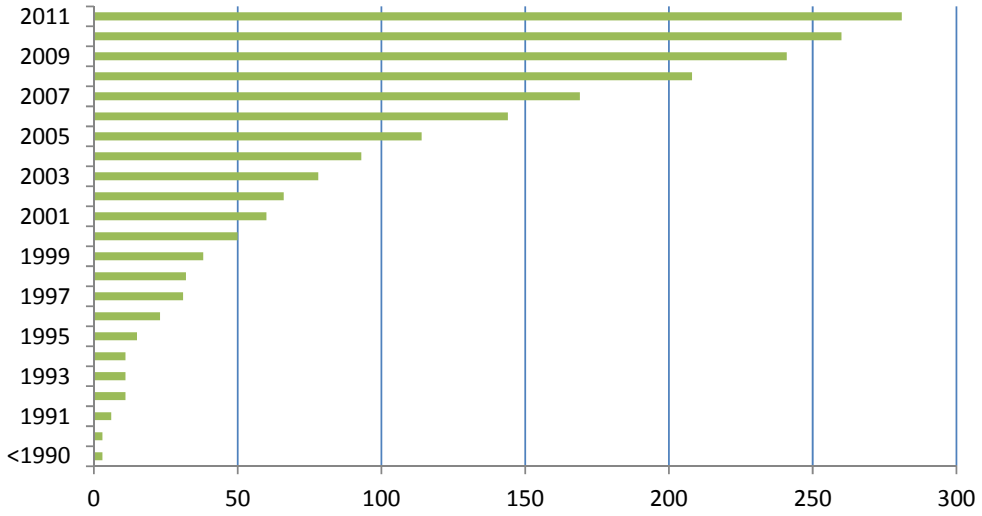
ESTABLISHMENT OF ENTERPRISES

Armenia's software and services industry is rather young: the prevailing number of companies, nearly 80%, was founded during 2000-2010.

The first local private software firm was established in 1987, and within 5 years the first foreign branch was launched in Yerevan. 1991-1997 turned to be a tough transitional period for the technology sector: regional conflicts, collapsed economy, brain drain – all had considerable effects on the revival of the industry. As of 1998, around 35-40 software firms and ISPs were operating in Armenia employing, according to various estimates, nearly 1,000 specialists. Size of the workforce was notably smaller in 1998 compared to that observed in 1987 when only YerSRIMM employed up to 10,000 people.

During the last 11 years, the industry saw a sharp increase in the number of newly formed companies, both local start-ups and branches of foreign companies.

ICT Companies in Armenia: 1990-2011



The number of operating IT companies in 2011 reached 281 representing nearly 17.1% growth from 2008 to 2011. On average nearly 20 IT businesses were launched annually in

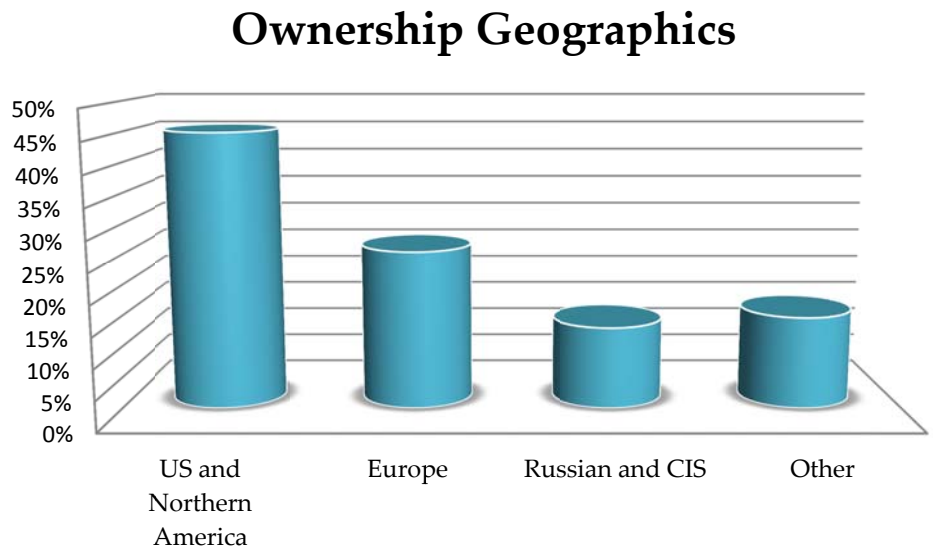
2000-2011. This was in sharp contrast to 1990s when only 5-6 companies were formed each year.

At the peak in 2008, annual number of newly started firms reached around 30. Those high rates, however, may be difficult to sustain due to a shortage of qualified developers, engineers, and project managers. Importantly, 22 startups were recorded in 2011, of which 15 were foreign branches.

FOREIGN OWNED COMPANIES

In 2011, the number of foreign owned companies in Armenia reached 107 or 38% from the industry total. Armenia's expertise in software development is winning growing recognition overseas thus fostering foreign investments in the IT sector.

Similar to the recent years, the US companies made the majority of foreign companies (45%). The number of companies with European ownership grew by 6% vs. 2008.



In the majority of cases, the foreign branches are pure development centers for the parent companies. Foreign companies usually set-up small development centers and, as there is an effectively operating team in place, start increasing the number of employees and moving higher added value activities to Armenia. It is common when the whole cycle of a company's technical activities including R&D, design, coding, testing, and support is eventually moved to Armenia. In addition, some companies have also started relocating parts of their business related functions such as marketing and customer support to

Armenia. Practice of sending local professionals to the customer sites outside of Armenia to provide implementation and customer support has been widely used.

In 2004, 2005, and 2010, Armenian IT sector witnessed a major M&A within the chip design segment. Synopsys Inc., a leader in delivering solutions for semiconductor design and manufacturing, acquired LEDA Design, Monterey Arset, HPL Technologies, and Virage Logic. The new combined development center in Armenia owned by Synopsys is currently the largest domestic software powerhouse with more than 500 employees.

Other examples of acquisitions of existing Armenian companies during the last several years included three state owned Armenian enterprises (MARS, YCRDI, and Yer.ACSSRI) sold to Russian investors by the Government of Armenia, an Armenian branch of a US company, Brience, which was acquired by Germany-based Lycos Europe, and acquisition of Ponte Solutions, a US company with an R&D center in Armenia, by a US-based Mentor Graphics Corporation.

In summer 2011, the regional software development laboratory of D-Link International was launched within the scope of the Gyumri Technopark Project. D-Link International is a Taiwanese company, a world leading manufacturer and vendor of network and telecommunication devices and maintains worldwide presence in more than 100 countries.

In fall 2011, one of major engineering companies of the world, the Singapore Technologies Kinetics Ltd (ST Kinetics) officially announced its entry into Armenia. ST Kinetics opened a branch in Armenia, which would be primarily aimed at creation of R&D laboratory and the platform for stand-alone machinery and off-line equipment. The algorithms developed there will be applied worldwide.

DIASPORA

It is a well-known fact that the United States and Russia are the major Diaspora centers and accordingly 50% of foreign companies represent the two nations.

Diaspora is considered one of the major competitive advantages of Armenia in terms of access to foreign markets and expertise. The majority of foreign branches operating in Armenia are established through direct involvement of Diaspora Armenians. Diaspora representatives are usually well disposed towards Armenia and are willing to contribute to its development. Companies with top management or owners of Armenian descent are better suited to evaluate the risks and understand the culture. Local companies also benefit from Diaspora when selling their services abroad.

Poor marketing skills and knowledge of target markets is a serious obstacle for the local companies. Having better understanding and being close to the target markets, representatives of Diaspora are better suited to sell or create contacts. In many cases, they

serve either as the final users of the product or as liaisons between Armenian and Western companies.

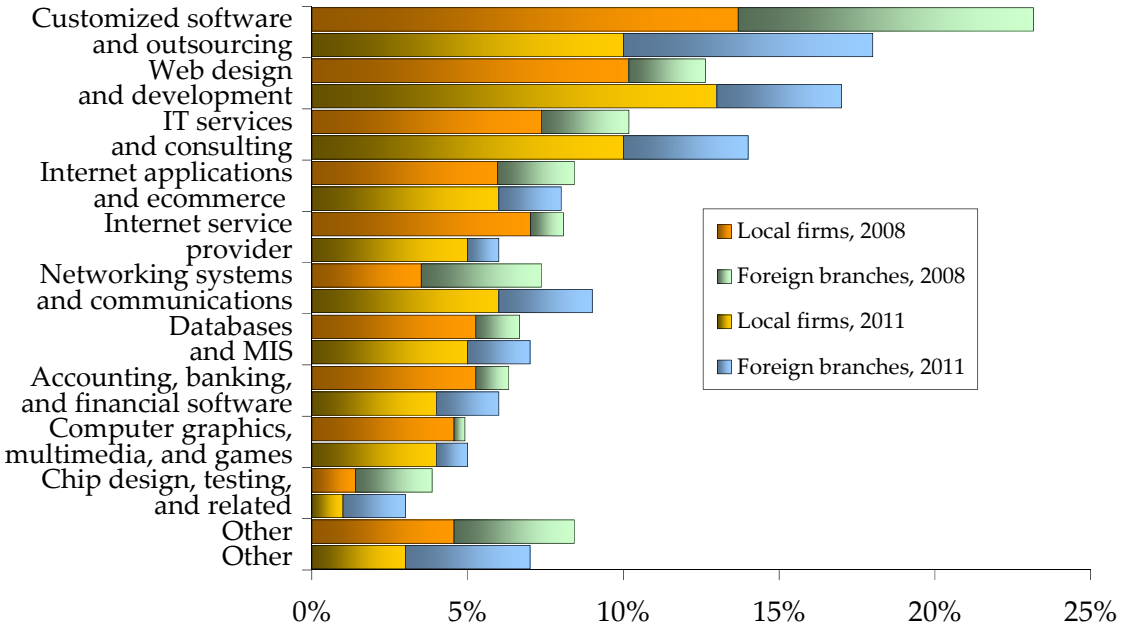
SPECIALIZATIONS

In the recent years the main trends of IT company specializations have undergone certain changes. The most widely practiced specializations are now customized software and outsourcing, web design and programming, IT services and consulting.

Though outsourcing remains a priority specialization, the Armenian IT companies are now moving to other products and services. This is clearly a good sign that probably means that industry is shifting to higher added value services. More companies are now involved in engineering, systems development, and R&D services.
Such tendency is favorable especially for local companies that are currently involved in chips design and system engineering.

The development of mobile applications is expected to have a good potential; particularly 42 companies have mentioned this trend as their business.

Company Specializations: Distribution



In recent years the local companies have evidently obtained the required qualification to offer complex software solutions and services. In addition, IT firms are pursuing opportunities in the Internet related areas such as web design and development, provision of Internet services, and Internet applications. Strong focus on internet related areas may be explained by the relatively high and increasing demand for internet services, low barriers to

entry by groups of young entrepreneurs, and the expected growth of e-commerce in Armenia. Despite the small added value nature of web development, it still plays an important role in the industry due to the substantial number of small companies offering web design services.

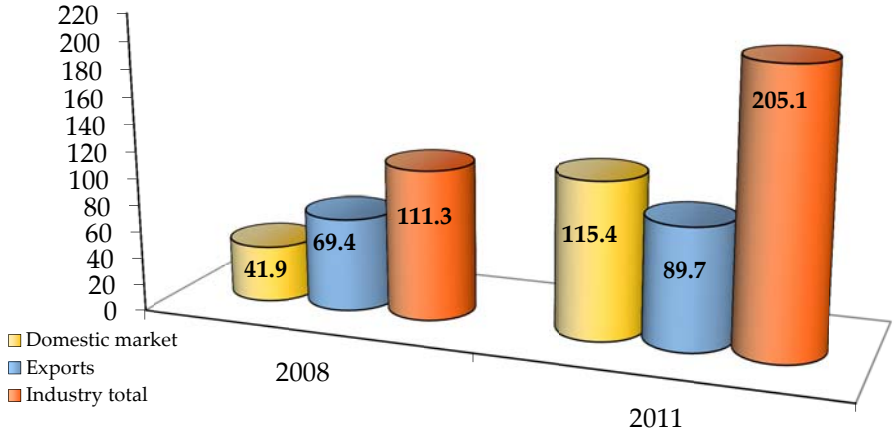
In general, both local firms and foreign branches are becoming more diversified than they were in the past.

TURNOVER

In 2011, the turnover of Armenian software and services sector reached nearly 205.1 million resulting in 27% CAGR during 1998-2011[2].
This figure constitutes about 2% of Armenia's GDP in 2011 ($9.4 billion[3]) vs. 1.7% in 2010.

During 2008-2011, the industry recorded 22.6% average annual growth. Industry's contribution to the total exports rose from 7% in 2008 to 8% in 2011[4], proving the growing importance of the software sector for the Armenian economy focused on the expansion of export-oriented businesses.

Armenian IT Industry Turnover



The share of local company revenues comprised 42% of the industry's total vs. 39% in 2010. Local firms are now in a better shape than several years ago: they have more employees, their technical expertise and knowledge of the market is on the rise, and they are willing to implement more complex and added value projects.

Consistent and sustainable performance of the branches is explained by the way foreign companies operate in Armenia: they are primarily outsourcing centers with a specific budget and a small profit margin; little value is left in the country, only operating expenses. Nevertheless, branch model is still relevant for Armenia and has visible positive effects on the industry and the overall economy. In the long run, however, models with a significant added value component are needed for the industry.

[2] In 1998, total turnover of tech industry's software and services segment was around $10 million. Source: USAID ICT Assessment Report, July 2000.
[3] Source: National Statistical Service of Armenia, http://www.armstat.am
[4] According to 2011 export rates (Source: Central Bank of Armenia).

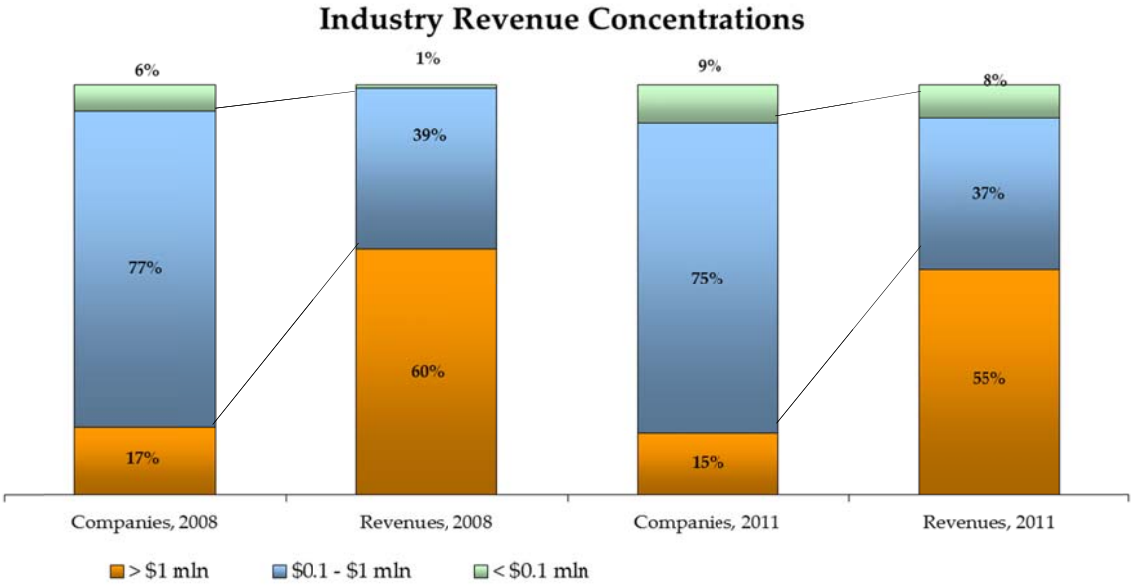
70% of the industry revenues were generated from Software Development and IT Consulting segments, while the share of Internet Service Providers comprised 30%.

For the majority (75%) of the Armenian IT companies the average annual revenues amounted from $100 thousand to $1 million.

47 largest companies (with turnover $1 mln and over) comprising only 15% of all IT firms generated 55% of all industry revenues. As opposed to 2008, the share of large companies in the total industry revenues reduced due to the increased number of small companies. Number of small firms with less than $100,000 in revenues increased by 3%, and their share in the total industry revenues grew by 7%. Though those firms do not have any visible impact on the industry, their increased number evidences the gradual development of the local market.

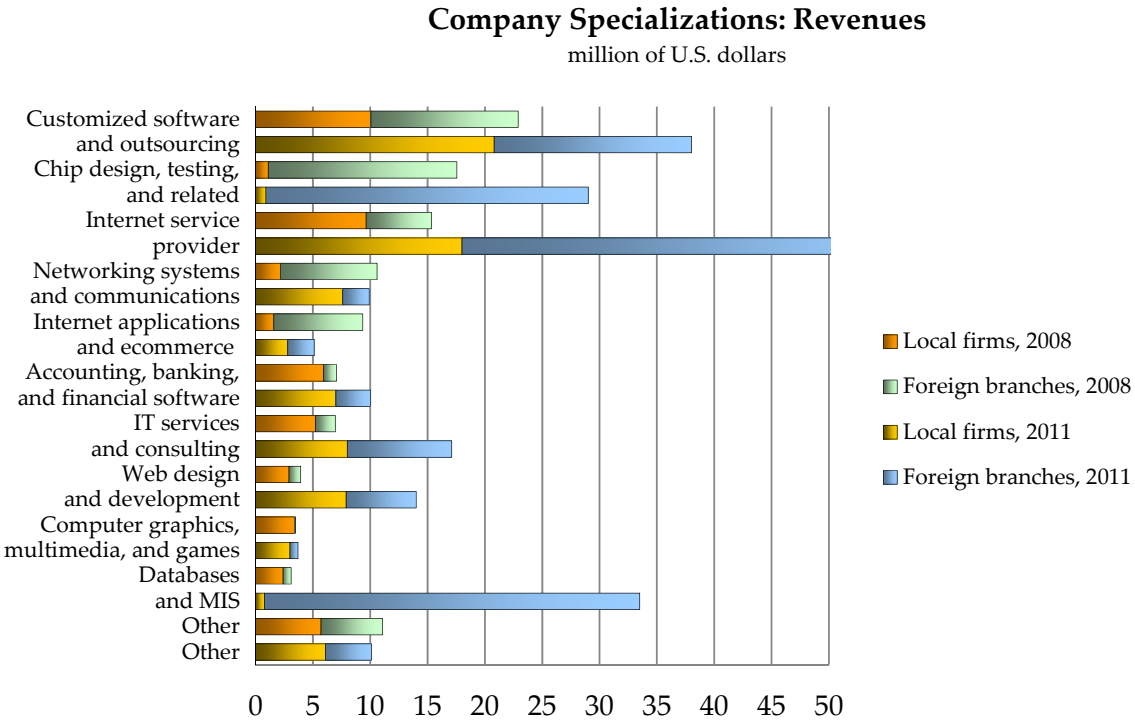
47 largest companies (with turnover $1 mln and over) comprising only 15% of all IT firms generated 55% of all industry revenues.

With regard to the industry revenue contributions by IT company specializations, the businesses of highest earning capacity mainly included the customized software and outsourcing, chip design and IT services and consulting. It is important to note that though only 3% of IT companies were specialized in chip design, their revenues comprised about 14% of the total IT industry turnover.



The Internet Service Providers recorded the highest rates - the annual growth of their turnover comprised around 59% during 2008-2011. A key reason for this was the major change in regulations pertaining to the telecommunications industry that ended the monopoly of ArmenTel. This led to the entrance of new major players in the ISP field and a

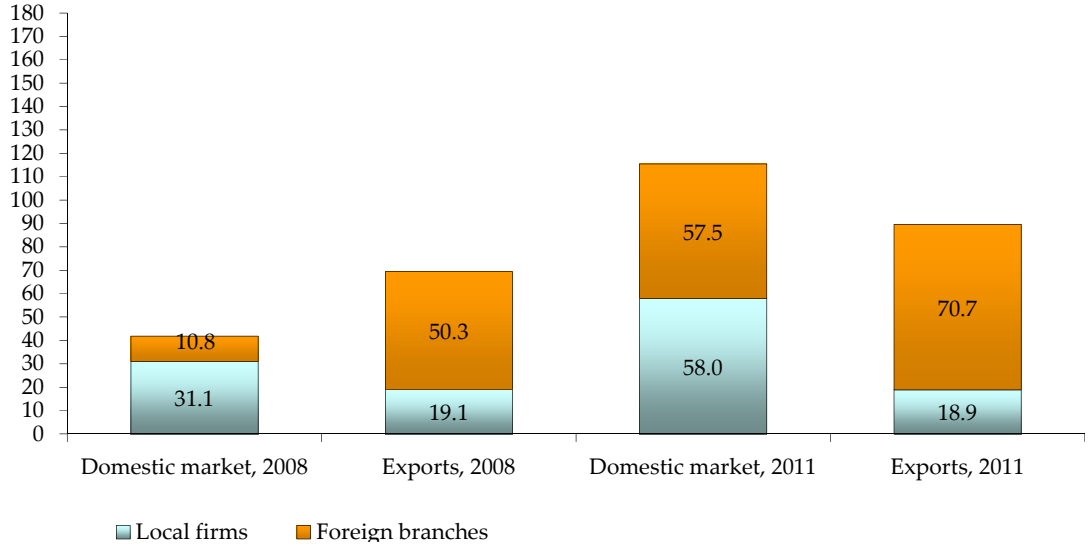
considerable drop in internet connection costs. Moreover, additional networks were built to connect Armenia to major internet hubs in Russia, Europe, and US.



In 2011, the volume of the domestic market reached about $ 115.4 million comprising 56% of the industry's total. Since 2008, the sales in the domestic market have increased by more than 175%, which has been the result of a substantial growth in the internet services area. In addition, exports increased essentially and reached $ 89.7 million or 44% of industry's total in 2011 vs. 2010 when exports had decreased due to the global financial crisis.

Nevertheless, share of exports of software and services segment (without ISPs) was still larger ($89.7 million) than that of the domestic market ($53.4 million). The main reason behind the difference in exports and domestic market is that the largest companies of the industry are branches of foreign firms, which almost completely export their products or services. In addition, many locally owned enterprises also export significant portion of their output.

Domestic Market and Exports: Local Firms vs. Foreign Branches
millions of U.S. dollars



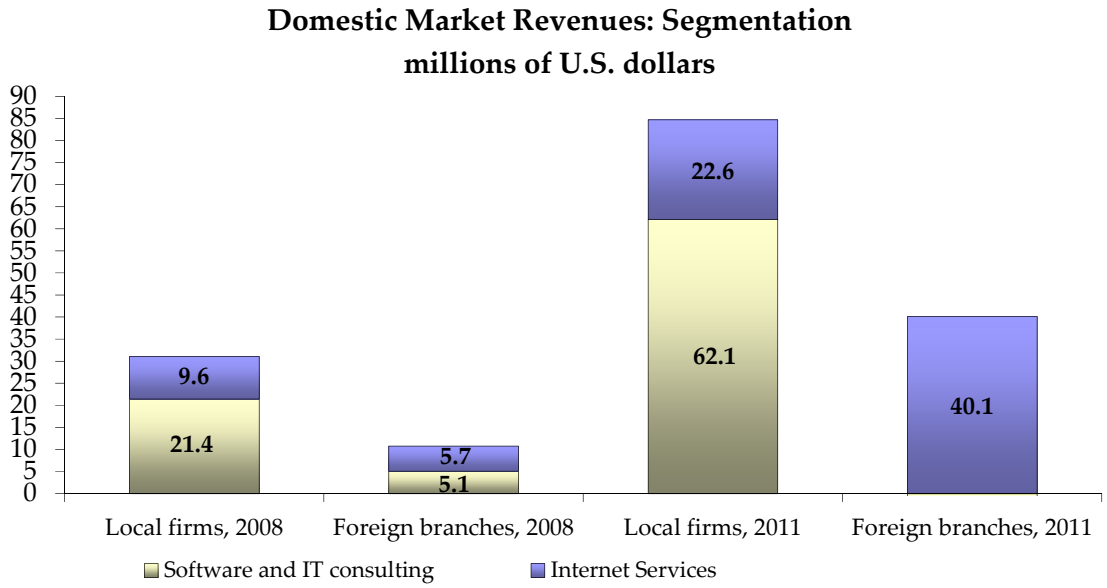
As opposed to 2008, the weights of local and foreign companies almost equalized at the domestic market, while the foreign companies were still prevalent in exports with 79% share. Such major difference is easily explained by the fact that almost all foreign branches are established by their parent companies as offshore software development locations. In addition, all three telecom/ mobile operators and certain major ISPs have foreign ownership, however they render services to the domestic market.

DOMESTIC MARKET

Revenues of IT companies from the domestic market reached $115.4 million in 2011. Software constituted 46% of the domestic market, while ISP segment was 54% with an estimated $62 million in total market revenues. Share of foreign owned ISPs and overall ISP market increased considerably due to the demonopolization of the telecommunications industry, formation of new large ISP firms, and acquisitions of telecom players. In 2011, domestic market turnover was larger than that of the exports ($115.4 million vs. $89.7 million).

The picture was quite opposite with software and IT consulting segment, where the exports exceeded the turnover at the domestic market ($89.7 million vs. $53.4 million). The smaller volume of the domestic market was the result of relatively low demand for software and IT consulting services among population, businesses, and the Government. A number of factors were responsible for the low demand including the margin domestic market, low wages, low demand for productivity enhancement tools, financial constraints, high software piracy rates and other factors.

Because of the relatively low domestic demand, there was less inducement for Armenian IT companies to develop packaged software or offer new and quality services. The majority of software packages sold on the domestic market included accounting and financial software for large enterprises and banks. Other products and services with the largest demand were enterprise resource planning solutions, e-commerce, web development services, tools for healthcare industry, and distance learning programs.

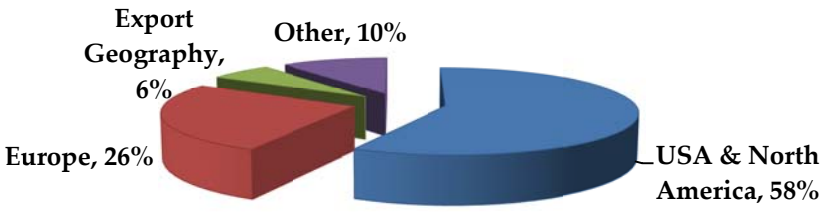


EXPORTS

Armenian IT industry exports nearly $89.7 million of products and services to many countries worldwide. About 50% of IT companies exports their own products and services though the export volumes vary; for certain companies exports account for low share in revenues, while others export their products in whole (100%).

The largest share of exports, almost 58%, goes to the United States and Canada, the second largest is Europe with 26%, and the third comes Russia and CIS with 6%. The revenues generated from exports increased by 29% vs. the 2008 rates.

Export Revenues: Geographical Distribution



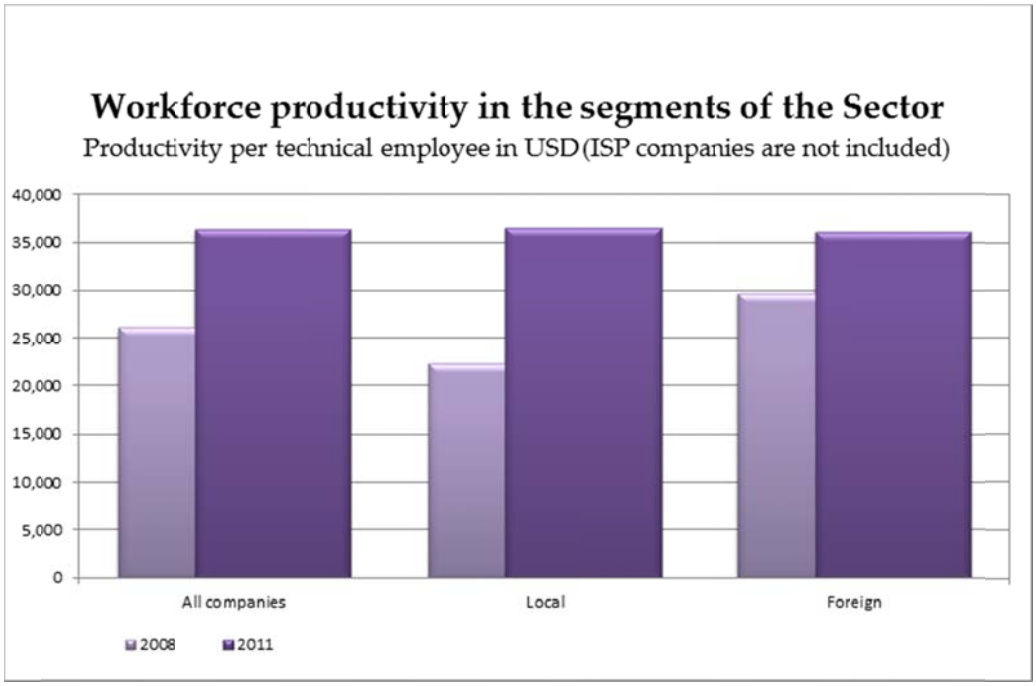
We can state that the declining tendency in export generated revenues due to the global financial crisis dating back to 2008, has been overcome.

In general terms, the factors hindering the growth of exports include the insufficient knowledge about Armenia and its IT industry by the international business community; remoteness from major IT markets and language barrier, which are, however, less important now as the young generation is becoming more proficient in English and other foreign languages.

PRODUCTIVITY

Industry average productivity or output per technical employee for software and IT consulting segment in 2011 reached $36,311 representing nearly 11.6% CAGR from 2008. Local companies showed 17.7% annual increase, while foreign braches around 6.7%.

Due to the continuous and sustainable growth rates in recent years, in 2011 the local companies surpassed the foreign companies by productivity rates.



Though the real productivity has grown in the reporting period, it is obvious that the industry needs to change the current economic model based on low-end outsourcing services to higher value services such as engineering, research, and product development. We already see certain progress as some companies, both foreign and domestic, have started offering engineering, design, and R&D services. It is important to improve productivity considerably because Armenia does not have the enormous workforce of India or China, and, therefore, should focus on boosting output per employee versus size of the workforce in order to raise industry revenues.

In 1998-2011, the industry witnessed an increase in nominal productivity rates somewhere around 10% CAGR, which was mostly attributed to export-oriented firms[5]. Such companies find ways to the foreign markets, thus becoming able to generate higher revenues and to charge higher rates as they build their reputation among the existing and new customers. Additionally, software professionals, project managers, and companies in general become more experienced as they participate in larger and more advanced projects.

[5] Due to unreliability of historical data, as well as significant changes in the industry structure, growth in productivity is difficult to estimate. Therefore, rates provided here should be used with caution.

The factors bottlenecking the growth of productivity of the Armenian IT companies include:

- small domestic market for software and services and low demand for productivity and sophisticated tools;
- focus on low-end outsourcing services and insufficient concentration on packaged software and other higher value segments;
- shortage of high-end software engineering, project management, and business professionals;
- lack of recognized process management certifications such as CMMI, ISO 9001, and others;
- insufficient number or lack of specialized support institutions such as venture capital funds, incubators, technoparks, and others.

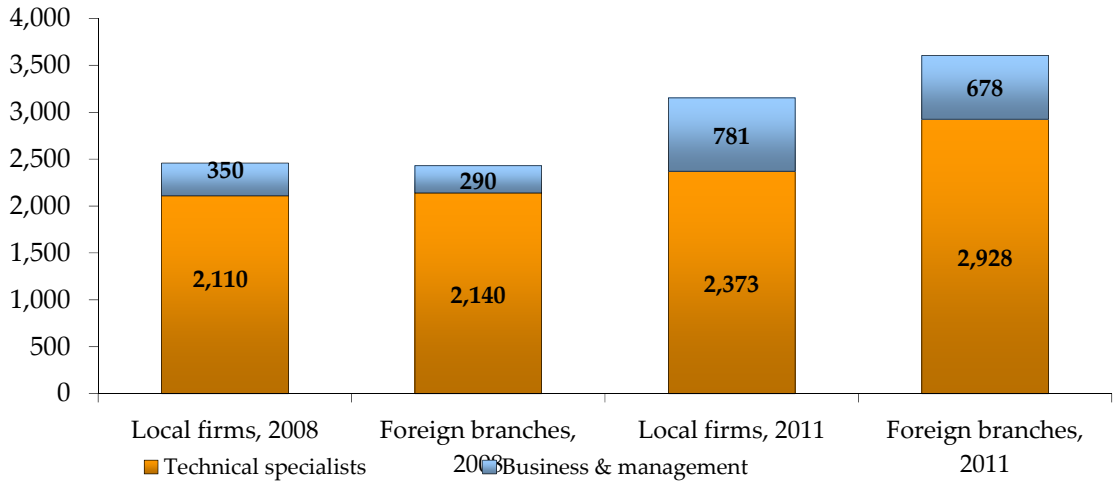
WORKFORCE

In 2011, the workforce employed by the IT sector reached 6,760, which accounted for about 17% growth from 1998. Around 77% of the workforce was technical specialists such as software engineers, analysts, developers, IT project managers, and others.

Management, business and administration professionals represented 23% of the total. Local and foreign companies employed 47% and 53% of the total workforce respectively (in 2008, this ratio was 50/50).

The ratio of males to females employed by the industry was 65/70% and 30/35% accordingly (2008 rates).

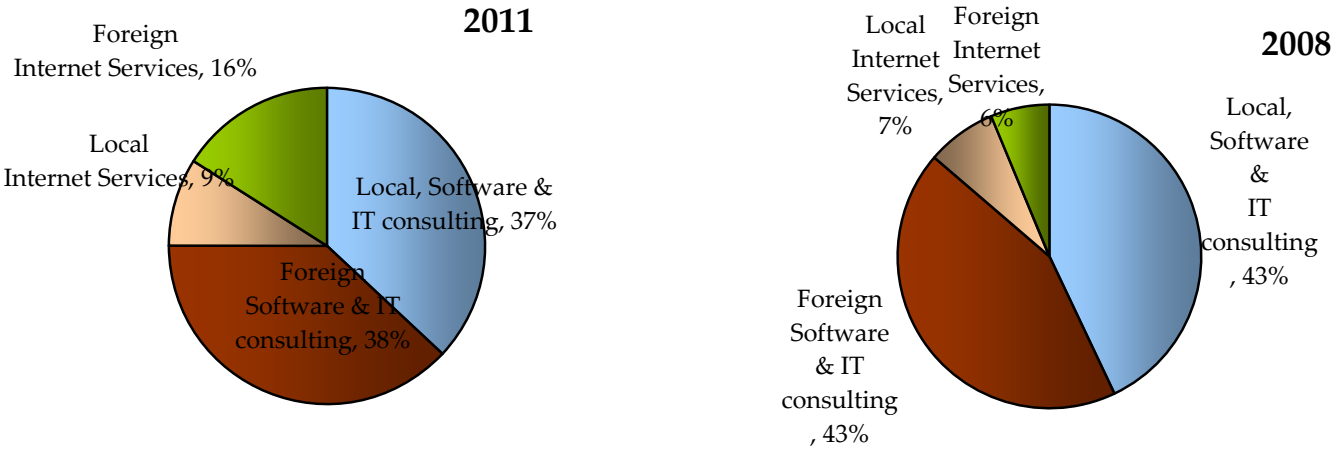
Workforce Distribution: Specialty & Company Ownership



On average, an IT company employed 24 people, which to a certain extent differed from the 2008 rates – 28 employees. Importantly the difference was significant in terms of the average number of employees of local companies and foreign branches - 18 and 34 accordingly.

From 6,760 business and technical professionals employed by sector, 25% worked for ISPs. Workforce distribution, as below chart shows, has changed visibly since 2008: more people are employed by foreign ISPs, 16% of the workforce in 2011 versus 6% in 2008.

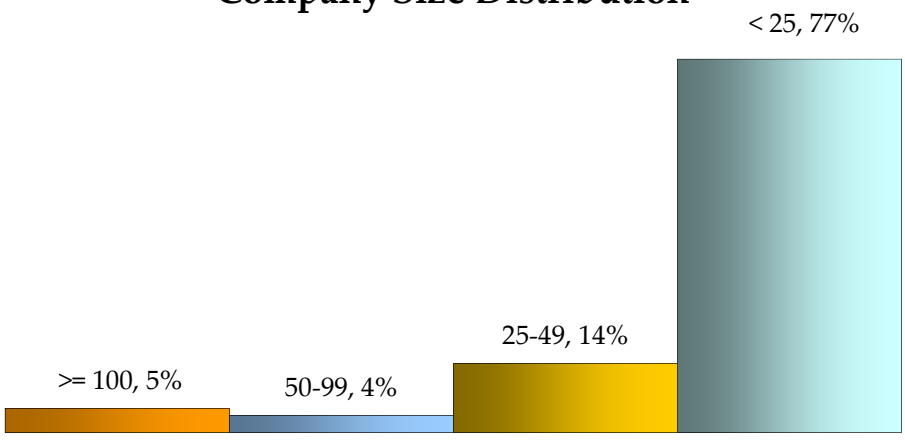
Workforce Distribution: Segments and Company Ownership



Distribution of companies according to their staff size in 2011 was close to the 2008 rates. As before, the number of specialists employed by the firms varied significantly within the industry. Only 5% of all businesses employed 100 or more specialists, while 77% had less than 25 employees. Those largest companies making only 5% employed nearly 3,290 people constituting around 48% of the total workforce.

On the other hand, firms with less than 25 people employed in total close to 2,031 specialists, which was around 30% of the workforce. Thus, distribution of companies according to the workforce size, as below chart shows, is skewed considerably towards small businesses.

Company Size Distribution



Majority of people employed by IT sector has higher education and around 20% of the technical staff has some type of a professional qualification from leading vendors such as Microsoft, Oracle, Sun, and others.

Though the local companies prioritize the personnel training as the essential factor of their development, few of them are in the position to provide ongoing training. The availability of the respective resources and personnel takes a significant role in this process. Branches, as part of their strategic management, constantly train their employees both in Armenia and at the head offices. Furthermore, the branches have created special resource centers and libraries to provide opportunity for the staff to improve their qualification and skills. Employees of certain foreign branches are offered employee stock options and other non-salary incentives. Many companies practice non-paid internships when selecting fresh graduates. It is common to host interns and to train them and use for small added value jobs and then select the best for permanent positions. New employees usually do not start working at full capacity for periods longer than two months. For many companies this is a limiting factor hindering growth and making employers complain about the quality of education.

Armenia has been chosen as an offshore development destination by the foreign companies partly because of its inexpensive and highly productive labor. However, due to the low supply of qualified specialists and the appreciation of local currency, the salary costs have increased over the last years.

In 2011, at local companies the average monthly salary of a technical specialist comprised $1,200 and of the managerial/business personnel $1,500.

Armenia is still considered a low-cost offshore development location, where salaries are competitive with those of many IT outsourcing countries such as India, Russia, Israel, Ireland, and China. Nevertheless, economic forces behind the appreciation of Armenian Dram may have serious negative impact on the cost effectiveness of Armenian software firms.

OTHER AREAS

MANAGEMENT PRACTICES

Significant difference exists between the management methods applied by locally owned companies and branches of foreign firms, for a number of reasons. The majority of branches are not engaged in common management practices such as business development, marketing, and strategic management: these activities are accomplished by the head offices. In addition, foreign companies, when compared to locally owned firms, employ more advanced project management practices and use better documented and designed methodologies. The reason is that, in most cases, processes employed by the parent companies are simply copied to the Armenian branches.

However, as companies grow and develop, their management methods become sophisticated. Western practices are becoming part of the day-to-day management of local software firms. While several years many marketing and project management functions were conducted by a company's director, now many firms have separate departments dedicated to marketing, HR, operations, and other areas. Companies accept larger number of business graduates and pay more attention to management training and professional development. Process improvement methodologies such as CMMI, ISO, and IT Mark are becoming widely recognized in Armenia as more companies get engaged in streamlining their management and development processes.

Many local software companies do no have sufficient experience and knowledge of the best management practices widely employed by foreign branches. The major reasons are the lack of quality managers with appropriate education and background, newly developing market economy, insufficient experience with international clients.

RESEARCH AND DEVELOPMENT

Historically major research were carried out in specially created institutions mostly for defense and industrial projects financed by the Government. Departments at the universities focused on smaller-scale research programs. After the collapse of the Soviet Union, government funding sharply decreased, which in turn forced those institutions to look for new sources of funding to finance their research activities. Several private companies were created on the basis of state-owned research institutions to develop and market commercial products and to perform smaller-scale research activities.

Today, around one fifth of the private companies are involved in some sort of research activities. The research, however, is mostly of applied engineering and company specific

nature and is directed at quick creation of intellectual property. In case of foreign branches, the results of their research are transferred to the parent companies in their respective countries and, therefore, do not normally create competitive advantages for Armenia.

Public research is conducted mostly by the major universities (SEUA and YSU) and by institutes within the National Academy of Sciences. Research is carried out in the fields of computer aided design (CAD), theory of algorithms, discrete mathematics and combinatorics, cognitive algorithms and expert systems, software engineering, networking, distributed processing, pattern recognition, mathematical logic, computational methods and signal processing systems, and others. Generally, in recent years there has been a shift towards the applied as opposed to the fundamental research, which raises concerns over the long-term viability of research by universities and research institutions. Institutions involved in R&D activities face several issues. Other issues are weak commercialization mechanisms and modest cooperation between the industry and research organizations.

TELECOMMUNICATIONS

A variety of internet access service offers is available in Armenia (e.g. dial-up, DSL, WiFi, WiMax, GPRS, EDGE, 3G (UMTS/WCDMA), FTTB, 4G(LTE) and others, a certain portion whereof is offered by numerous providers).

Based on 2009-2010 date, the accessibility to personal computers per 100 people was 15 and 27 accordingly, and the internet access per 100 people was 15.3 and 44 accordingly.

According to the United Nations Global E-management Readiness Report 2010, Armenia was behind 100 countries notwithstanding the fully liberalized telecommunications since 2007 with three major competing mobile operators, numerous internet service providers and a number of new entries. In recent four years the expansion of mobile communication has surpassed 100%, due to which Armenia turned up in the third place among the CIS countries and ahead of its neighbors in the region.

However, with the widespread introduction of relatively inexpensive ADSL, WiFi / WiMAX, and 3G services, the number of broadband users increased substantially over the last 3-4 years. According to various experts, in 2011 the number of broadband subscribers may reach 300,000 (10% of the population or 40% of households), around half of which being users of fiber-optic technologies FTTB, ADSL and the other half of wireless technologies 3G, WiMAX. The broadband internet is provided in the regions primarily through ADSL and 3G technologies offering several Mbps connections to a variety of individual and business users.

As of December 2011, the total internet traffic amounted to approximately 25 Gbps.

There are three mobile phone operators in Armenia: ArmenTel/Beeline, VivaCell/MTS and Orange Armenia.

The major ISPs are foreign invested companies including the aforementioned mobile phone operators, as well as Ucom, GNC-Alfa Arminco, WEB, Armenian Datacom Company (ADC) and others. There are numerous small internet providers offering internet services to a limited number (normally from 2 to 10) large companies or a fixed district (for instance, to some residential areas).

EDUCATIONAL SECTOR

The development of the educational system is a condition precedent to the ongoing development of the IT sector in Armenia. The application of professional IT education models is essential for supplying skillful technical and managerial staff to IT companies.

Armenia has a strong tradition of higher education, where universities put great stress on training students in the fundamentals and in educating them to understand the entire engineering process. Today this tradition is enhanced with new ideas and approaches, which is the result of Armenia's adoption of free market principles.

UNIVERSITIES

State Engineering University of Armenia (SEUA) and Yerevan State University (YSU) are the oldest and largest institutions developing engineering professionals for the IT industry. Other institutions active in the IT education include American University of Armenia (AUA), European Regional Educational Academy (ERA), and Russian-Armenian (Slavonic) University

State Engineering University of Armenia (SEUA)
State Engineering University of Armenia is the successor of Yerevan Polytechnic Institute established back in 1933. The university offers a number of degrees in many fields of engineering, science, and technology, and it is the primary educational institution preparing engineering specialists in Armenia. It has several branches in other cities of Armenia. Number of students today is 10,000[6], and the number of graduates since foundation amounts beyond 115,000. 1960թ. SEUA began teaching computer related courses starting from 1960 when the Department of Cybernetics, Computer Systems, and Radio Engineering was launched. Later each of these areas has become separate departments and together they now educate more than 3,000 engineering students. Today the aforementioned departments offer several specializations in computer and hardware design, software engineering, electronics and chip design, automated control systems, and others. SEUA conducts R&D in a variety of areas such as design and installation of computer systems and networks, research and design of semiconductor devices, artificial intellect, research and development of dynamic systems, analysis and synthesis of management systems, microelectronics, microcircuitry, etc.

[6] Source: SEUA, http://www.seua.am

Yerevan State University (YSA)

YSU was founded in 1919. 1920. Today, it is the largest educational institution in Armenia with more than 13,000 students[7], and estimated number of all graduates reaching 90,000. YSU offers degrees in a wide range of disciplines including biology, economics, history, linguistics, law, mathematics, physics, and other areas. Department of Physics and Mathematics was established back in 1924; later, in 1971, Department of Informatics and Applied Mathematics was founded. These mathematics departments offer majors in such IT related areas as algorithmic languages, cybernetics, discrete mathematics, system programming and modeling, and others. About 2000 students currently study in the above stated departments.

American University of Armenia (AUA)

American University of Armenia (AUA), an affiliate of the University of California, was established in 1991 as a graduate university based on the U.S. system of education. AUA offers Master's degrees in Business Administration, Computer and Information Science, Industry Engineering, Law, and other areas. 75 students currently study at the Department of Industry Engineering.[8] AUA conducts research in such fields as business, engineering, environmental management, healthcare, law, and political science through its several research centers.

European Regional Educational Academy (ERA)

EREA was founded in 2001 by the European Union, and offers degrees in Software Engineering and IT Business Management. Apart from the professional training the ERA curricula include study of three foreign languages: English, French and German. Currently about 180 students currently study at ERA.[9]

Russian-Armenian (Slavonic) University (RAU)

The Russian-Armenian (Slavonic) University was established on August 29, 1997, based on the treaty executed between the Government of Russian Federation and the Government of Armenia. In 1999, the RAU list of professions was further expanded to include specifically Applied Mathematics and Computer Science, and Applied Physics Department was later on established in 2003. The departments provide majors in mathematics and math modeling, system programming, electronics and microelectronics. RAU currently has 324 students.[10]

Current educational system, except for a few universities, is inherited from the former Soviet Union. After the independence, however, demand for professionals had changed significantly, which resulted in discontinuation of many fields and specializations and emergence of new ones. A number of universities have already adopted the western style two-level educational system with Bachelor's and Master's degrees, however the Soviet 5-year degree educational system is still practiced by certain universities. Many universities offer post-graduate education and PhD.

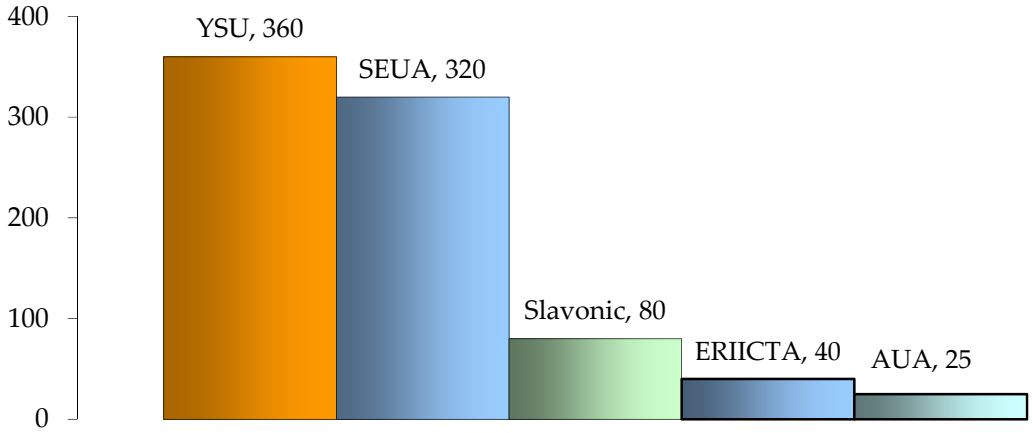
[7] Source: YSU, http://www.ysu.am
[8] Source: AUA, http://www.aua.am
[9] Source: ERA, http://www.eriicta.am
[10] Source: RAU, http://www.rau.am

The main issue faced by the educational sector is inadequate funding: tuition fees and government support are not sufficient for the majority of educational institutions. At the same time, many universities have no intention to raise tuition fees because they are already high for an average Armenian student. Other issues faced by many universities are lack of textbooks and professional literature, outdated library, limited availability of computer equipment and Internet access.

FACULTY AND TEACHING METHODS

Most of the IT related faculty staff is concentrated at YSU and SEUA with the remainder spread throughout other universities. The faculty staff totals 800 at the five leading universities.

Faculty Distribution across 5 IT Universities



The majority of educational institutions consider their curricula and teaching methods up-to-date and in line with industry requirements. Many professors develop their classes using experience of leading European, Russian, and US universities and with their assistance. In some cases, local IT professionals are invited to help faculty in aligning the curricula to the latest industry trends and requirements.

Today, more and more institutions recognize that besides technical skills students need to be proficient in business areas as well. Different business courses are offered at a number of universities including marketing, management, business ethics, law, and other subjects. Teaching of foreign languages such as Russian and English are also considered extremely important for development of quality engineering and managerial cadre.

Despite the recent improvements in the educational system, current teaching methods are considered inadequate in the attempt to meet the IT industry's demand for quality human resources. Furthermore, two major interrelated issues: low wages and aging faculty – result in the faculty size being constant or decreasing over time while the student body growing each year.

COOPERATION WITH PRIVATE BUSINESSES

Cooperation between the industry and the educational institutions was rather weak for a number of post-Soviet years. However, this trend has changed recently. Examples of such cooperation are:

- Interdepartmental Chair of "Microelectronic Circuits and Systems" established by LEDA Systems (acquired in 2004 by Synopsys Inc.) and SEUA. The Chair, now part of Synopsys University Program, supplies more than 60 quality VLSI and EDA specialists each year. Later Synopsys expanded this initiative through opening interdepartmental chairs at YSU, RAU and ERA;

- Internet and web technologies laboratories established by Lycos Europe, EIF, and Sourcio CJSC at SEUA and YSU in 2005;

- Sun educational laboratories formed by Sun Microsystems, EIF, and USAID at SEUA, YSU and RAU in 2008;

- Gyumri IT Center, first IT training center in the city of Gyumri, established by the Fund For Armenian Relief (FAR) and EIF in 2006;

- Microsoft Innovation Center formed by Microsoft, EIF and USAID at SEUA;

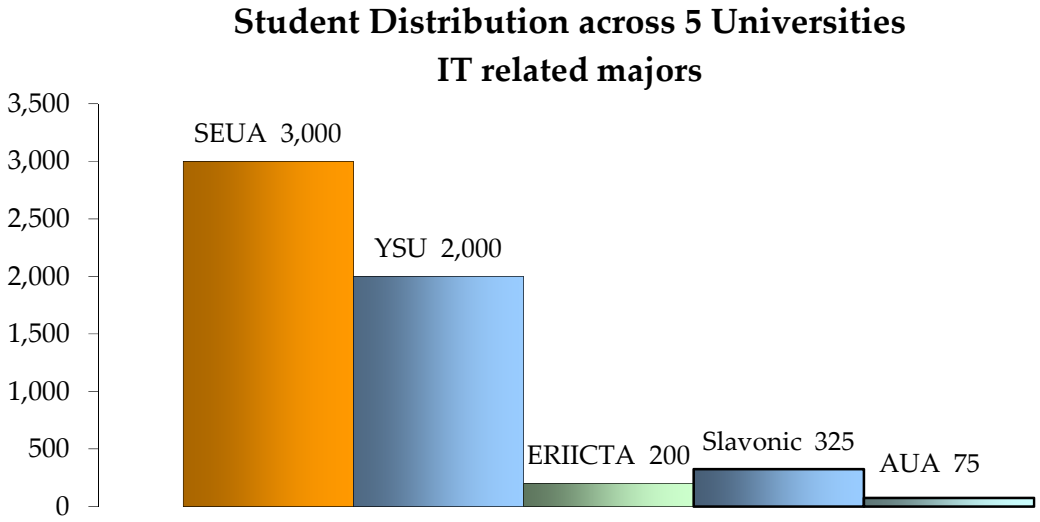
- Armenian-Indian Center for Excellence in ICT, founded in 2011 under the joint project of Governments of Armenia and India;

- Regional Mobile Application Laboratory founded in 2011 for Eastern Europe, South Caucasus and Central Asia under the joint project of InfoDev, Government of Finland and Nokia.

The aforementioned companies hire the graduates of the particular training courses. At this point, industry and university cooperation does not go further than teaching and training, mainly concentrating on the preparation of quality professionals for several companies and industry in general.

STUDENTS

In 2010-2011, nearly 6,900 students were enrolled at the Armenian universities offering IT related professions[11], of which about 6,000 study at the above stated 5 main universities. Around 75% of all these students study at SEUA and YSU. Foreign students from Europe, Russia & CIS, Middle East, and other countries study in Armenia, and their number is growing over time. In recent 3-5 years the students recorded substantial academic progress, and the enrolment in the IT related departments has become rather difficult, specifically at YSU and SEUA. Programming, information and applied mathematics, automated control systems and microelectronics are the most popular majors for applicants.



In general, the representatives of IT firms regard the current number of students as inadequate to meet industry's demand in technical specialists. In addition, the level of qualification of graduates does not often meet the needs of the industry, which forces the IT companies to organize additional on job training for those graduates to obtain relevant qualification and get full time positions.

[11] Source: National Statistical Service of Armenia, http://www.armstat.am

POLICY DEVELOPMENTS

In 2000, the Government of Armenia declared the IT sector as one of the priorities for the development of the Armenian economy, which was followed by a number of specific actions to bring the Government decree into effect. In 2001, the Government jointly with the World Bank, USAID, various foundations, universities, and private enterprises developed the ICT Master Strategy and ICT development implementation plan to promote IT and establish Armenia as a regional ICT hub. In May 2001, the Government approved the ICT Development Concept Paper and Action Plan prepared by the Ministry of Trade and Economic Development in accordance with the recommendations outlined in the ICT Master Strategy.

In July 2001, Information Technologies Development Support Council of Armenia (ITDSC), chaired by the Prime Minister was established by the decree of the President of Armenia. The mission of the Council is to act as a bridge between the Government and the private sector and to serve as a connecting link between the Diaspora and Armenia. The goals of the Council are to assist the Government and the private sector in building strong and viable IT industry and developing Armenia into an advanced information society.

In 2002, Enterprise Incubator Foundation was established by the Government of Armenia and the World Bank to support the development of information technology industry in Armenia. EIF is the largest development initiative within the IT industry in Armenia

Information technology is considered by the Government as an important area for international cooperation. Various projects are initiated in this area: the European Regional Institute of Information and Communication Technologies in Armenia (ERIICTA), which was established with the financial assistance from the European Union; Competitive Armenian Private Sector Program (CAPS), a program funded by the United States Agency for International Development and implemented by Nathan Associates in cooperation with J. E. Austin Associates.

In 2008, the Government adopted a new 10-year industry development strategy focused on building infrastructure, improving quality of IT graduates, creating venture and other financing mechanisms for start-up companies. The main goals of this new strategy are: build a developed information society in Armenia, make Armenia part of the knowledge creation global network, and form a strong and advanced information technology sector. The strategy aims at increasing the rates of computer and internet penetration in all segments of the economy, building new technoparks and incubators, establishing a major venture fund, developing domestic market for local IT products and services, increasing FDI, and other measures targeting the expansion of the ICT sector, and on the other hand the development of an IT society in Armenia. The Government body responsible for the implementation of this strategy and overall IT industry development is the Ministry of Economy.

Since 2008, allocations have been made from the National Budget to the RA Ministry of Economy for providing government support to the development of the IT sector. Those

funds are used for IT industry research, industry status survey, guidelines of the industry and enterprise rates; organization of industry related events of local, regional and international importance – exhibitions, forums, conferences and competitions; participation of Armenia in major international events abroad; and as well co-financing of joint projects and events with foreign governments, international institutions and multinational organizations of IT industry.

ArmTech, the Armenian hi-tech international congress and DigiTech, the specialized information, telecommunications and hi-tech expo, arranged and implemented in close cooperation with the Government of Armenia, have established a tradition.

ArmTech is intended to highlight the growth in hi-tech industry having a strategic importance for the Armenian economy, promote the international collaboration and attraction of investments, foster the cooperation between IT specialists and turn the Armenian hi-tech industry globally recognizable. The annual forum is organized sequentially in Armenian and USA.

The main goal of DigiTech expo is to create a favorable communication environment for hi-tech companies, business consumers and the general public. The expo serves a floor for studying and understanding the real picture, identifying the achievements, challenges and opportunities of the Armenian ICT sector, and tends to facilitate the market entry of IT companies, the exhibition of their products and services and the strengthening of international relations.

In recent years the Government of Armenia has signed a number of cooperation treaties and memoranda of understanding with governments including the Republic of India, Arab Republic of Egypt and others, as well as with world known companies, such as Microsoft, Aclatel, Hewlett-Packard, Sun Microsystems, National Instruments, Mentor Graphics, Cisco, Intel, Synopsys, D-link and others.

The Government of Armenia implements targeted projects for development of IT sector infrastructure. Particularly, in 2008, the Government of Armenia approved the Concept Paper and the Action Plan for reconstruction of Gyumri (Shirak marz, Republic of Armenia) to a technocity. Since 2008, allocations have been made from the National Budget to the Ministry of Economy to provide state support to the activities of Gyumri Technopark

The program aims at turning Gyumri into a Center of Excellence – a Technocity reputed as an international business environment with large education centers, research centers and strong facilities for development, testing, realization of innovative, information and hi-tech projects and starting large-scale production and small and medium hi-tech companies.

Within the framework of Gyumri Technopark project, D-Link International opened the regional software development laboratory in 2011. Given the huge success of the accomplished projects, D-Link plans to build one of its international centers in Gyumri in the near future.

One of the goals of the new ICT Development Strategy adopted by the Government of Armenia is to form an E-society in Armenia, specifically the significant expansion of the computer usage and internet access. To achieve the goal Computer for All program has been launched, which intends to:

- Make computers affordable and accessible to the population,
- Train skillful users of the respective computer hardware and software,
- Enhance internet accessibility to and the use of E-services by the population,
- Reduce the propagation of non-licensed software.

The program is implemented by the Ministry of Economy and EIF jointly with international and local ICT companies, banks and other partners.

In 2010, memoranda of partnership were signed by the Ministry of Economy, Ministry of Education and Science, Intel and Hewlett-Packard, EIF and Unicomp CJSC for the implementation of Teachers PC and Classmate PC pilot projects in Armenia.

Based on the GOA Decree #7 (February 25, 2010), the Government of Armenia approved the Armenian E-society Development Concept Paper for the next few years.

To foster the use of electronic management systems to the fullest extent, in 2010, the Government of Armenia introduced the www.e-gov.am electronic management portal with the intention to unify all electronic management tools and databases of the Armenian government authorities and provide a comfortable environment for their use. The site allows electronic applications for license, electronic registration of organizations, electronic tax reports, electronic visa applications, electronic applications to Intellectual Property Agency, issue of electronic signatures, electronic procurements, etc. New services are being continuously added to the electronic management portal. At present, works are under way to introduce e-health, e-education, e-pension and e-identification services.

To achieve the aforementioned objectives and implement other industry development programs and projects, the Government of Armenia signed a credit agreement with the European Bank for Reconstruction and Development, under which the Armenia E-Society and Innovation for Competitiveness Program started in 2011. The Program consists of several projects aimed at strengthening the ICT infrastructure in Armenia, taking actions to foster the industry development, formation of e-society, etc. Specifically, the program includes the following projects: Pan-Armenian Broadband Access and Management Network, Introduction of Certification Center in Armenia, Computer for All, Gyumri Information Technologies Center, Financial Support to Companies Needing Innovative Knowledge and Technologies, Assistance to IT/Research Industry Development, and others.

In 2011, the USAID funded Economic Development and Market Competitiveness (EDMC) project was launched, targeting SME capacity building in IT sector among others. The overall budget of the project is $ 17 million.

Below table provides IT industry growth targets through 2018.

Main Indicators	2018
Home computer penetration	70%
Educational computer penetration	100%
Central and local government computer penetration	100%
Population Internet penetration	90%
State entity spending on locally developed IT products, % of national budget	>1%
Domestic spending on locally developed IT products, % of GDP	>2%
Share of e-services in all services provided by government authorities	80%
Number of IT companies with foreign capital	1000 200
IT workforce	20000
Productivity, output per employee	50,000 USD
Industry revenues	1 mln USD
Exports	700 mln USD
Companies with ≥ 1,000 employees	>1
IT companies offering R&D services	100-200
Techno-city Techno-Parks & incubators	>1 >10
Venture capital funds committed	>700 mln USD
Local open joint stock companies (registered at Armenian Stock Exchange)	50 - 100
Local open joint stock companies (registered at international stock exchanges)	>5

APPENDICES

ARMENIA, KEY FACTS

Republic of Armenia, formerly one of the fifteen Soviet republics, declared its independence on September 21, 1991, based on the results of the nation-wide referendum (99% aye vote). Capital and the largest city is Yerevan.

GEOGRAPHY

Armenia is located in the South Caucasus region of Eurasia continent. Border countries are Azerbaijan (east and southwest), Georgia (north), Iran (south), and Turkey (west). Land area is approximately 25,800 square kilometers or 11,500 square miles. Armenia is a mountainous region with the average elevation above sea level of 1,800 meters or 5,900 feet. The climate is sunny, dry, continental with hot summers and moderate to cold winters.

POPULATION

According to the 2002 data, the population is 3.2 million with approximately 67% residing in cities and towns. Armenian is the official language. Armenians are fluent in Russian, and many, especially in Yerevan, are also proficient in English. The population of Armenia is highly educated with 98% literacy rate for residents over 17 years old. Educational system of Armenia has two levels, which includes secondary and higher educational institutions. The largest universities are Yerevan State University and State Engineering University. Armenia was the first country to officially adopt Christianity as its state religion in 301 A.D.

GOVERNMENT SYSTEM

Armenia is an independent, democratic, social and lawful state. The state power is exercised under the Constitution and laws, on the principle of separation of legislative, executive and judicial authorities. The president of Armenia is the head of the state. The president is elected by the citizens of Armenia for a five year term and maximum of two consecutive terms. The President of Armenia is Serzh Sargsyan, who was elected on February 19, 2008.

The Government of Armenia is the executive power. The Government consists of the Prime Minister and ministers. Based on the distribution of deputy seats at the National Assembly and consultations with parliamentary factions, the President appoints Prime Minister the person enjoying the trust of the majority deputies, otherwise the person having the trust of the biggest number of deputies. The President appoints and dismisses the members of the Government on the recommendations of the Prime Minister.

The supreme legislative power is the single-chamber National Assembly. It consists of 131 members, who are elected by people for 5-year term. The latest elections took place in May 2007.

ECONOMY

Major industries: non-ferrous metallurgy, electric energy, electronics, electric engines, chemical and petrochemical, metal cutting machine tools, software development, wood working, mining, building materials and construction, furniture, watches, health care, food processing and beverages, jewelry, instruments, diamond cutting, textiles and shoes, silk fabric, tobacco, tourism and tires. According to the 2010 Index of Economic Freedom[12] compiled by the Heritage Foundation and the Wall Street Journal, Armenia is the 36th freest economy in the world (Norway 30, Latvia 56).

Main Economic Indicators[13]

	2003	2004	2005	2006	2007	2008	2009	2010
Gross Domestic Product, (GDP), billion USD	$2.80	$3.56	$4.87	$6.41	$9.20	$11.9	$8.54	$9.39
Real GDP growth, % change over previous year	13.9%	10.1%	13.9%	13.4%	13.8%	6.8%	-19.7%	2.6%
Inflation, annual average	4.7%	7.0%	0.6%	2.9%	6.0%	9.0%	-5.1%	8.2%
Unemployment rate	9.8%	9.4%	8.1%	7.4%	7.1%	6.3%	6.9%	7%
Average wage, annual average, USD	$674	$980	$1,365	$1,846	$2,718	$3,582	$3,363	$3,496
Exports, billion USD	$0.68	$0.72	$0.95	$1.00	$1.16	$1.06	$0.68	$1.01
Imports, billion USD	$1.27	$1.35	$1.77	$2.20	$3.28	$4.41	$3.31	$3.78
Exchange range USD/AMD, reporting period average	578.80	533.45	457.69	416.04	342.08	305.97	363.28	373.66

BUSINESS ENVIRONMENT

The following are major taxes in Armenia, which are considered rather low compared to those adopted in many other countries:

- multilevel *personal income tax* has the maximum rate of 20%;
- *value added tax (VAT)* is 20%;
- *corporate tax* rate is 20%; and
- *employee social security taxes* with the rate of 3% are imposed on employees; a specific scale is applied for employers.

Around 20% of IT companies are involved in activities subject to licensing, i.e. data transfer and internet access services. The Law "On Licensing" provides the list of business activities subject to licensing. Armenia offers several incentive programs for foreign investors. In particular, no duties on statutory capital, no barriers on investment entry, and a 5-year protection clause in the Law on Foreign Investments. Additionally, companies operating in Armenia have an option to carry forward their tax losses to the following financial year.

There are incentives available to exporters such as no export duty, and VAT refunds on goods and services exported. Imports of a few IT products are exempt from customs duties

[12] Source: the Heritage Foundation, http://www.heritage.org/index/
[13] Source: the Central Bank of Armenia, www.cba.am, Armenian Statistical Service, www.armstat.am

and taxes. VAT is deferred on some products, such as computers, when they enter the country. According to the Armenian customs code, the value of contents of computer software is not included in the customs value, which is limited only to the value of the carrier media. This provision is in accordance with WTO/GATT customs valuation agreements.

Key Indicators for Opening and Operating a Business in Armenia [14]

Indicator	Armenia	Europe & Central Asia	OECD Countries
Starting a Business: Time (days)	15	16	14
Starting a Business: Cost (GDP per capita, %)	3.1	8.5	5.3
Hiring Cost (% of salary)	17.5	26.7	21.4
Firing Costs (weeks of wages)	8.7	26.2	31.3
Enforcing Contracts: Time (days)	285.0	408.8	351.2
Enforcing Contracts: Cost (% of debt)	19.0	15.0	11.2

INTELLECTUAL PROPERTY RIGHTS

Armenia has started reforming its intellectual property regime in the last ten years. It has created a modern system that protects intellectual property rights. Currently, intellectual property related matters in Armenia are regulated by the Civil Code, Law on Copyright and Related Rights, Law on Patents, Law on Trade Names, Law on Trademarks, Service Marks and Appellations of Origin, Law on Protection of Topographies of Integrated Circuits, and Law on Protection of Economic Competition, as well as by a number of international treaties. Armenian legislation on intellectual property has been harmonized with the requirements of the Agreements on Trade Related Aspects of Intellectual Property Rights (TRIPS Agreements). Since February 2003, Armenia has been a member of the World Trade Organization (WTO).

INTERNATIONAL ORGANIZATIONS

Armenia has a membership in a number of international organizations, agreements, and treaties including Commonwealth of Independent States (CIS), Council of Europe (CE), Economic Commission for Europe (ECE), Eurasia Economic Community (EurAsEC), Black Sea Economic Cooperation Organization (BSEC), International Monetary Fund (IMF), Interpol, International Atomic Energy Agency (IAEA), International Civil Aviation Organization (ICAO), International Fund for Agricultural Development (IFAD), International Organization for Standardization (ISO), International Telecommunications Union (ITU), Organization for Security and Cooperation in Europe (OSCE), United Nations (UN), World Bank (WB), World Intellectual Property Organization (WIPO), World Health Organization (WHO), World Trade Organization (WTO) and others.

[14] Source: The World Bank's Doing Business database, http://www.doingbusiness.org

In 2011, Armenia took the position of the coordinator of Information and Communication Technologies working group operating under the Black Sea Economic Cooperation (BSEC) Organization. In November 2011, the 2011-2013 road map was approved, which was drafted and submitted by the coordinating country – Armenia in compliance with the Joint Declaration adopted by the foreign ministers of BSEC member countries and the Joint Declarations.

SCIENCE AND TECHNOLOGY IN ARMENIA, TIMELINE

Year	Soviet Armenia establishments and events
1919	Yerevan State University (YSU)
1924	Department of Physics and Mathematics at YSU
1933	Yerevan Polytechnic Institute (State Engineering University of Armenia, SEUA)
1935	Armenian branch of USSR Academy of Sciences
1942	Yerevan Physics Institute
1943	Armenian Academy of Sciences (National Academy of Sciences, NAS)
1946	Byurakan Astrophysical Observatory
1955	NAS Institute of Mechanics
1956	Yerevan Scientific Research Institute of Mathematical Machines (YerSRIMM)
1957	Institute of Informatics and Automation Problems
1958	"Transistor" semiconductor R&D and manufacturing plant
1959	First generation computer "Aragats" on vacuum tubes at YerSRIMM
1960	NAS Institute of Radiophysics and Electronics Department of Cybernetics at SEUA
1961	Second generation computer "Hrazdan" on semiconductors at YerSRIMM
1963	Development of microprogrammed computers "Nairi" at YerSRIMM
1964	"Sirius" radioelectronics plant in city of Abovyan
1965	"Posistor" microelectronics factory in city of Abovyan
1966	Institute of Microelectronics, Scientific Research, and Technology
1967	NAS Institute of Physical Research
1971	NAS Institute of Mathematics Department of Informatics and Applied Mathematics at YSU
1972	Department of Radio Engineering at SEUA
1973	ES-1030 computer (IBM 360/370) at YerSRIMM
1976	"Nairi-3" computer with shared usage capabilities at YerSRIMM
1978	Yerevan Telecommunications Research Institute ES-1045 computer (IBM 360/370) at YerSRIMM
1979	Department of Calculating Techniques (Computer Systems) at SEUA
1980	NAS Institute of Applied Problems of Physics
1981	"Nairi-4" computer (PDP compatible) at YerSRIMM
1984	ES-1046 computer (IBM 360/370) at YerSRIMM SEUA branches in cities of Kapan and Goris
1986	Ashtarak semiconductor and electronics manufacturing plant ($120 million investment)
1987	First Armenian private IT firm "Armenian Software"
1988	"Mars" integrated circuits and electronics manufacturing plant ($300 million investment)
1990	NAS engineering center "Mashtots" (atomic optics, thin film physics)

Year	Independent Armenia establishments and events
1991	Armenia declares independence on September 21 American University of Armenia (AUA)
1992	Yerevan Automated Control Systems Scientific Research Institute (YerACSSRI) Arminco (leading ISP in Armenia)
1994	MSHAK (Armenia's leader in CNC systems and tools)
1995	HPL (U.S., yield management software; acquired by Synopsys in 2005) ArmenTel (Armenia's leading telephone company)
1997	Russian-Armenian (Slavonic) State University
1998	Acquisition of ArmenTel by Greek telecom OTE Credence Systems (U.S., semiconductor design-to-test solutions) Representative offices: Alcatel, Siemens AG
1999	Virage Logic (U.S., advanced embedded memory IP)
2000	Union of Information Technology Enterprises (UITE, Armenian IT association) Viasphere Technopark (U.S., commercial technology park) LEDA Systems (U.S., digital standard cells and I/O libraries; acquired by Synopsys in 2004) Epygi Technologies (U.S., IP PBXs)
2001	"Microelectronic Circuits and Systems" chair at SEUA in cooperation with LEDA Systems ICT Master strategy and Information Technologies Development Support Council (ITDSC) European Regional Institute of Information and Communication Technologies in Armenia (ERIICTA)
2002	Enterprise Incubator Foundation Lycos Europe (Germany, pan-European online network)
2003	EPAM Systems (U.S., global offshore software development firm)
2004	Synopsys Inc. (U.S., world leader in semiconductor design software) CQG (U.S., analytics software and trading solutions)
2005	VivaCell (second mobile operator in Armenia) Luxoft (Russia's leading software development firm)
2006	Microsoft Corporation, representative office Acquisition of ArmenTel by Russian mobile operator VimpelCom (Beeline)
2007	National Instruments Corporation (U.S., global leader in virtual instrumentation solutions) Macadamian (Canada, full-range software development and related services firm) Acquisition of VivaCell by Russian mobile operator Mobile TeleSystems (MTS)
2008	Mentor Graphics (U.S., a world leader in electronic hardware / software design solutions) New IT industry strategy adopted by the Government of Armenia Orange SA (France Telecom) won the state tender for the third mobile operator in Armenia
2009	«iCON Communications' Wi-MAX network in Yerevan Orange Armenia's nationwide 3G+ network New fiber-optic channel by GNC-Alfa connecting Armenia to the global internet UCOM Communications' triple-play fiber network in Armenia
2010	Synopsys Inc. acquisition of Virage Logic
2011	Opening of Microsoft Innovation Center Opening of Armenian-Indian Center for Excellence in ICT Establishment of Regional Mobile Applications Laboratory Opening of D-Link International regional software development laboratory in Gyumri Acquisition of iCON Communications by Ucom Communications Official announcement of ST Kinetics' (Singapore Technologies Kinetics Ltd) – one of the largest engineering company's entry into Armenia

MINISTRY OF ECONOMY OF THE REPUBLIC OF ARMENIA

The history of the Ministry of Economy dates back to 1965 when Material and Technical Supply Department within the government of the Soviet Armenia was established by the decree of the Supreme Council of Armenian SSR. In 1978, the Department was renamed to Material Supply State Committee, and later in 1992 the Committee became the Ministry of Material Resources of the Republic of Armenia. In the period of 1995-2002, the Ministry of Material Resources, the Ministry of Trade, and the department of Foreign Tourism, and later the Ministry of Industry, and the Ministry of Economy merged and later in 2002 were reorganized into the Ministry of Trade and Economic Development. According to the President's Decree on April 21, 2008, the Ministry was renamed to the Ministry of Economy of the Republic of Armenia.

Today the Ministry covers a number of areas including economic policy, regional development, science and innovation policy, foreign cooperation and investment policy, information technology industry development, relationship with EU and WTO, natural resources, trade policy, standardization and metrology, intellectual property, tourism sector development, and others.

The 3-year strategy of the Ministry recently adopted by the Government is intended to:

- create a productive and transparent management system,
- form an environment supportive to the sustainable and proportional development of the Armenian economy,
- build an entrepreneurial and investment-friendly business environment,
- support productive public-private sector cooperation,
- promote the integration in the global economy parallel with improving the competitiveness of Armenia,
- design and implement a diversified industrial policy aimed at developing priority sectors of the economy,
- support the transition of Armenia towards resource-saving and knowledge-based economy.

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ENTERPRISE INCUBATOR FOUNDATION

Enterprise Incubator Foundation or EIF is a business development and incubation agency operating in Yerevan, Armenia. EIF was established by the Government of Armenia within the framework of the World Bank's "Enterprise Incubator" project to support the development of Information Technology sector in Armenia. EIF objectives are to improve competitiveness of Armenian IT companies in the global marketplace, build linkages with business communities in key technology markets, improve access of local companies to knowledge and information on best practices and experience, and assist Armenian firms with attracting local and foreign investors.

Enterprise Incubator provides a comprehensive package of services via its two major components:

Business Services focus on assisting Armenian technology firms in a variety of areas including business development, marketing and promotion, management, accounting and finance, legal, and other areas vital to the success of a company. Business Services component helps existing companies in growing their businesses within Armenia and internationally, facilitates the development of start-ups, and assists local entrepreneurs in building their ideas into successful businesses. As part of its assistance, EIF helps companies to improve professional and business skills of the employees and managers via provision of short-term advanced trainings and seminars and creation of learning partnerships within the industry and the universities.

Facility Services component provides high-end facilities to existing technology companies and newly created start-ups. Options included in the base package are high-quality office space, shared meeting and conference rooms, shared resource center with access to literature and other information resources, high-speed Internet connection, receptionist and security, and 24-hour access to the facility. The facilities are located at the premises of the Russian-Armenian (Slavonic) University.

EIF signifies the development of long-term relationships with organizations and individuals worldwide interested in mutually beneficial business collaboration. It works closely with many technology companies in Armenia and may serve as a major channel to creating successful partnerships with Armenian enterprises. Individuals and companies interested in developing partnerships or investing in Armenia are encouraged to contact EIF at the below address.

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Director Bagrat Yengibaryan

UITE, ARMENIAN IT ASSOCIATION

The Union of Information Technology Enterprises (UITE) is the primary IT Association in Armenia. It was formed in 2000 as a non-profit association of Armenia-based ICT companies. UITE was established by the private sector to consolidate industry's advocacy efforts, facilitate business, and encourage advancement of research in the ICT sector. Member firms are involved in Internet applications, e-commerce, IT services, chip design, and other areas. From May 2004, UITE is a member of World Information Technology and Services Alliance (WITSA).

UITE is involved in a variety of activities such as:

- advocacy of member interests,
- organization of trade shows and programming contests,
- workforce development through custom training programs,
- design of online information and collaboration portals on IT sector,
- conducting industry surveys and research,
- assisting its members with business development.

UITE leads a number of policy related initiatives aimed at the development of ICT sector in Armenia. As part of these initiatives, the association formed seven working groups, which will formulate Armenian ICT sector development strategic plans and activities. Groups cover different areas vital to the sector development including regulatory environment and advocacy, ethics, global marketing and promotion of the industry, education and workforce development, telecommunications infrastructure, domestic ICT market development.

One of the key events organized by the association is the annual DigiTec Expo technology tradeshow, which was first held in September 2005 in Yerevan and has turned into an annual event. The exhibition attracts a variety of domestic and foreign businesses, educational institutions, and other organizations active in the ICT sector. The DigiTec-2011 Expo was participated by Armenian, Singaporean, Taiwanese, Russian, Polish and Georgian companies, 115 in total, which was higher by 70% versus the previous-year participation of 68 companies. The number of visitors to the exhibition is growing from year to year: the 2011 expo hosted more than 18,000 visitors.

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METHODOLOGY

In this section, we describe how we have estimated various industry figures, what sources of information and data were used, as well as the assumptions, various issues relating to collection and analysis of information, as well as other aspects important for understanding the value and limitations of this Report.

Information and Data

While developing the Report, we had to rely on the data provided by the industry representatives during their interviews. Although we believe that information and data gathered during those interviews were mostly reliable, however, not all of the companies provided all the information we required. Since in a number of cases, we did not have data at all, we had to extrapolate various figures based on what we had at hand.

Therefore, because of the unavailability and, in some cases, unreliability of the data, the Report was based, to some extent, on our estimates and analysis. However, based on our experience with the industry, estimates provided in other reports and publications, and other sources, we believe that the Report offers reliable description of the industry, its main trends and characteristics, as well as overall prospects.

Unless otherwise specified, all information and data in this report are based on EIF estimates and analyses and are for the period 2008-2010. All monetary units are in the United States dollars.

Definitions

Software and IT consulting segment of the information technology industry is defined as the cluster of companies engaged in software development and maintenance; provision of software related services, consulting and integration; development of graphics, animation, multimedia applications; chip design; and provision of engineering and R&D services. Internet service providers offer access to internet (wholesale and/or retail) through various channels; this group does not include VoIP businesses or Internet cafes. While companies included in our research may be engaged in a number of other activities within the technology sector, the above two components generate the major share of the firms' revenues. Respectively, only software and ISP segments of those companies were used in estimating industry figures.

Locally owned or local companies are defined as Armenia-based enterprises, and at least 51% of their equity is owned by citizens or permanent residents of Armenia or locally owned firms. Foreign branches or companies are defined as Armenia-based enterprises, and at least 51% of their equity is owned by foreign citizens, residents, or firms.

Assumptions and Estimation Methods

Industry revenues were estimated, when we did not have accurate data from the companies, based on the number of employees, average salary levels, as well as non-wage related costs, and respective profit margins. We tested our assumptions against reliable revenue figures from several companies, and, therefore, we believe that our industry revenue estimates provide reasonable approximation to the actual amounts. Our calculations did not include hardware and hi-tech companies, as well as temporary donor funded software projects for the Government.

Productivity was estimated based on the annual revenues per employee. Two sets of figures were calculated: one was a mere division of all industry revenues by the total workforce; second was the annual revenue of each company per employee, which was then averaged for the total industry using revenues as the weight factor. While the second estimation provides a better picture of the productivity, it complicates the forecasting of the industry's growth. Therefore, industry projections are estimated using the first set of figures. Productivity calculations were made only for software development companies because significant differences existed between those firms and ISPs in terms of how their revenues were generated.

Workforce was estimated, when we did not have data from the industry, based on the average number of employees per company. Average figures were calculated using a sample of local and foreign companies, where the outlier companies with largest and smallest staff were excluded. This method allows estimating average employee quantities that better reflect the actual state of the industry.

For forecasting the industry growth, we assumed that the local and international demand for the products and services from Armenian companies matched the supply, and, therefore, we did not consider directly the demand side in our forecast.

Outline of Industry Survey

This report is based on the industry survey conducted by EIF in November-December 2011. The survey covered three main groups: companies engaged in software development and IT consulting, internet service providers, and IT related faculties of major educational institutions. The surveys included a number of areas important to the development and growth of the industry such as business and legal environment, revenues, educational framework, human resources, export and others. The report also uses information from EIF previous industry surveys conducted in 2003 – 2010.

The 2011 survey covered 230 software, IT consulting, and internet service firms, and IT related faculties of major educational institutions.

Survey Coordinator – Sophia Muradyan, EIF.
Data Analysis and Industry Survey Report – Sophia Muradyan, Zhenya Azizyan and Sona Kochkanyan, EIF.

INDUSTRY STATISTICS

	2011	% from Industry	2008	% from Industry	% change 2011/2008	CAGR 2011/ 2008
Operating Companies						
Industry total	281	100%	175	100%	61%	17.1%
Local firms	174	62%	119	68%	46%	13.5%
Internet service providers (ISP)	20	7%	20	11%	0%	0.0%
Foreign branches	107	38%	56	32%	91%	24.1%
Internet service providers (ISP)	12	4%	3	2%	300%	58.7%
Breakdown of foreign and locally owned companies						
Industry total	281	100%	175	100%	61%	17.1%
Armenia	170	60%	119	68%	43%	12.6%
USA and North America	54	19%	36	21%	50%	14.5%
Europe	31	11%	9	5%	244%	51.0%
Russia and CIS	16	6%	10	6%	60%	17.0%
Other	10	4%	1	1%	900%	115.4%
Foreign markets (million USD)						
Industry total	$89.7	100%	$69.4	100%	29%	8.9%
Armenia	$51.6	58%	$41.0	59%	26%	8.0%
USA and North America	$23.2	26%	$12.7	18%	84%	22.5%
Europe	$5.5	6%	$11.8	17%	-53%	-22.3%
Russia and CIS	$9.3	10%	$4.0	6%	134%	32.7%
Productivity (average output per technical employee, excluding ISPs), million USD						
Industry total	$36,311	100%	$26,115	100%	39%	11.6%
Local firms	$36,508	101%	$22,366	86%	63%	17.7%
Foreign branches	$36,115	99%	$29,757	114%	21%	6.7%
Turnover, million USD	**2011**	**% from Industry**	**2008**	**% from Industry**	**% change 2011/2008**	**CAGR 2011/ 2008**
Industry total	**$205.1**	**100%**	**$111.3**	**100%**	**84%**	**22.6%**
Local firms	$87.0	42%	$50.1	45%	73%	20.2%
Foreign branches	$118.1	58%	$61.2	55%	93%	24.5%
Local market	**$115.4**	**56%**	**$41.9**	**38%**	**175%**	**40.2%**
Local firms	$58.0	28.3%	$31.1	28%	87%	23.1%
Software and IT consulting	$40.0	19%	$21.4	19%	87%	23.1%
Internet Services	$18.0	9%	$9.6	9%	87%	23.1%
Foreign branches	$57.4	28.0%	$10.8	10%	431%	74.5%
Software and IT consulting	$13.4	7%	$5.1	5%	162%	37.8%
Internet Services	$44.0	21%	$5.7	5%	673%	97.7%
Exports	**$89.7**	**44%**	**$69.4**	**62%**	**29%**	**8.9%**
Local firms	$18.9	9%	$19.1	17%	-1%	-0.3%
Foreign branches	$70.7	34%	$50.3	45%	40%	12.0%
Total Industry Turnover	**$205.1**	**100%**	**$111.3**	**100%**	**84%**	**22.6%**
Software and IT consulting	$143.1	70%	$96.0	86%	49%	14.2%
Internet Services	$62.0	30%	$15.3	14%	304%	59.3%

Human Resources	2011	% from Industry	2008	% from Industry	% change 2011/2008	CAGR 2011/ 2008
Industry Total	**6,760**	**100%**	**4,890**	**100%**	**38%**	**11.4%**
Technical professionals	5,226	77%	4,250	87%	23%	7.1%
Management and administrative	1,534	23%	640	13%	140%	33.8%
Software and IT consulting	**5,060**	**75%**	**4,220**	**86%**	**20%**	**6.2%**
Local firms	2,516	37%	2,100	43%	20%	6.2%
Foreign branches	2,544	38%	2,120	43%	20%	6.3%
Internet Services	**1,700**	**25%**	**670**	**14%**	**154%**	**36.4%**
Local firms	638	9%	360	7%	77%	21.0%
Foreign branches	1,062	16%	310	6%	243%	50.7%
Local firms	**3,154**	**47%**	**2,460**	**50%**	**28%**	**8.6%**
Technical professionals	2,373	35%	2,110	43%	12%	4.0%
Management and administrative	781	12%	350	7%	123%	30.7%
Foreign branches	**3,606**	**53%**	**2,430**	**50%**	**48%**	**14.1%**
Technical professionals	2,928	43%	2,140	44%	37%	11.0%
Management and administrative	678	10%	290	6%	134%	32.7%
Technical professionals	**5,060**	**75%**	**4,220**	**86%**	**20%**	**6.2%**
Technical professionals	3,972	59%	3,680	75%	8%	2.6%
Management and administrative	1,098	16%	540	11%	103%	26.7%
Internet Services	**1,700**	**25%**	**680**	**14%**	**150%**	**35.7%**
Technical professionals	1,254	19%	580	12%	116%	29.3%
Management and administrative	436	6%	100	2%	336%	63.4%

Company Specializations, % of Companies	Total, 2011	Local, 2011	Foreign, 2011	Total, 2008	Local, 2008	Foreign, 2008
Customized software and outsourcing	18%	10%	8%	23.2%	13.7%	9.5%
Chip design, testing and related activity	3%	1%	2%	3.9%	1.4%	2.5%
Internet services	6%	5%	1%	8.1%	7.0%	1.1%
Networking systems and communications	9%	6%	3%	7.4%	3.5%	3.9%
Internet applications and e-commerce	8%	6%	2%	8.4%	6.0%	2.5%
It services and consulting	14%	10%	4%	10.2%	7.4%	2.8%
Accounting, banking and financial software	6%	4%	2%	6.3%	5.3%	1.1%
Web design and development	17%	13%	4%	12.6%	10.2%	2.5%
Computer graphics, multimedia and games	5%	4%	1%	4.9%	4.6%	0.4%
Databases and management information systems	7%	5%	2%	6.7%	5.3%	1.4%
Other	7%	3%	4%	8.4%	4.6%	3.9%

Breakdown of company specializations by revenues, million USD	Total, 2011	Local, 2011	Foreign, 2011	Total, 2008	Local, 2008	Foreign, 2008
Customized software and outsourcing	$38.0	$20.8	$17.2	$22.9	$10.1	$12.8
Chip design, testing and related activity	$29.0	$0.9	$28.1	$17.5	$1.1	$16.4
Internet services	$62.0	$18.0	$44.0	$15.3	$9.6	$5.7

Networking systems and communications	$9.9	$7.6	$2.3	$10.6	$2.2	$8.4
Internet applications and e-commerce	$5.1	$2.8	$2.3	$9.3	$1.6	$7.8
It services and consulting	$17.1	$8.0	$9.1	$7.0	$5.2	$1.7
Accounting, banking and financial software	$10.0	$7.0	$3.0	$7.1	$5.9	$1.2
Web design and development	$14.0	$7.9	$6.1	$3.9	$2.9	$1.0
Computer graphics, multimedia and games	$3.7	$3.0	$0.7	$3.5	$3.4	$0.0
Databases and management information systems	$6.2	$4.9	$1.3	$3.1	$2.4	$0.7
Other	$10.1	$6.1	$4.0	$11.1	$5.7	$5.4

Armenia on the Internet

1. www.ada.am, Armenian Development Agency
2. www.aitc.am, Armenian-Indian Center for Excellence in ICT
3. www.armeniainfo.am, Information about Armenia
4. www.armeniapedia.org, Encyclopedia about Armenia and Armenians
5. www.armenica.org, Information on and history of Armenia
6. www.arminfo.am, www.armenpress.am, www.arka.am, Major Armenian news agencies
7. www.armstat.am, National Statistical Service of Armenia
8. www.banks.am, Information about banks and financial institutions
9. www.bisnis.doc.gov/bisnis/country/armenia.cfm, US Business Information Service on Armenia
10. www.cba.am, Central Bank of Armenia
11. www.cia.gov/cia/publications/factbook, CIA World Factbook
12. www.customs.am, Armenian Customs Service
13. http://directory.google.com/Top/Regional/Asia/Armenia, Google on Armenia
14. www.gov.am, Government of Armenia
15. www.imf.org/external/country/ARM, International Monetary Fund
16. www.mfa.am, Ministry of Foreign Affairs of Armenia
17. www.micarmenia.am, Microsoft Innovation Center in Armenia
18. www.mindiaspora.am, Ministry of Diaspora of Armenia
19. www.mlabeca.com, Regional Mobile Application Laboratory for ECA
20. www.parliament.am, National Assembly of Armenia
21. www.president.am, President of Armenia
22. www.spyur.am, Armenian Business Directory and Yellow Pages
23. www.taxservice.am, State Tax Inspection of Government of Armenia
24. www.uite.org, Union of Information Technology Enterprises of Armenia
25. www.un.am, United Nations in Armenia
26. www.usaid.am, USAID/Armenia
27. www.worldbank.org.am, World Bank's Mission in Armenia

Abbreviations

ADSL	–	Asymmetric Digital Subscriber Line
ASSR	–	Armenian Soviet Socialist Republic
AUA	–	American University of Armenia
CAD	–	Computer Aided Design
CAGR	–	Compound Annual Growth Rate
CAPS	–	Competitive Armenia Private Sector project
CIS	–	Commonwealth of Independent States
CMMI	–	Capability Maturity Model Integrated
ECM	–	Electronic computing machine
EDA	–	Electronic Design Automation
EIF	–	Enterprise Incubator Foundation
EU	–	European Union
GDP	–	Gross Domestic Product
I/O	–	Input/Output
ICT	–	Information and Communications Technologies
IT	–	Information Technology
Ltd	–	Limited Liability Company
NAS	–	National Academy of Sciences
NGO	–	Non-governmental Organization
SEUA	–	State Engineering University of Armenia
SME	–	Small and Medium Enterprises
UITE	–	Union of Information Technology Enterprises of Armenia
UN	–	United Nations
USA	–	United States of America
USSR	–	Union of Soviet Socialist Republics
VAT	–	Value Added Tax
VLSI	–	Very Large Scale Integration
YSU	–	Yerevan State University