ARMENIAN ICT SECTOR 2015

STATE OF THE INDUSTRY REPORT: INFORMATION AND TELECOMMUNICATION TECHNOLOGIES SECTOR IN ARMENIA

Report prepared by Enterprise Incubator Foundation

December 2015

Table of Contents

1. ICT Business in Armenia 2
   - **1.1 Overview of the IT Industry in Armenia** 2
   - **1.2 Why Start a Business in Armenia?** 3
   - **1.3 Legal Framework** 5
   - **1.4 Competitive Advantage** 8

2. 2015 Survey 9
   - **2.1. Sampling and Methodology** 9

3. Key Findings 11
   - **3.1 Customized Software and Services** 12
   - 3.1.1 Economic Indicators 12
   - 3.1.2 Main Specializations 12
   - **3.2 . Telecommunications** 13
   - 3.2.1 The Industry and Key Economic Indicators 13
   - 3.2.1 Internet Coverage 14

4. Key Challenges to ICT Operations 16

5. Research and Development in Armenian ICT Companies 17

6. Education 18
   - **6.1 General Overview** 18
   - **6.2 Institutions of Higher Education/Universities** 19
   - **6.3 The Faculty and Teaching Methods (Instruction)** 23
   - **6.4 Students** 24
   - **6.5 Cooperation with the Private Sector** 25

7. ICT Workforce Structure 26

8. The Role of ICT Sector in the Economy of Armenia 29
   - **8.1 Development Progress and Prospects** 29
   - **8.2 Domestic Market** 29
   - **8.3 Exports** 30
   - **8.4 Foreign-Owned Companies** 31
   - **8.5 Success Stories** 32

9. Policy Developments and Major Accomplishments 35

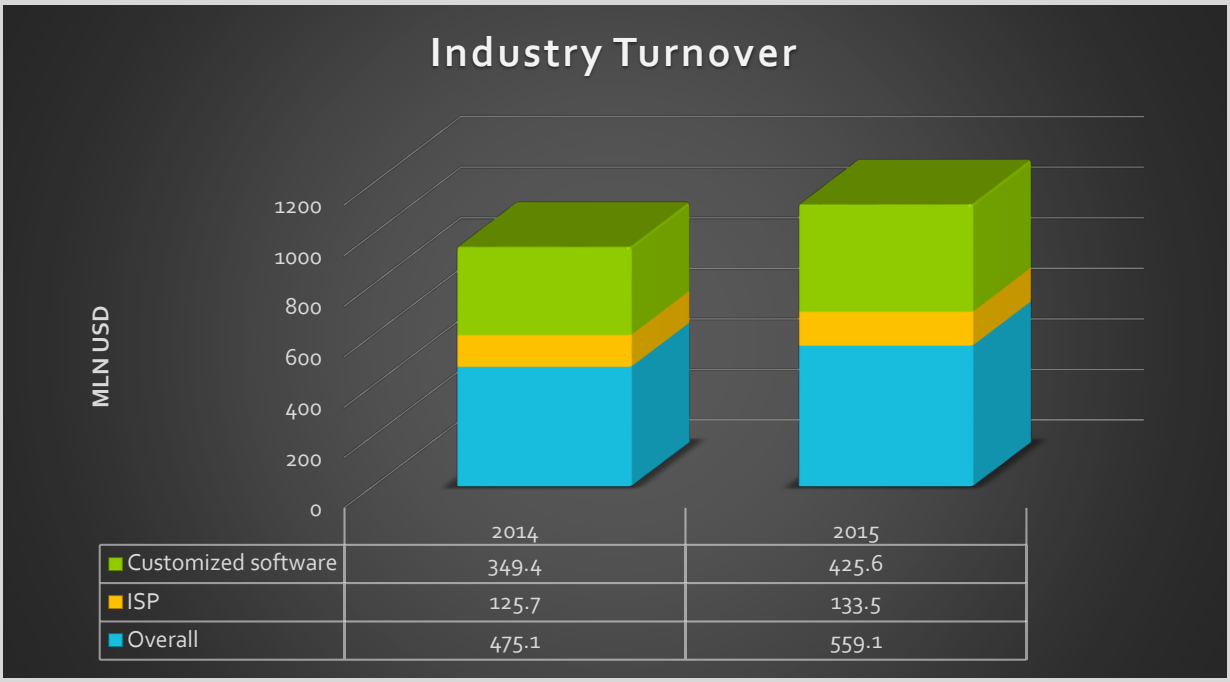
ANNEXES 40

1. ICT Business in Armenia

1.1 Overview of the IT Industry in Armenia

Armenia has retained its huge potential for technology development, and is regarded as a hub for software development, industrial computing, electronics, and production of semiconductors, even under the Soviet Union. It continues to be the regional leader in IT and high-tech industry, due to its competitive labor, its share in GDP, as well as the constant growth in the number of companies and total turnover. It is already a widely accepted fact that information and high technologies, as well as their commercialization in different industries, are the main factors driving growth in the world economy in the last decades.

The industry's total revenue, which consists of the Software and Services sector and the Internet Service Provider sector, reached $559.1 million USD in 2015, an increase of 17.7% over 2014's total of $474.9 million.



	2014	2015
Customized software	349.4	425.6
ISP	125.7	133.5
Overall	475.1	559.1

Armenia's competitive technical workforce creates a favorable investment climate for large ICT companies and multinationals. These specialists ensure annual productivity estimated at $48,000 USD for their companies.

Armenian ICT companies specialize in embedded software development, semiconductor design, customized software, outsourcing, financial software, multimedia, web design, information systems, and system integration. Armenia has made significant gains in semiconductor design and the creation of related intellectual property.

Today, about 450 ICT companies operate in Armenia, generating an average annual growth of 10%. The majority of these companies are Yerevan-based (about 88%), but we have to mention that the number of companies operating in other regions of Armenia is growing from year to year, due to the development of educational and scientific infrastructure, particularly in the Shirak and Lori regions.

In 2015, 70 new companies were established, creating nearly 400 new jobs. In addition, the workforce in the ICT sector increased by around 1200.

The Survey of Armenia’s Information and Communications Technology industry has been implemented since 2002, both to follow up on the ICT developments and to address the identified issues, using tailored measures.

1.2 Why Start a Business in Armenia?

It's been several decades, that Armenia offers a number of privileges to foreign investors, including not levying duties on investment in founding capital, as well as the absence of obstacles to investment entry. The RA Law on Foreign Investments has developed solid foundation for attraction of foreign investments to Armenia via regulation of legislative, economic and organizational issues aimed at foreign investors' rights, legal interests and property protection, the involvement of foreign material and financial resources, the creation of necessary conditions for the introduction and effective use of advanced technologies, management and organization. The abovementioned law also provides effective mechanisms for the protection of foreign investments. Particularly, in the event of amendments to the legislation on foreign investments during 5 years since the initial investment, per foreign investor's request, the legislation active at the time of the initial investment will be applied. The aforementioned regulation provides an opportunity to foreign investors operating in RA to not only be protected from the unfavorable legislative changes, but also to effectively take advantage of favorable legislative regulations.

In addition to the above-mentioned, according to the RA Law on Profit Tax the taxpayer's losses for the accounting and previous years, including the foreign investors', are transferred to the 5 years following the year of obtaining losses.

It should be noted that Armenia ranked 45th out of 185 for Ease of doing Business, and fourth for Starting a Business, in the World Bank Doing Business 2015 report.

Also, according to the same source, Armenia made starting a business easier by streamlining post registration procedures and by eliminating company registration fees.

The following table shows key indicators for opening and operating a business.

Indicator	Armenia (2015)	Europe and Central Asia	OECD Countries
Starting and registering a business: Time (days)	3.0	12.1	9.2
Starting a business: Cost (% of income per capita)	1	5.3	3.4
Enforcing contracts: Time (days)	570	448.1	539.5
Enforcing contracts: Cost (% of claim)	14	25.2	21.4
Total tax rate (% profit)	20.4	34.9	41.3
Labor tax and contributions (%)	0	21.4	23

As the table's contents indicate, the presented indicators are more favorable in Armenia than in Europe, Central Asia and OECD countries.

Taxing: Armenia's main tax categories are presented below, and are rather low when compared with other countries.

- *Multilevel/unified personal income tax and employer's Social Security payment* rates are between 24.4 and 36%, respectively
- *Value added tax* (VAT) is 20% or turnover tax -3%
- *Corporate (profit) tax rate* is 20%

In 2013, employee and employer social contributions and individual income tax were merged into one unified income tax, making it easier to pay taxes. In that same year, the RA Law on Turnover Tax became effective in Armenia. The law defines an alternative Turnover Tax rate of 3.5 to 5%, compared to the Corporate Income Tax rate of 20%. This applies to entrepreneurs and commercial organizations whose turnover does not exceed 115 million Armenian drams (with the exception of a tax rate of 10% on rental income, interest, royalties, asset disposal (including real estate); and a rate of 20% on income from notary activity).

Exporters are granted privileges, including freedom from paying export duties and refund of VAT applied to the value of exported goods and services. Importing some IT products is exempt from custom duties and taxes, while VAT charges are delayed on the import of certain equipment. In compliance with Armenia's Customs Code, the value of software content is not included in its customs value, which is limited to the value of the software medium. This provision complies with WTO and GATT agreements pertaining to the estimation of the customs value.

In 2015, the process of adoption of new tax reform package passed in the previous year has been continued. The abovementioned tax reforms were enforced in response to the need for more favorable taxing conditions for small and medium entrepreneurship entities and family members involved in joint commercial activity (purchase and sales). This took into consideration the reality that the legal regulations in force before these amendments were conducive of a shadow turnover, due to non-documentation of acquisitions on the part of turnover tax payers. With respect to family members involved in joint entrepreneurship, the lack of a specific taxing approach was a limitation on the formation and development of entrepreneurship entities.

To summarize, as of October 1, 2014, the legal reforms introduced a privileged taxing system for family entrepreneurship/business. The RA Law on Taxes defined the procedures for qualifying as an entity of family entrepreneurship, and termination thereof, in addition to regulating taxing and tax record keeping issues.

- With respect to enforcement of tax legislation, a family enterprise is defined as the joint entrepreneurship activity undertaken by more than one family member (parent, spouse, child, sibling), for the purpose of profit making, if the proceeds from the sale of all goods and services (works done) related to that activity does not exceed 18.0 million Armenian drams annually, without VAT.
- All entities of family entrepreneurship are exempt from all state taxes arising from family entrepreneurship (including the obligation to calculate, withhold, and transfer the tax agent tax to the state budget). An exception is made in regard to the obligation to calculate and pay income tax on taxed income from family entrepreneurship for each family member involved in the business (including hired help). This tax is 5,000 Armenian drams for each person, which is paid before the 20th of the month following the month for which income is calculated, and is considered a final obligation with regard to income tax.

- As of January 1, 2015, the Value Added Tax and Turnover Tax Laws defined new and simplified procedures for qualifying as a VAT payer and turnover tax payers.

Thus, in compliance with these legal regulations, legal entities registered as being involved in entrepreneurship activity; legal entities entitled to engage in entrepreneurship activity; branches of foreign companies registered in the Republic of Armenia (irrespective of their non-commercial status); notaries; and sole entrepreneurs will qualify as VAT payers from January 1 to the end of the calendar year, if as of January 1 they do not qualify as turnover tax payers, or if they failed to submit a statement about their turnover tax payer status within the timelines defined by the law.

These legal modifications resulted in changes in turnover tax rates related to commercial activity (purchase and sale), along with the requirement of documenting acquisition transactions and defining measures of liability.

Thus, as of October 1, 2014, turnover tax from income from commercial (purchase and sale) activity is calculated at a rate of one % applied to the taxed entity (replacing the current rate of 3.5%). Turnover tax payers involved in commercial (purchase and sale) activity are obliged to document all goods acquisition transactions in compliance with the requirements defined by the law.

To optimally increase tax legislation predictability, the Law on Making Amendments and Supplements to the RA Law on Taxes (HO 152) was adopted and enacted in 2014. The Law specifies a time requirement for enforcing laws on increased tax rates, new taxes, or relevant provisions of other laws of the Republic of Armenia. Thus, such laws and provisions should come into force at the beginning of the fiscal year following the year when the law or provision was passed, but not earlier than the first day of the sixth month following the official publication of the laws.

1.3 Legal Framework

2015 was marked by continuous developments in the Armenia's Information Technology Industry. In late 2014, the National Assembly adopted a legislative package on state support to IT, which was successfully enforced the following year. Aiming to promote startup company formation and new job creation, the National Assembly also adopted and enacted the Law on State Support to Information Technology Sphere. The law and the respective amendments made to the tax legislation define tax privileges for newly established and startup entities, including a 0% profit tax rate and a 10% income tax rate. An accreditation committee established in compliance with this law and the relevant decision of the RA government has already accredited approximately 60 companies and given them access to these privileges.

In addition to these legislative reforms, Armenia has furthered previous efforts in various areas, including the development of an improved business environment for IT companies, through undertakings with respect to tax privileges, foreign trade, investor protection, property registration, and other ongoing initiatives. To illustrate, in adherence with its longstanding commitment to creating a fast and effective reform process, the Government of Armenia approved the 2015 Program of Activities in Support of Improved Business Environment. The Program aims to facilitate and streamline administrative procedures required for starting and developing a business in Armenia. This action promotes fast growth for small and medium enterprises and implements a balanced tax and customs policy. These efforts will certainly have a positive effect on the IT sector in Armenia and improve entrepreneurship in the IT field.

E-governance: During 2015, the previously introduced www.e-gov.am website was effectively in use among the general public and in the business community of the Republic of Armenia. This platform represents a system for unifying all tools and resources, as well as information on electronic governance services provided by the state entities. In addition to various useful opportunities, this website has allowed for electronic submission of tax reports to all business entities, including those involved in the IT sector. Thirty-nine different tax reports can now be submitted through the electronic tax submission system, which is continuously improved to include new types of reports. This resource makes available a number of other systems, including State Payments, State Real Estate Cadastre, electronic registry of organizations, legal databases, and the official website for online notifications, electronic signature, and electronic visas. Some of these systems will be featured in greater detail below.

The website's Write a letter to the Government section allows any legal or physical entity to express opinions, positions, and views. This section also offers the option to track the progress of a letter/application/request and follow up as to which Government body or official has been tasked to handle it.

Starting a Business: In order to create a favorable business environment for IT companies in Armenia, it was important for the different initiatives to simplify the procedures required to establish legal entities. A number of efforts have been undertaken by the RA Ministry of Justice, including ensuring the possibility of electronically submitting required documents for registering a shareholder company, as well as utilization by a limited liability company of the E-register electronic system to register a Charter and its revisions (reorganization, termination and others). These improvements will help significantly reduce the time required to register shareholder companies, minimize citizen-state entity contacts and documentation requirements, reduce the time and cost for state registration of changes, and streamline the entire process. The respective changes initiated and introduced into the RA Civil Code by the RA Ministry of Justice are also noteworthy, since they will define provisions for establishment and operation of small and medium group companies.

In 2015, the www.e-register.am website continued to function effectively. Launched in April 2011, this platform has made the State Registry of Legal Entities' service available electronically. The system allows for the registration of legal entities (in cases of sole entrepreneurs through registering physical entities) in a matter of minutes, thus minimizing time spent. The website is available in English and Russian, making Armenia's IT sector and companies operating in IT accessible and transparent to foreign investors.

The One-Window system for registering legal entities continued operations in 2015, providing an opportunity for those wishing to establish a legal entity or a sole entrepreneurship to deal with only one state entity, i.e., the State Registry of Legal Entities under the Ministry of Justice. Once the agency accepts the documents, it handles all additional tasks, working in conjunction with other involved state agencies. In the past, registering a company involved visits to six different state agencies; currently, it is possible to obtain a company name and a tax registration and insurance number, as well as to complete other processes required for state registration through a single agency.

State Registration of Rights/Title over Real Estate: The discussion of the IT business environment within the context of developments that took place in 2015 should also address legal regulation with respect to registering rights over real estate, an important area for both startup and established companies with growth potential. In 2015, system reform continued to target streamlining the process for state registration of rights and reducing

time required through introducing the One Window principle. To this end, the drafts of respective legal acts have been elaborated upon, and creation of the unified pubic registry portal as a functioning service office is ongoing. Application of the so-called acceleration rates for fees levied for state registration of rights was carried on in 2015, an important factor in improving the business environment.

With regard to registration of rights, the electronic system of the State Committer of Real Estate Cadastre under the RA Government continued to operate, as a means of improving the overall business environment. An official electronic registry system, which is available on the Committee's official website at www.e-cadastre.am. The system allows for electronic online submission of requests for registering rights over real estate and movables, as well as supporting documents in compliance with the procedure defined by the RA Law on State Registration of Rights over Property

Contract Enforcement: Positive developments with respect to improving the business environment in 2015 included several initiatives that targeted minimizing contract enforcement procedures, time, and cost, as well as increasing the level of public awareness through publication of detailed brochures describing the processes and costs required for resolving disputes arising from contracts.

When discussing the business environment in place for IT companies in Armenia, there should be recognition of the fact that legislative changes of the previous years resulted in the removal of a discretionary requirement for "by seal" ratification of transactions or other documents signed by legal entities that was previously in effect. In other words, the mere signing of civil-legal acts by legal entities functioning in Armenia will not constitute grounds for recognizing them as invalid.

The notable developments in 2015 include the introduction of the electronic notary system and the One Window approach. The Armenian E-Notary Information System (AENIS) allows for service provision through a one-window approach. The electronic notary system is available throughout the country, and has been an effective tool for improved notary service and increased efficiency in signing contracts that require notary validation.
E-Payment State System: Successful application of the state electronic payment system (www.e-payments.am) was carried out in 2015. The system allows for electronic payments of state and local duties, as defined by RA legislation, as well as of fees and administrative fines collected for services delivered by state or local government bodies.

Payments can be made with ArCA or MasterCard payment cards, as well as with the virtual ArCA card. The payments are grouped into four main categories: duties, service fees, fines, and taxes. Each of these categories has sub-indexes through which the payer can easily find the required payment type.

The system also accepts community payments (e.g., property tax, land tax, garbage collection fee, and others) from all Yerevan districts, Gyumri, and Vanadzor. In the future, it will also serve other communities in the Republic of Armenia.

The state e-payment system allows Armenian citizens in foreign countries and citizens of other countries to make consular service fee payments (e.g., passport issuance, entry visa, and others) or pay state duties.

1.4 Competitive Advantage

As a country favorable for foreign direct investments in ICT, Armenia offers the following competitive advantages relative to other countries of the region:

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

2. 2015 Survey

2.1. Sampling and Methodology

The survey sample was expanded in 2015, to include around 420 Armenian ICT companies that were classified according to NACE rev.2. To observe expanded population data time series, the data available for 2014 were refined, respectively.

Information and Data
The survey relied on the data provided during interviews with industry representatives. Incomplete or unreliable data was approximated with the data generated from the estimates made in the ICT sector growth model. However, based on our experience with the industry, estimates available in other surveys and publications, and other sources, we believe that the Report offers a reliable description of the industry, its main trends and characteristics, and its overall prospects.

Definitions
The Software and Services 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, and multimedia applications; chip design; and provision of engineering and R and D services.

Internet service providers offer access to the Internet (wholesale and/or retail) through various channels. This group includes VoIP businesses and companies providing web hosting services and working with web portals.

While companies included in our research may be engaged in a number of other operations within the technology sector, the two components described above make up the main direction of their operations and are the major sources of their revenue. Respectively, only the software and ISP segments of those companies were used in estimating industry figures. Local companies are defined as Armenia-based enterprises with at least 51% of their equity owned by Armenian citizens, permanent residents of Armenia, or locally owned firms. Foreign branches or companies are defined as Armenia-based enterprises with at least 51% of their equity owned by foreign citizens, residents, or firms.

Assumptions and Estimation Methods
The productivity estimate was based on annual revenues per employee. Two sets of figures were calculated: the first involved a simple division of all industry revenues by the total workforce; the second looked at 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 productivity, it complicates the forecasting of the industry growth. Therefore, the first method was used for making industry projections. Productivity calculations were made only for software development and services companies.

Workforce estimates were made based on the number of technical, business, or administrative specialists employed by companies in the Software and Services segment and of technical employees of ISPs.

Outline of the Industry Survey
This report draws on the industry survey conducted by EIF in October and November 2015. The survey respondents included three main groups: companies in the Software and Services segment, Internet Service Providers, and ICT-related departments of major educational institutions. The survey looked into 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 previous industry surveys conducted by EIF from 2003 through 2014.

The 2015 survey covered 200 respondents involved in software, IT consulting, and Internet services, along with the ICT departments of major educational institutions.

Acknowledgments

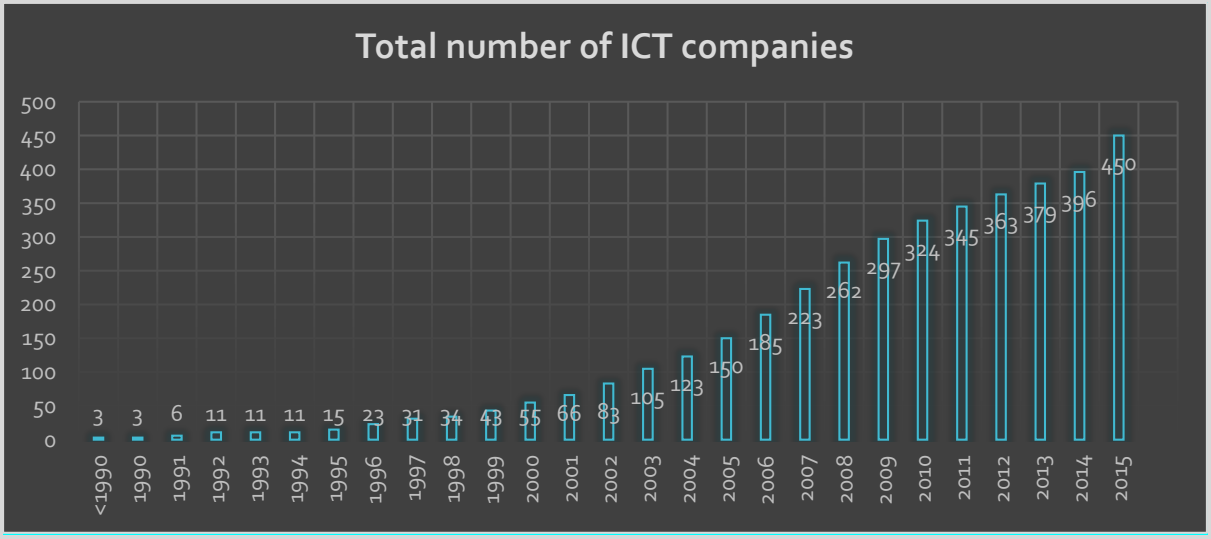
The Ministry of Economy of the Republic of Armenia supports the implementation of the annual Survey.
EIF's research team would like to thank the management of Armenian ICT companies, as well as Faculty members of YSU, NPUA, ERIICTA, RAU, and AUA for their time and kind assistance with data acquisition as they participated in the Survey.

The names of the key members of our research group appear below. We would also like to thank all who participated in our research, including our fieldwork team and volunteers, for their contributions to the implementation of our survey and the preparation of our State of ICT Industry 2015 Report.

Research manager, methodology design, overall market research and analysis, report preparation – Mr. Areg Gevorgyan
Fieldwork coordinator – Mr. Ashot Altunyan
Data input and assistance with analysis – Ms. Ani Begluyan
Analysis of the legal framework related to the IT Sector – Mr Tigran Harutyunyan.

3. Key Findings

Armenia's software and services industry is rather young, with most of the companies, i.e., nearly 82%, founded during the time period from 2000 to 2015. The first local private software firm was established in 1987, and within the next five years, the first foreign branch was launched in Yerevan. From 1991 through 1997 proved a challenging transitional period for the technology sector since regional conflicts, a declining economy, and brain drain had prevented the economy's general recovery. As of 1998, close to 35 to 40 software firms and ISPs were operating in Armenia, employing, according to various estimates, nearly 1,000 specialists. The workforce employed in the sector in 1998 was notably smaller compared to that of 1987, when only YerSRIMM employed up to 10,000 people. During the last 11 years, the industry has seen a sharp increase in the number of local startups and branches of foreign companies.



In 2015, the number of functioning ICT companies reached almost 450, a 12% increase over the previous year. Local companies accounted for 64% of the 450. In 2005 through 2015, an estimated average of 30 ICT companies were established each year. To compare, it should be noted that back in the 1990s, the same indicator was five to six companies established per year.

Sixty new companies were established in 2015, representing the peak in terms of numbers. The proliferation of companies is due to the new Law on ICT, which provides for tax incentives for new companies. This number includes new companies, as well as companies that were operating on the "black market", or operating without registration.

From 2010 through 2015, Enterprise Incubator Foundation, the RA Ministry of Economy with the support of World Bank initiated a number of grant programs targeting information and high technologies to promote idea generation and innovation, including Innovation Matching Grants, Gyumri Matching Grants and Vanadzor Matching Grants. As a result, teams made up of ICT professionals and students were formed to work on developing innovative products in Software and Services. In 2015, about 30 new companies evolved from these teams, including about 10 companies in Gyumri and Vanadzor.

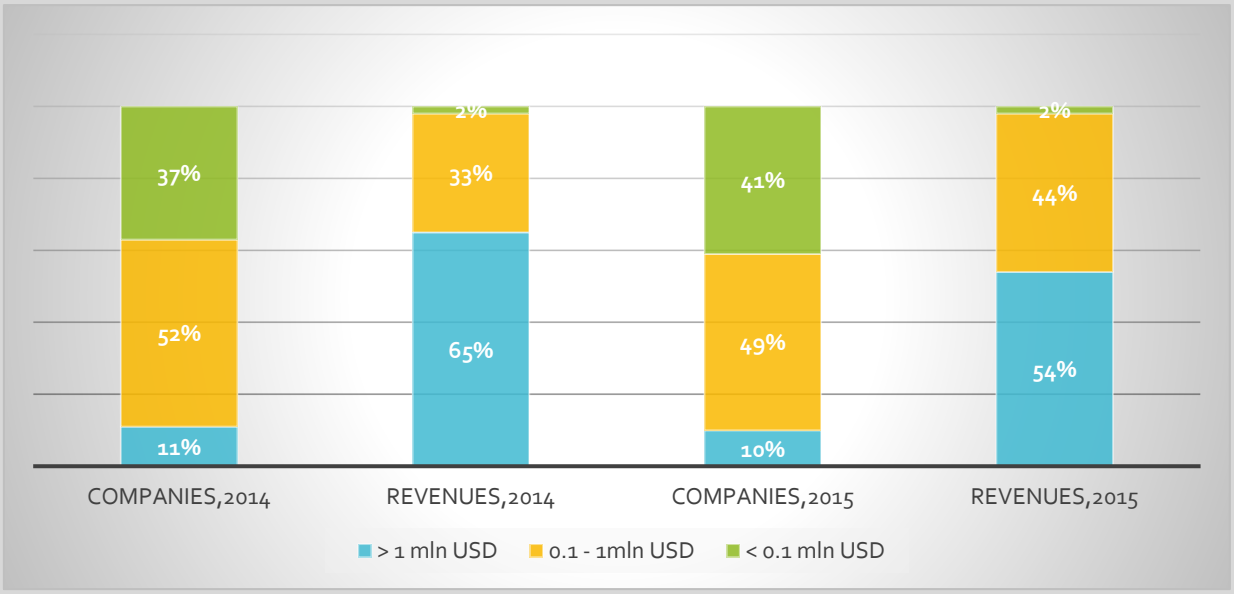
3.1 Customized Software and Services

3.1.1 Economic Indicators

In 2015, the total turnover of the Armenian Software and Services sector amounted to around $425.5 million USD, which indicates 21% growth when compared to the previous year. Average annual growth in the industry amounted to 20.1% in 2010 through 2015.

The share of local companies in total industry revenues is about 50%, as compared to 45% observed in 2014. Local firms are now in better shape than they were five years ago; they have more employees and their technical expertise and knowledge of the market has improved. Furthermore, they implement more complex and value-added projects.

As the chart below indicates, the 44 large (with turnover of $1 million USD and over) Software and Service companies, which make up10% of all companies, generate 54% of total industry revenue.

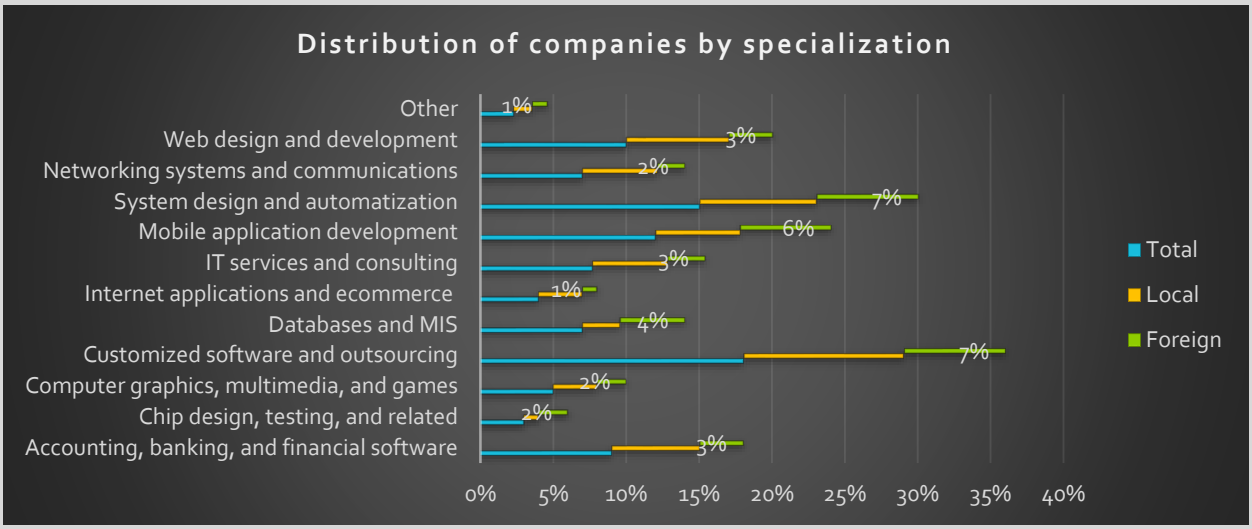


Half of IT companies have average annual revenue between $100 thousand USD to $1 million USD. The share of the number of medium-sized companies has decreased to 49% relative to 2014 (52%). The data indicate that this decrease is due to the establishment of 60 new companies in the industry during 2015. The share in revenue has changed by 10%, which means that our local medium-sized companies are continuing their stable growth.

The number of small firms with less than $100,000 USD in revenues increased by 4% relative to 2014, while their share in the total industry revenues increased by 50%. Though those small firms do not have any visible impact on the industry, their increased total number is a positive indication of the market's continued growth.

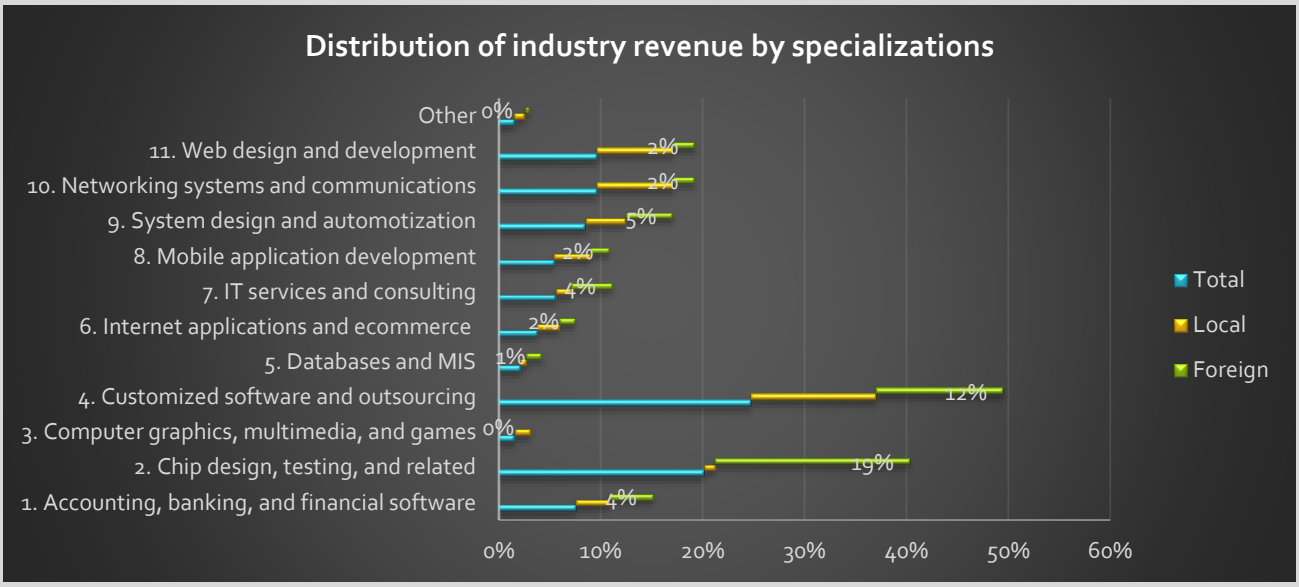
3.1.2 Main Specializations

There are approximately 420 companies currently active in the Armenian Software and Services sector. The majority of these companies specialize in software development.



The diagram shows the results of a survey concerning specializations of Software and Services companies, based on their share in the total number of companies. As we can see, the dominant specializations by number of companies are *Customized software and outsourcing* and *System design and automatization*.

With respect to distribution of industry revenue by IT company specialization, *Customized software and outsourcing*, as well as about 20% of the total *Software and Services* segment turnover. *Chip design, testing, and related* are the most profitable operations. It is worth mentioning that while 3% of IT companies specialize in



chip design, their revenues comprise about 20% of the total *Software and Services* segment turnover.

3.2 . Telecommunications

3.2.1 The Industry and Key Economic Indicators

The Armenian Telecommunications sector is represented in this research by 33 companies providing services under the following NACE rev2 classifications: wired telecommunication services (61.10); wireless telecommunication services (61.20); other telecommunication services (61.90); and companies working on web portals (63.12). Services offered by these companies predominantly include mobile and fixed telephony; cable

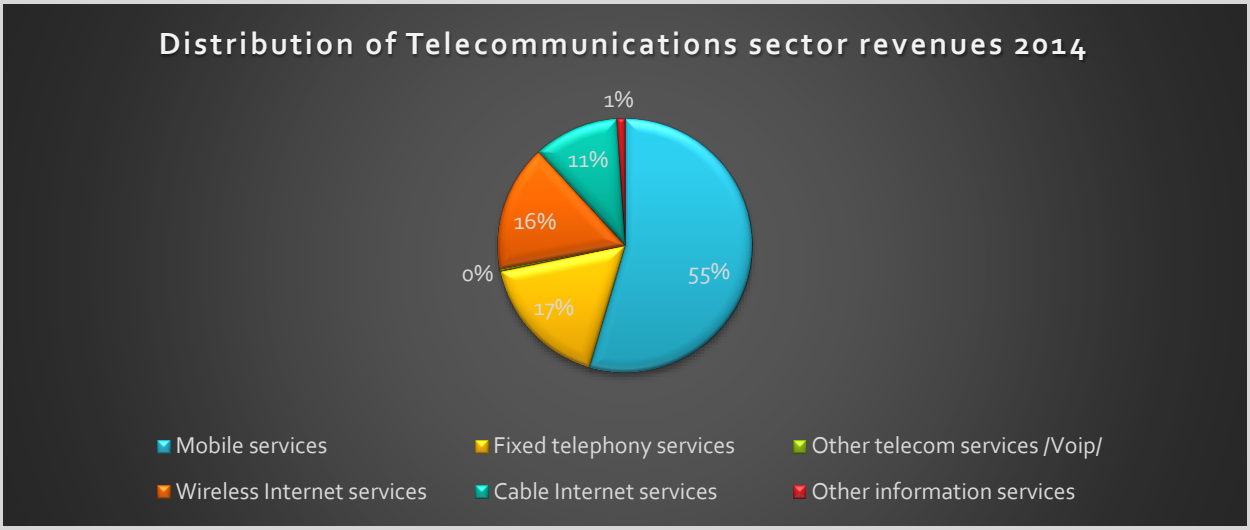
and wireless Internet; provision of IT infrastructure (e.g. web hosting) and VoIP services. It should be emphasized that telecommunication companies typically provide their services for the local market, rather than for export.

According to the chart, the share of revenues generated from mobile communications is the greatest among total revenues in Armenia's telecommunications sector. There are currently three operators in Armenia's mobile market: Armenia Telephone Company (trademark Beeline, a member of VimpelCom Ltd.); VivaCell-MTS (daughter company of Russian MTS); and Orange Armenia. In 2015, 100% of Orange Armenia shares were alienated to Ucom LLC.

Data from October 2015 indicate that there are 3.47 million mobile users/subscribers in Armenia. Meanwhile, the growth in fixed phone services has been negative since 2009, with no evidence of increasing progress; in 2015, there were 534,000 fixed phone users. Beeline has completed the national digitalization program, and after years of slow progress ensured 100% digitalization in 2012.

The growth trend for the overall telecommunications sector has slowed since 2014, which can be indication of market saturation. The total revenue is expected to amount to $480.0 million USD, with total customer/subscriber base growing by 12%, reaching 5.7 million subscribers.

Ninety-four percent of total revenue in Armenia's Internet Services segment is generated by five large ISPs, one



of which is an Armenian provider; the other four are foreign-owned companies. The Internet Services (cable, wireless, and VoIP) sector showed slow growth in 2015, with revenue reaching $133.5 million USD (5% increase relative to 2014), where the share of foreign companies was eighty-seven percent.

3.2.1 Internet Coverage

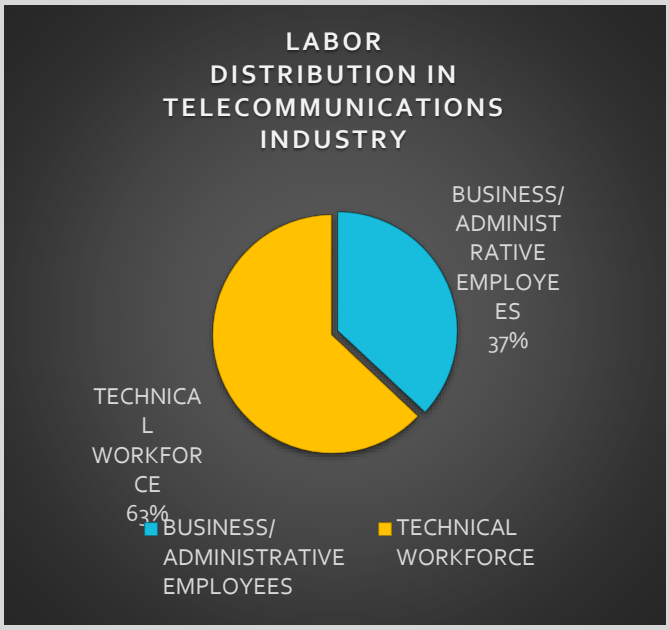
The internet coverage has maintained its trend of positive change through 2015, with the number of internet users reaching 2.2 million users, i.e., about 69% coverage. This number includes mobile, broadband and Internet.

In Armenia, 43% of Internet service providers are foreign-owned companies. Internet providers offer the following services on the domestic market: ADSL; fiber-optic and cable access; WiFi and WiMax wireless technologies; general packet radio services (GPRS); EDGE; CDMA and 3G technologies (UMTS/WCDMA); and 4G/LTE. Internet services based on 4G/LTE are available in limited locations, including Yerevan, Gyumri, Vanadzor, Dilijan, Tsakhkadzor.

At present, the number of ADSL subscribers in Armenia is 148,000, which indicates a decrease of about 2,000 customers. Tariff plans offer various Internet speeds, including 1Mbps to 32Mbps. All these services are offered across the country, except in 150 villages where no phone lines are available.

There are approximately 91,000 fiber-optic network (FTTB) subscribers. Such services are accessible to limited geographic locations, mainly in the cities Yerevan and Abovyan.

In 2015, the number of broadband Internet services users (including 3G) has reached about 2.0 million. The average price for 1MB/s Internet is 500 AMD ($1.00 USD). The operators also offer three-in-one packages that include IP television and fixed telephone services, priced at 10,500 AMD ($22.00 USD) in average for 20 Mbps.[10]



There are 247,000 wireless technologies subscribers (WiMax4, WiFi). In late 2015, 3G coverage has reached ninety-eight percent. Data transfer and Internet connection via wireless network is organized through GSM/EDGE (900MHz and 1800MHz), UMTS 2100, and UMTS 900 technologies.

Unlike the corporate market, there are no obvious leaders on the consumer market. Supplier offers for such services vary from AMD 8000 to AMD 25,000 (from $18 to $55 USD), depending on the ensured accessibility and service quality.

4. Key Challenges to ICT Operations

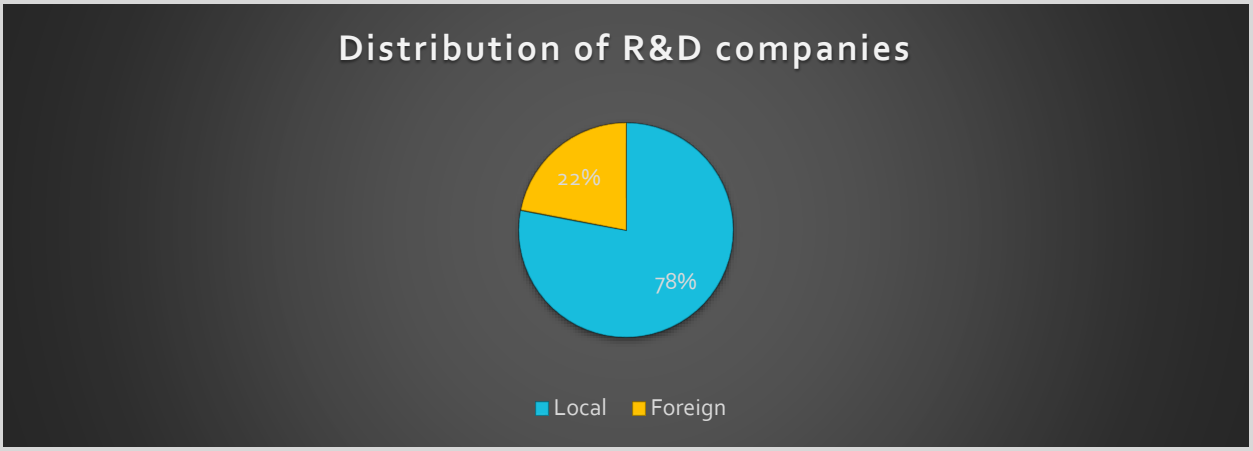
Approximately 70% of survey respondents representing company leadership emphasized the challenges related to attracting highly qualified workforce. The shortage of highly qualified staff was mentioned by 59% as a major impeding factor, which confirms the fact that there is an increased demand for technical workforce with superior qualifications and experience. Consequently, the demand results in increased compensation for such a technical workforce. Furthermore, 44.8% of surveyed companies pointed to the brain drain as a main cause for this situation.

According to the answers provided by the surveyed companies, tax and customs procedures are also barriers (40.8% and 42.5%, respectively) that hinder developments in the sector. It should be noted that for 31% of these companies, their turnover is less than $500,000 USD annually. The respondents claim that the VAT and the corporate tax use up a significant portion of their revenues. Moreover, local authorities determine the customs rates. In addition, the respondents pointed to the lack of accessible financing and the lack of support from state authorities and non-governmental organizations – both factors that limit growth in the software and services sector in Armenia. Respectively, 53% and 36% of surveyed companies cited such challenges.

Nearly 20% (19.5%) of surveyed organizations face challenges related to entry into world markets. As noted by the respondents, the underlying reasons for this is lack of awareness in regard to Armenia among several international partners or a lack of trust in representatives of a country with low or average income levels. Interestingly, about 6% of survey participants noted problems related to unclear tax legislation, although it was not mentioned to them by the interviewers. Only 1.1% of the companies included in the 2015 ICT survey cited challenges related to low manufacturing capacity, while nearly 13.79% noted issues related to market saturation and inequality in relation to state attitude as barriers to business development.

5. Research and Development in Armenian ICT Companies

The number of Armenian ICT companies developing their own products and investing in R & D is growing from year to year, which is a positive indicator that the ICT sector of Armenia is transforming from an outsourcing destination for foreign companies to a technology development hub. The average revenue generated from products and services of companies included in the survey sample have grown to 47% of average revenue in the industry. Innovation-related revenue generation in large companies is mainly correlated with the number of company employees, i.e., the larger the company, the higher the investment in R & D. Distribution of R & D companies by local and foreign ownership is shown below:



The establishment of local technology-based startups has resulted in an increase from 68% to 78% in the number of local companies among total investing in R & D companies.

For 78% of companies established from 2014 through 2015, development of products and services is a primary operation. This is an increase of 1% over the previous year. This is indicative of a growth trend in innovation in Armenia's ICT industry.

Generally, governments use R & D tax incentives to support related activities. As to the companies, such tax incentives are an effective way of reducing innovation-related costs. Several of the tax incentives provided by governments are unique in their type and nature. Tax planning schemes with regard to R & D tax incentives fall under three categories:

1. Spending-based tax incentives are calculated based on an organization's R & D spending.
2. Asset-based tax incentives are calculated as a percentage of the asset value used for R & D purposes.
3. Revenue-based tax incentives are calculated as a percentage of the related revenue.

In Armenia, R & D tax incentives are still in development. As already mentioned, in 2014 tax incentives were introduced at Parliament, which has created unprecedented favorable conditions for IT industry growth: the income tax will be only 10%, and profit tax 0%, for newly established start-ups, and they can profit from these incentives for up to three years.

6. Education

6.1 General Overview

The availability of high-quality technical and management professionals who work in the industry leads to sustained ICT growth in Armenia.

The system of education of the Republic of Armenia includes pre-school, pre-higher education (including primary school, intermediate school, high school) vocational (professional-technical), higher and post-graduate education. There are 26 public state universities and 40 private universities in Armenia, majority of which are based in Yerevan and some of them have branches in the regions.

Due to high quality educational programs offered by Armenian Universities for decades, the labor market in Armenia is supplied with a workforce that is in high demand. The Universities emphasize teaching fundamental knowledge, along with hands-on practical experience. Educational methodologies used by the Universities are continuously supplemented with new ideas and enhanced by the traditions and approaches utilized by the internationally acclaimed institutions of higher education. Upholding free market principles in Armenia has made such developments possible.

From 2014 through 2015, approximately 79,623 students were enrolled in varying specialization studies at Armenian Universities[1]. State Engineering University of Armenia (NPUA) and Yerevan State University (YSU) are the largest institutions offering programs for IT-related technical specializations. Other institutions involved in IT education include the American University of Armenia (AUA), the European Regional Educational Academy (EREA), the Armenian-Russian (Slavic) University (RAU), National University of Architecture and Construction of Armenia (YSUAC), and the French Higher Institute of Engineering in Armenia (ISIFA).

Table 10: Universities and Departments offering IT specializations

National Polytechnic University of Armenia	Radio-techniques and Communication
	Applied mathematics and physics
	Mechanics and machine study
Yerevan State University	Mathematics and Mechanics
	Applied mathematics and informatics
	Physics
	Radio Physics
American University of Armenia	Science and engineering
European Regional Academy	Information Technologies
Armenian-Russian (Slavonic) University	Applied Mathematics and Informatics
National University of Architecture and Construction of Armenia	Cybernetics
	Computer Systems and Informatics
French Higher Institute of Engineering in Armenia	Information management systems

Representatives of 13 departments teaching IT specializations in the above Universities were involved in the Survey (*see Table 10*).

[1]Source: RA Statistical Service, www.armstat.am

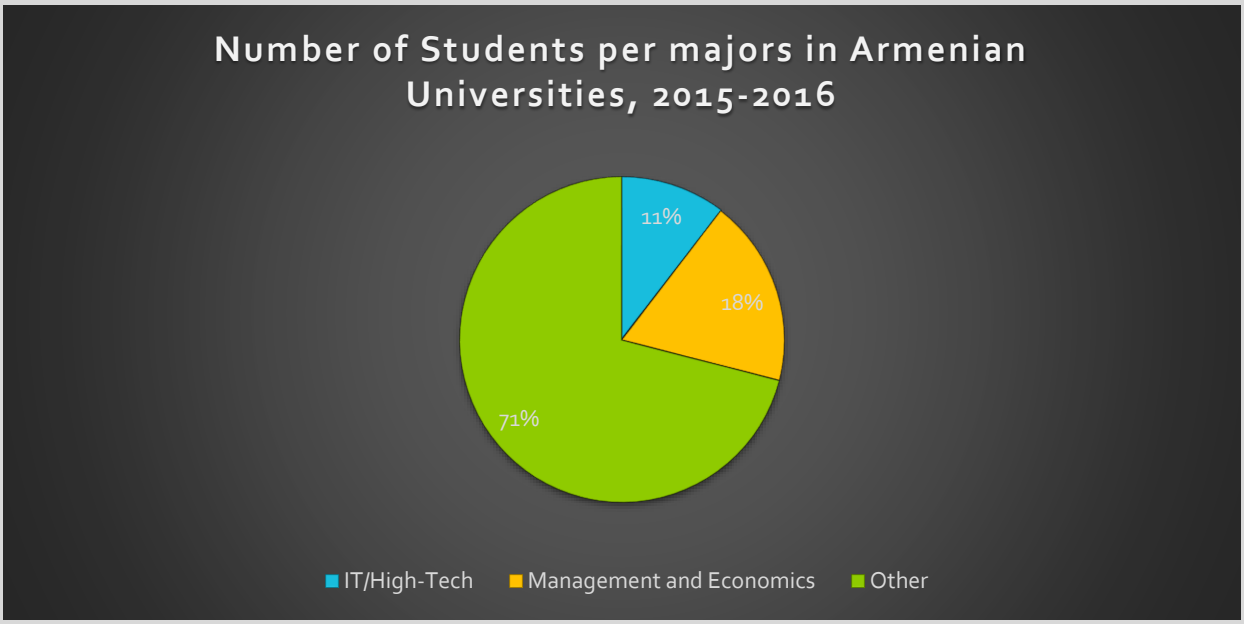
Except for the French Higher Engineering Institute in Armenia, which is a newly based university and has a small number of students, the other surveyed institutions of learning included in the survey are considered the main universities in Armenia proposing ICT-related faculties.

Data received from these six key Universities indicates that 1,098 faculty members are employed in the ICT-related departments, including lecturers and researchers.

In 2014 through 2015, around 5,153 students were enrolled in these six Universities, of which nearly 60% are NPUA and YSU-affiliated.

6.2 Institutions of Higher Education/Universities

In academic year 2014 to 2015, a total of 9,352 students were enrolled in departments related to informational and high-tech specializations, which constitutes 11.71% of total student population (79,623) in Armenia's Universities. Whereas the students engaged in economics and management represent nearly 19% of the total number of students enrolled in Armenian universities.



National Polytechnic University of Armenia (NPUA) and Yerevan State University (YSU) are the largest and oldest institutions in Armenia to offer majors for ICT specialists. IT education is also offered at Other institutions that offer IT education include the National University of Architecture and Construction of Armenia, the American University of Armenia (AUA), the European Regional Educational Academy (EREA), and the Armenian-Russian (Slavic) University (RAU).

National Polytechnic University of Armenia (NPUA): NPUA is the successor of the Yerevan Polytechnic Institute, which was established in 1933. The University offers several degree programs in engineering, science, and technologies, and is considered the major institution preparing technical specialists in Armenia. The University has affiliates in a number of regions throughout Armenia. Today, NPUA's student population is 10,000[2], while the University has had over 120,000 graduates since its inception. In 1960, when the Cybernetics, Computing Systems, and Radio-Technical Department (later separated into three stand-alone departments) was established at NPUA, the University started teaching computer classes. Today, these departments offer different

[2]Source: NPUA http://www.polytech.am

specializations, including computer hardware and software development, electronics and microchip design, automated management systems, and others. NPUA conducts scientific research in areas that include computational systems, design and installation of networks, artificial intelligence, the study and development of dynamic systems, analyses and synthesis of management systems, microelectronics, microchips techniques, and more.

Yerevan State University (YSU): Established in 1919, YSU is currently Armenia's largest educational institution, with over 12,000 students[3]. YSU offers educational programs in specializations including biology, economics, history, linguistics, legal studies, mathematics, physics, and other sciences. The Mathematics and Physics Department was established in 1924, while the Informatics and Cybernetics departments opened in 1971. These departments prepare IT-related specialists in the following areas: algorithm languages, cybernetics, discrete mathematics, software developments modeling, and others.

The YSU Information Technologies Educational and Research Center was established in 2007, with the objective of providing programs in professional tutoring/mentoring, continuous education, discrete programs, scientific research, university education management and quality assurance, and the development and installation of informational systems. In addition to traditional formats, the Center offers online and distance learning courses, as well as combined programs. The Center is implementing three IT-related graduate programs: development of informational technologies, management of information technologies, and visual computation. The Center also offers advanced professional tutoring and mentoring programs that directly target the needs of the IT sector. Active application of new instructional and educational technologies is one of the achievements of the Center. It includes the development of the Armenian Virtual College, sponsored by the Armenian General Benevolent Union, as well as development of multimedia courses for YSU, NPUA and RAU. These courses are electronically managed and allow for remote use. The initiative is financed by the Open Society Foundations Armenia.

National University of Architecture and Construction of Armenia: The history of the Armenian school of Architecture and Construction began in 1921, with the opening of a Technical School in the newly established Yerevan State University. The new specialties taught in the school included Engineering and Architecture and Engineering and Hydro-technology.

In February 1933, the Construction Institute was restructured, becoming the Polytechnic Institute, which included the Chemical Engineering Institute that had operated independently until that time.

During its 94-year history, starting from the Technical Faculty of the Yerevan State University, up to today's

[3]Source: YSU http://www.ysu.am

Yerevan State University of Architecture and Construction, the university has produced around 30,000[4] graduates.

National Academy of Science of Armenia (NASA): Armenian Academy of Sciences (since 1993 - the National Academy of Sciences of the Republic of Armenia) was founded on November 10, 1943 on the basis of the USSR Academy of Sciences' Armenian Branch, organized in 1935. NAS RA is a highest state scientific self-governing organization. It unites NAS Members and scientific staff members of affiliated scientific and research institutions. The Academy promotes and carries out fundamental and applied research in various scientific fields, and coordinates research carried out throughout Armenia. NAS RA is an official scientific consultant to the highest Governing Bodies of Armenia. The Presidium of NAS RA has five scientific divisions that concentrate on particular areas of science: Division of Mathematical and Technical Sciences, Division of Physics and Astrophysics, Division of Natural Sciences, Division of Chemistry and Earth Sciences, Division of Armenology and Social Sciences.

American University of Armenia (AUA): Founded in 1991, AUA provides a high-quality graduate and undergraduate education that encourages civic engagement and promotes democratic values, fostering scholarship in a setting that values and develops academic excellence, free inquiry, integrity, scholarship, leadership, and service to society. AUA's graduate program offers master's degrees in eight fields of study: Business Administration, Industrial Engineering and Systems Management, Computer and Information Science, Political Science and International Affairs, Economics, Public Health, Law, and Teaching English as a Foreign Language. AUA also offers a dual Master of Business Administration (MBA)/Master of Public Health (MPH) program. The goal of these programs is to develop critical analysis and depth of knowledge through advanced coursework, independent study, and research. AUA's undergraduate program offers bachelor's degrees in English and Communications, Computational Sciences, and Business. Through its undergraduate courses, the University offers students depth of knowledge for career preparation and further studies, as well as breadth and a foundation of general knowledge and skills for life-long learning.

[4]Source: YSUAC http://www.ysuac.am/

European Regional Educational Academy (EREA): Established in 2001 by the European Union, EREA specializes in programming and IT business management. Parallel to mainstream academic programs, EREA offers programs in three foreign languages: English, German, and French. Currently, around 250 students are enrolled in EREA programs. [5] EREA offers graduate and post-graduate education, European educational standards for professional training and qualification courses, as well as college (vocational) education programs in Yerevan and the regions.

Armenian-Russian (Slavonic) University (RAU): The Armenian-Russian (Slavonic) University was founded on August 29, 1997, based on an agreement between the Governments of the Republic of Armenia and the Russian Federation. In 1999, the University expanded its list of specializations to include Applied Mathematics and Informatics, and the Physics-technical department opened in 2003. These departments have educational programs in mathematics and math modeling, software development, electronics and chip design. In 2012, the standalone departments offering programs in similar subject areas merged and became separate institutes/colleges. Currently, the Institute for Mathematics and High Technologies is providing specialized education in information and telecommunication areas through specializations in applied mathematics and informatics, electronics and nano electronics, telecommunication technologies and communication systems, electronic media technologies and design, medical biochemistry, pharmaceutical, bioengineering and bioinformatics. Over 422 students are enrolled in respective programs.

With the exception of a few universities, the current educational system is overwhelmingly the legacy of the former Soviet Union. Following Armenia's independence, the workforce demand changed drastically, which, in turn led to the disappearance of several specializations and the emergence of others. A number of Armenian Universities have already transitioned to a two-tier educational system that offers undergraduate and graduate degree programs. However, at some of the universities, the five-year system inherited from the Soviet Union is still functional. Several of the Universities issue Candidate of Sciences and doctorate degrees.

The main issue faced by the educational sector is lack of sufficient financing, since the tuition fees and state subsidies are not adequate for the majority of the universities. Meanwhile, the private sector's involvement in financing educational programs is almost non-existent. In addition, most Universities are unable to increase tuition fees, since they are high for an average Armenian student as things stand. University development is also faced with other obstacles, including the lack of textbooks and specialized literature, difficulties associated with cooperation with the private sector, and challenges related to recruiting new specialists to replace the aging

[5]Source: EREA, http://www.era.am/

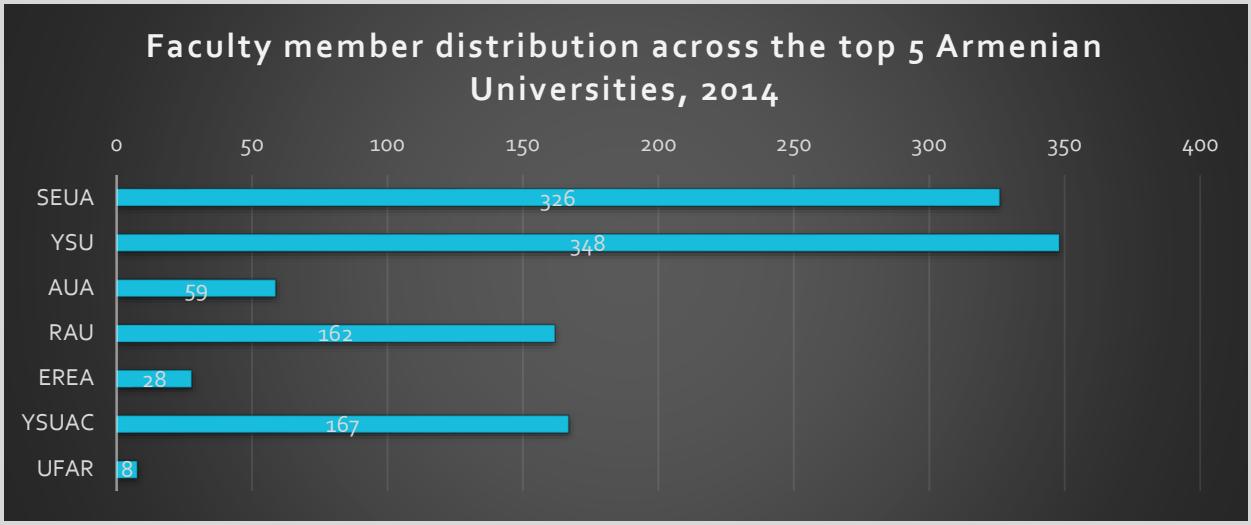
faculty members. Some of the Universities still face problems related to Internet access and insufficient availability of computers.

6.3 The Faculty and Teaching Methods (Instruction)

YSU and NPUA employ the largest portion of the ICT specialization faculty members, with the rest spread over the remaining Universities. The total number of faculty members across the six leading universities is 1,098 specialists. It should be noted that the majority of the universities consider that they offer contemporary curricula and methods in line with the requirements of the industry.

A number of faculty members use the experiences of leading European, Russian, and US universities supported by their peers in those institutions. In many instances, local IT experts are invited to Universities to help them bring curricula in line with industry trends and requirements.

Many of the universities acknowledge that in addition to technical skills, the students need business knowledge. This is why a number of universities offer business-related courses such as marketing, management, business ethics, legal studies, and others. The universities also emphasize the importance of learning foreign languages,

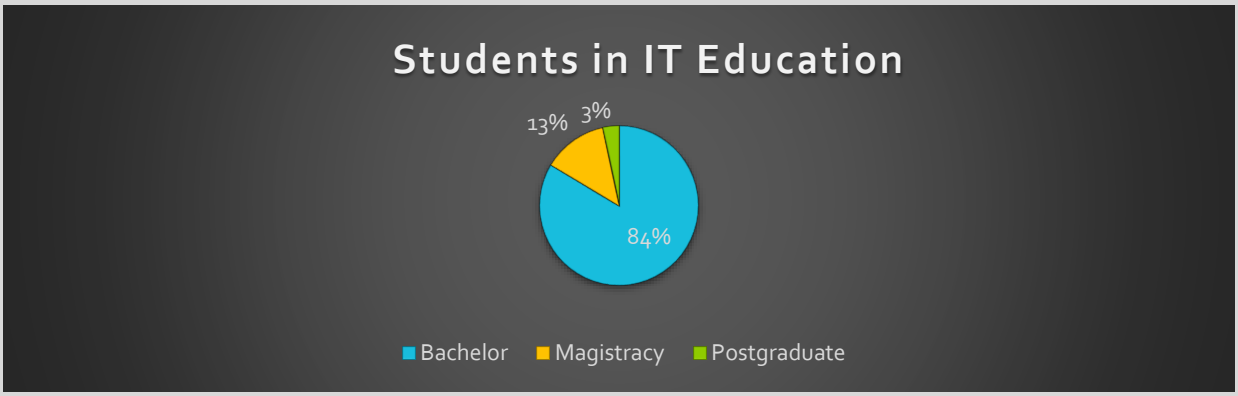


specifically English and Russian, as part of the overall process of shaping high-quality technical and management professionals.

Despite recent education system reforms, the instructional methods in current use do not comply with the demand within the IT sector for highly qualified specialists. Two other interrelated issues include low faculty salaries and the aging faculty.

6.4 Students

From 2014 through 2015, 9,352 students[6] were enrolled in Armenian universities offering IT specializations, with 5,153 students studying in the above-mentioned six main universities. Around 61.2% of all students study at YSU and NPUA. Foreign students studying in Armenia come from CIS, the Middle East and Europe; their numbers continue to grow over time. In the past three to six years, the students' academic progress has increased substantially. Enrollment in IT-related departments has become rather difficult due to high competition for each place, specifically at YSU and NPUA. Computer science, applied mathematics, information technologies, information system security, automated control systems, and microelectronics are the most popular majors among applicants.



Generally, representatives from IT companies are of the opinion that the current number of students is not sufficient to meet the demand for an average of 2,000 specialists in the industry. They also point out that the level of proficiency of some graduates does not meet industry demands, and that many of them need further training to gain sufficient proficiency to gain full-time employment.

Today, a large proportion of students prefer the IT industry, as it is becoming one of the most desired spheres. However, the universities alone are unable to provide students with enough experience to obtain a job in this industry. To help resolve this, many companies are organizing special trainings, courses, and internship programs for students. These include the following:

Armenian-Indian Center for Excellence in ICT: Armenian-Indian Center for Excellence in Information and Communication Technologies is a joint project of the Governments of Armenia and India, which is implemented by Enterprise Incubator Foundation (from Armenian side) and C-DAC center (from Indian side). It offers IT related trainings, management courses, exchange programs, and more.

Microsoft Innovation Center Armenia (MIC): MIC Armenia provides world-class recourses and supports, focusing on skill development and innovating thinking that can be demanding in local and international markets. MIC Armenia delivers training courses on programming fundamentals for beginners, web programming, and object-oriented programming.

IBM Innovative Solutions and Technologies Center in Armenia (ISTC): IBM ISTC is the result of a joint effort between IBM, the Government of Armenia, USAID, and EIF. ISTC offers trainings and workshops in such areas as cloud computing, cyber security, cognitive computing, big data analytics and artificial intelligence based on IBM products.

Armenian National Engineering Laboratories (ANEL): ANEL cooperates with industry and research institutions in throughout the country in the areas of engineering, electronics, precise engineering and high-tech.

[6]Source: National Statistical Service, http://www.armstat.am

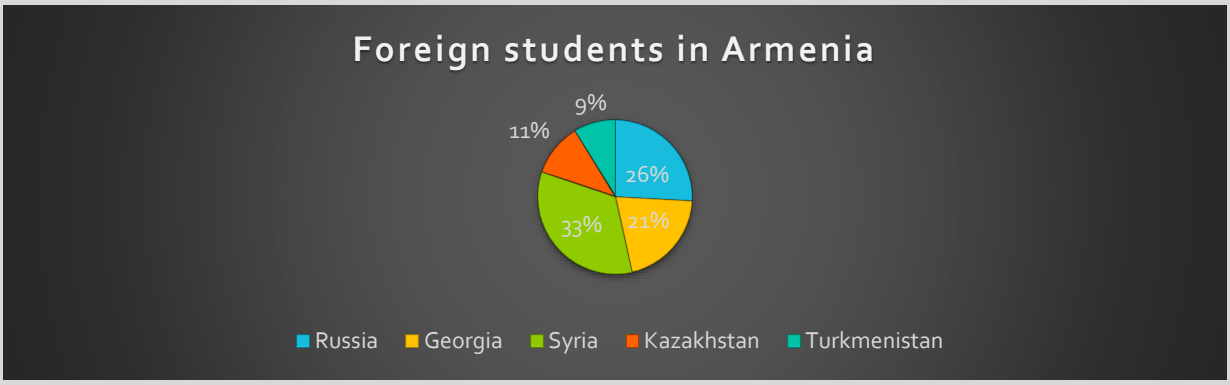
In particular, Research Laboratories offers services to Armenia's industry and research institutes to quickly and inexpensively resolve their technical and scientific challenges. Educational Laboratories complement these efforts by providing facilities for training future personnel for the research institutions, Armenian industry, and engineering groups.

Gyumri Technology Center (GTC): GTC offers the following courses: Basic Programming in Web, Mobile and Software: Algorithms and Data Structures, Database Programming, Interface Design, and so on.

Vanadzor Technology Center (VTC): The goals of the Center include development of technical and business skills, promotion of technological entrepreneurship, commercialization of innovative research undertakings, creation of new technology companies, attracting of foreign investment, and others.

Regional mobile application laboratory for ECA (mLab ECA): mLab provides major opportunities for mobile application industry development in Eastern Europe, South Caucasus, and Central Asia. mLab offers training programs related to mobile software development.

Armenian students are not alone in their interest in furthering their education and gaining the knowledge necessary for finding work in their chosen fields. Numerous foreign students are moving to Armenia for education and training in spheres related to medicine, economics, and computer science. The amount of foreign students continues to rise year after year.



6.5 Cooperation with the Private Sector

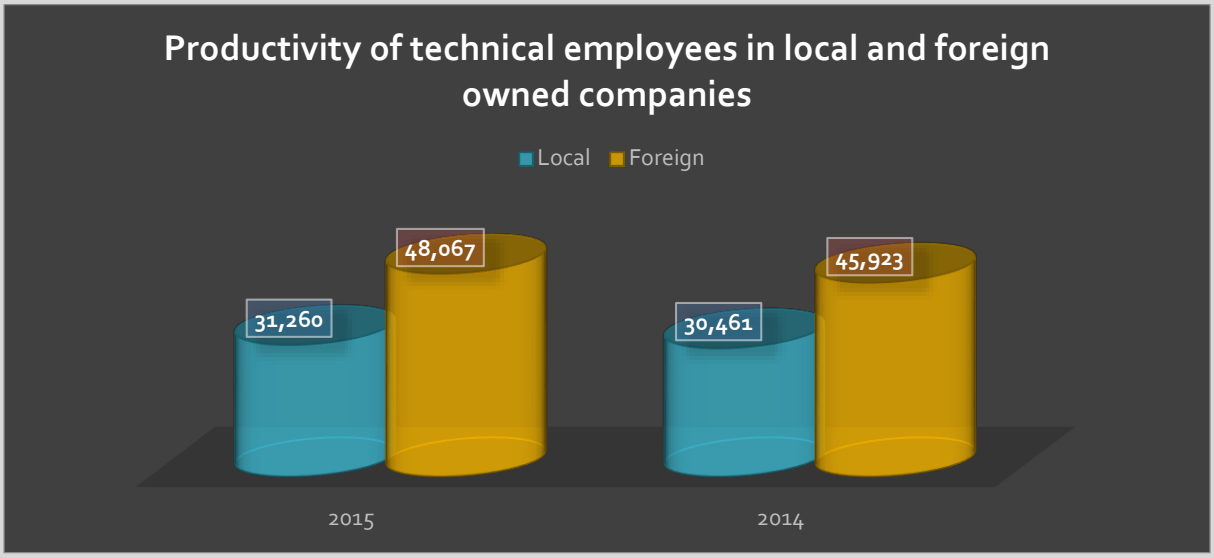
During the period following the collapse of the Soviet Union, cooperation between the IT industry and universities was rather lacking. However, some positive developments recently taken place. The most evident examples of this include the following:

- Interdepartmental Chair of Microelectronic Circuits and Systems, established by LEDA Systems (acquired in 2004 by Synopsys Inc.) and NPUA, and now part of the Synopsys University Program, supplies more than 60 high-quality VLSI and EDA specialists each year (Synopsys has expanded this initiative by opening interdepartmental chairs at YSU and RAU)
- Gyumri IT Center (GITC), the first IT training center in the city of Gyumri, established by the Fund For Armenian Relief (FAR) and EIF in 2006
- Academic Initiative launched in 2013 jointly with IBM and IBM Innovative Solutions and Technologies Centre, established in 2015 (physical building will be ready in 2016 at YSU)
- Samsung Learning Center, formed at YSU in 2014 through joint efforts by Samsung and YSU

There are many examples of companies hiring graduates of the tailored training programs. At this point, industry and university cooperation goes no further than educational programs and training courses that focus mainly on the development of high-quality professionals for specific companies and for the industry in general.

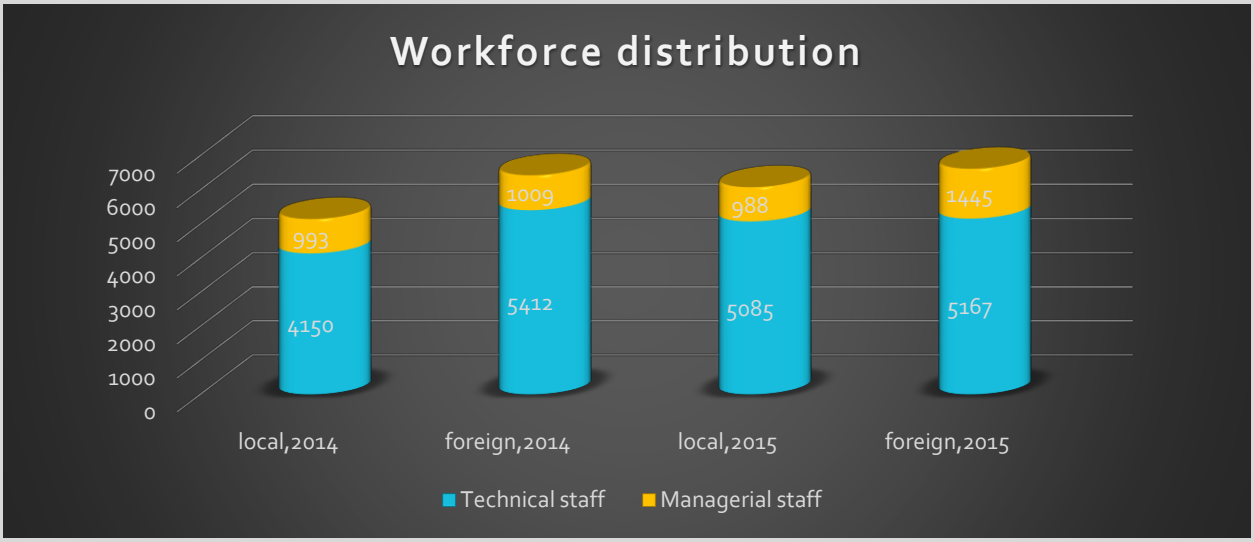
7. ICT Workforce Structure

Unquestionably, the workforce is one of the most important competitive advantages in the Armenian ICT sector. Not only is this a cheap labor, Armenian specialists are also highly productive, making them attractive to foreign investors. In 2015, the workforce employed in the IT sector reached 12,685, which accounted for about 10% growth compared to the previous year. The number of technical specialists such as software engineers, analysts, developers, IT project managers, and others reached 10,250. Altogether, including support staff, employment in the sector has reached about 15,000.



The productivity of the technical workforce has grown by 5% for foreign-owned companies compared to 2014, reaching $48,067 USD per employee. For locally owned companies, employee productivity has not registered much change, and is about $31,260 USD, as in the previous year.

70% of 10,250 technical specialists employed in the IT sector are engaged in the software and services segment, while the remaining technical workforce works in the telecommunication segment.



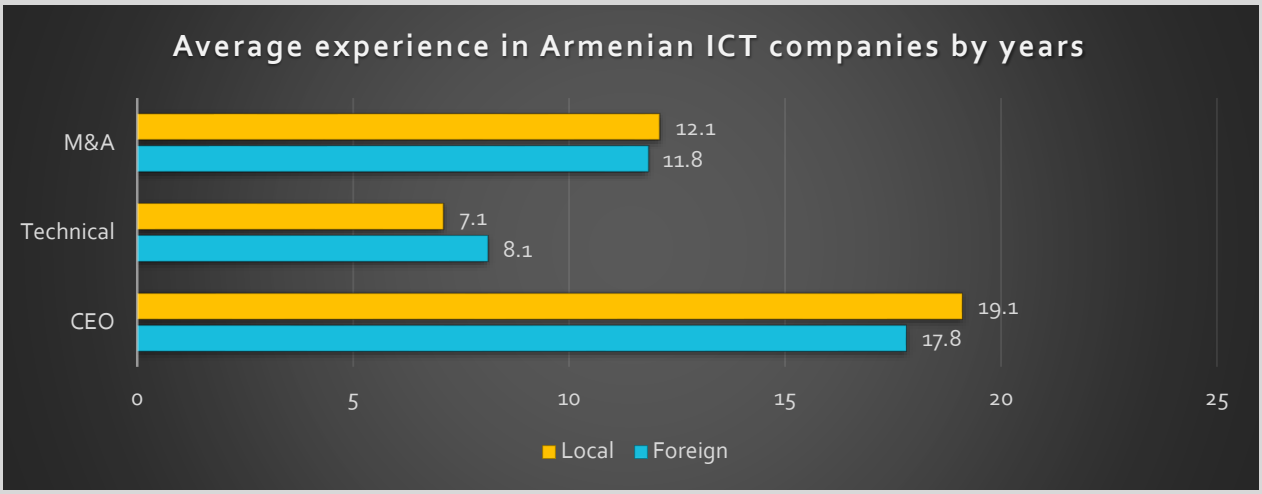
As the chart shows, in 2015 the number of management and business professionals increased in the total IT workforce as compared to 2014, both in domestic companies and those with foreign ownership. We can see that

foreign companies have registered a higher rate of growth in comparison to local companies, which indicates that foreign companies are broadening their presence in Armenia.

According to data from 2015, 68% of the Armenian ICT workforce have Master's or higher degrees. Students represent 35% of the entire ICT workforce. Although local companies prioritize personnel training as an essential factor in employee development, few are in a position to provide ongoing training. The availability of resources and personnel play a significant role in this process. Many companies offer new graduates non-paid internships, training them in small, value-added jobs and then selecting the best of them for permanent positions. New employees usually do not start working at full capacity for periods longer than two months.

The overwhelming majority of the specialists employed in the Armenian ICT sector are males (63%). The number of female employees in the software and services sector has increased by 2% as compared to 2014.

On average, the work experience of company directors included in our survey sample is 19.1 years in domestic companies and 17.8 years in foreign companies. Information on average years of work experience of other employees is shown below.



Local and foreign companies employed 43% and 57% of the total workforce, respectively (in 2008, this ratio was 50/50), which means that the number of persons employed by foreign companies has increased by 1% as compared to the previous year.

Companies with foreign ownership employ 57 people on average (arithmetic average value), while the average number of employees in local companies is 20.

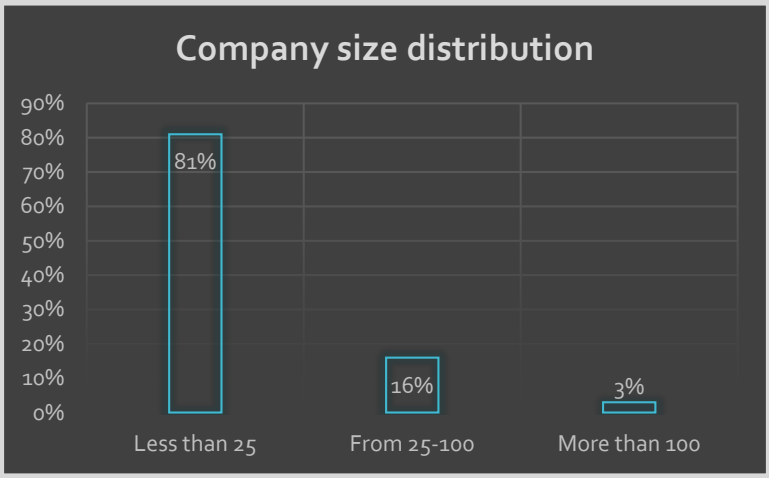
Armenia is still considered to be a low-cost location for offshore development, where salaries are competitive with those of many IT-outsourcing countries, such as India, Russia, Israel, Ireland, and China.

Among local companies, the average monthly salary of a junior technical specialist amounts to $300 to $400 USD, while the salary of senior specialists can be as much as $3,500 USD.

Foreign-owned companies pay technical specialists $400 to $3,500 USD.

The results of this study show that salaries are correlated with the work experience, rather than the educational attainments, of technical employees.

Company distribution according to employee numbers in 2015 is not much different from the rates of the previous year. Similar to 2014, the number of specialists employed by the firms varies significantly within the industry. Only 4% of all businesses employ 100 or more specialists, constituting 43% of the total workforce, while 81% have fewer than 25 employees, constituting 30% of the total workforce.



Thus, as the chart at left shows, the distribution of ICT companies in Armenia related to the workforce tends towards small businesses.

As part of their strategic management, foreign branches constantly train their employees both in Armenia and at their head offices. Furthermore, the branches have created special resource centers and libraries to provide opportunities for the staff to improve their qualifications and skills. Employees of a number of foreign companies have the option of becoming shareholders of the employer company and to receive other non-salary incentives. In the last three years, local companies have begun to offer similar initiatives.

8. The Role of ICT Sector in the Economy of Armenia

8.1 Development Progress and Prospects

Summarizing the results of the survey it may be stated that the IT sector has an immense export potential and may have significant contribution in the growth and development of the economy of Armenia.

Nowadays Armenian IT companies are able to offer products and services in compliance with high international standards. However, there are still certain problems from the perspective of entering foreign markets and training specialists for the IT industry. With this respect, Government's policies and ongoing programs in support of the sector have an important role to play.

In 2015, revenues generated by the software and services sector, along with Internet service providers, have increased to 5% of Armenia's GDP or $10.3 billion USD.[7]

During the period of 2010 through 2015, the average annual growth in the industry amounted to nearly 20%. The industry's share in total exports increased from 8% in 2010 to 11% in 2015[8] with a focus on the expansion and development of export-oriented businesses. This confirms the growing importance of the software development sector in the Armenian economy.

The ICT sector creates 1700 well-paid jobs for technical specialists annually. However, Armenian universities graduate 2,000 IT and high-tech specialists each year. Hence, only the best specialists, after undergoing training provided by the companies, are hired for these jobs.

The share of local companies in total revenues of the software and services segment comprises approximately 56%, an increase of 8% over the indicator from the previous year.

In addition to local ICT companies, foreign branches and representation offices also operate in Armenia. These are primarily outsourcing centers with clearly defined budgets; little of the value generated by these foreign branches is left in the country besides salaries and other expenses. Nevertheless, this branch model is still relevant for Armenia, and has visible positive effect on the industry and the overall economy of the country.

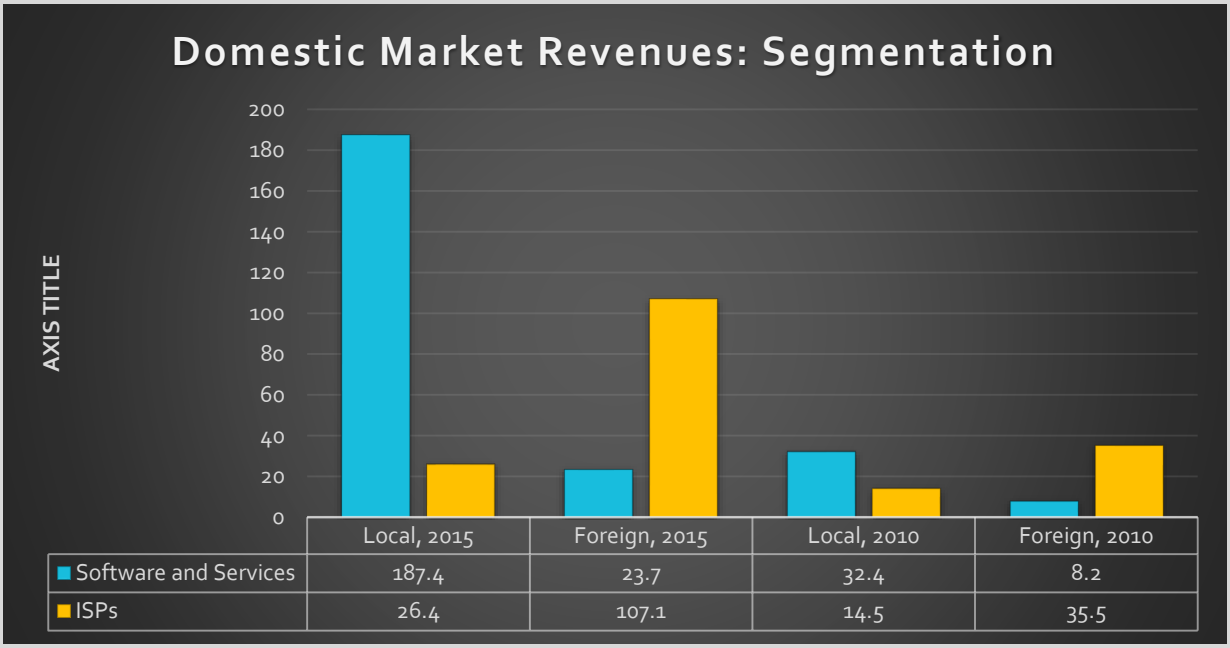
8.2 Domestic Market

In 2015, domestic market volume reached about $344.7 million USD, comprising 61% of the industry's total. This is less than the 2014 domestic market share, due to an increase in exports and a slowdown in the Telecom market. In general, since 2010, sales volumes in the domestic market have increased by more than 253%, which has been the result of substantial growth in the Internet services area. The share of the software sector constituted 61% of the domestic market, while the ISP segment was at 39%, with an estimated $133.6 million

[7]Source: National Statistical Service of the Republic of Armenia, http://www.armstat.am.
GDP is counted for 3 quarters of 2015 and 4th quarter of 2014.

[8]Based on export indicators of 2015 (data from the Central Bank of the Republic of Armenia)

USD in total market revenues. Share of locally owned ISPs and overall ISP market increased considerably, due to entry into the market of new, large ISP firms, as well as acquisitions of telecom players.



As the chart shows, turnover volumes have tripled during the last five years. The reason is the growing demand for IT sector services in other industries. There is a growing demand for IT services in the domestic market; however, this is a slow process due to a number of factors, including margin domestic market, low wages, low demand for productivity enhancement tools, financial constraints, high software piracy rates, and other factors.

The relatively low domestic demand constituted insufficient inducement for Armenian ICT companies to develop software packages 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 the healthcare industry, and distance learning programs.

8.3 Exports

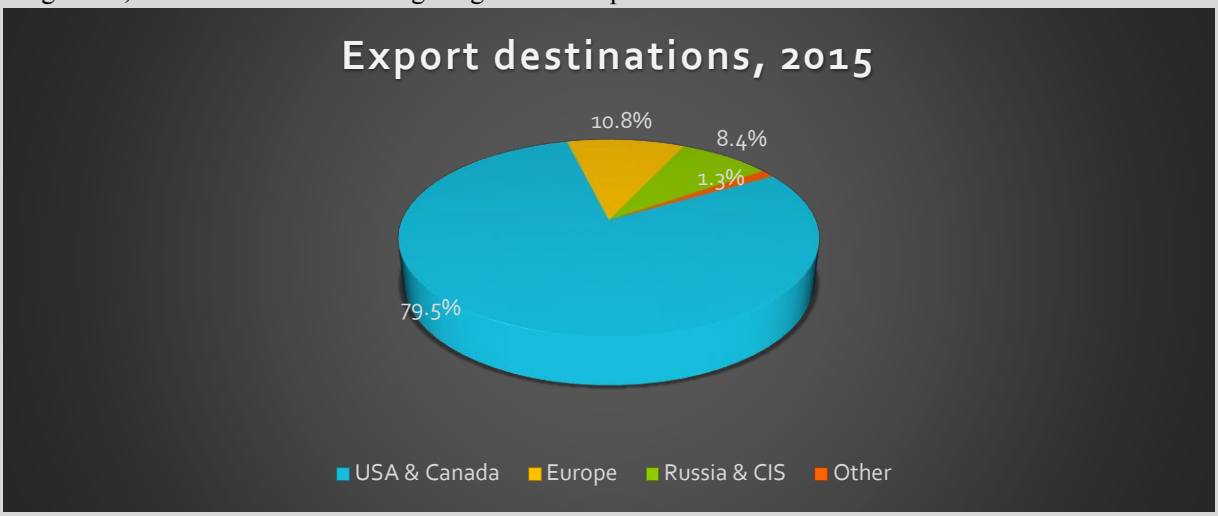
Exports increased essentially in 2015, reaching $214.4 million USD, comprising 50% of the Software and Services segment (without ISPs) total.

With 76% of exports' share, foreign companies were still prevalent in exports. The largest Software and Services companies are branches of foreign firms, which almost completely export their output. In addition, many domestic enterprises also export a significant portion of their products and services.

More than 50% of IT companies export their own products and services, though the export volumes vary; for certain companies exports account for a low share of revenues, while others export their products in whole (100%).

The largest share of exports, almost 79.5%, goes to the United States and Canada; 10.8% goes to Europe; and Russia and CIS countries are third, with 8.4%. Among other countries, UAE has the highest demand for Armenia's services, focusing mostly on outsourcing of accounting, banking, and financial services.

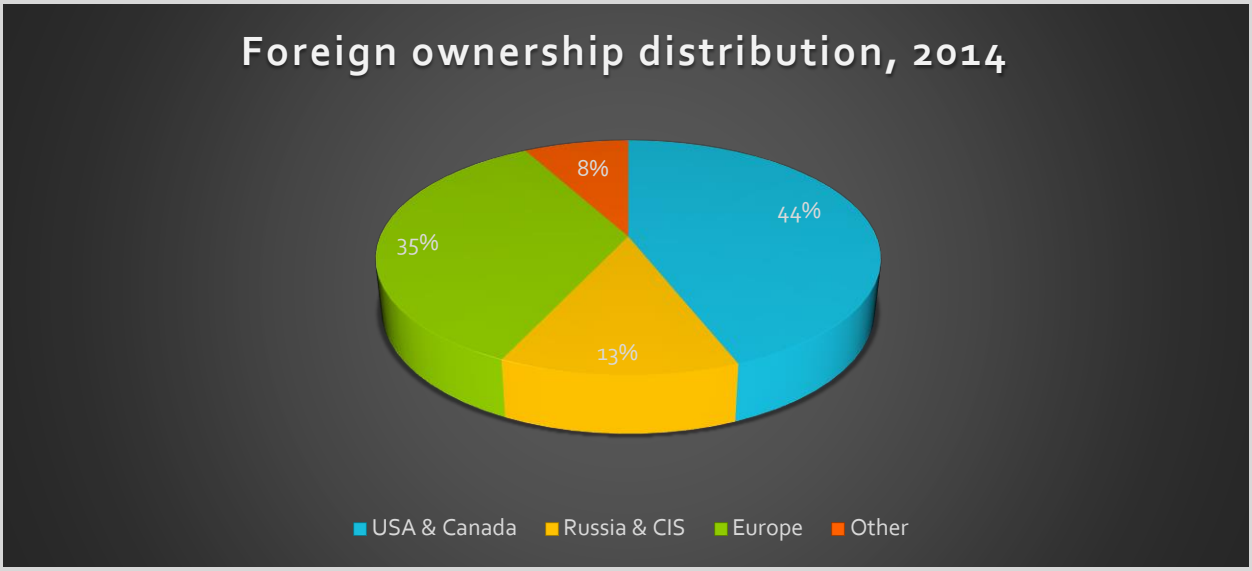
In general, the main factors hindering the growth of exports include the insufficient awareness of the international



business community about Armenia and its IT industry; the country's distance from major IT markets; and language barrier. The latter, however, has become less important.

8.4 Foreign-Owned Companies

The 2015 data shows that 162 companies with foreign ownership operate in Armenia, constituting about 36% of the industry total. In 2005, these companies represented only 25% of Armenian ICT companies. Armenia's expertise in software development continues to gain recognition overseas, thus attracting foreign investments in the ICT sector.



Similar to recent years, US companies constitute the majority of foreign companies (44%) operating in Armenia. This number has increased by 2% as compared to the numbers recorded in the previous year. European companies, or companies with a European share, make up 35% of companies with foreign ownership.

In the majority of cases, foreign branches are pure development centers for the parent companies. These are usually established as small development centers and, after forming an effectively operating team, start increasing the number of employees and moving on to activities of higher value to Armenia. It is a common practice to eventually move the entire cycle of a company's technical activities to Armenia, including R & D, design, coding, testing, and other functions. In addition, some companies have started relocating parts of their business-related functions, such as marketing and customer support, to Armenia. The practice of sending local professionals to the customer sites outside of Armenia to provide implementation and customer support is widely used.

8.5 Success Stories

In 2004, 2005, and 2010, the Armenian ICT sector witnessed a major transaction that took place 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.

Other examples of acquisitions of existing Armenian companies during the last several years included the sale of three state-owned Armenian enterprises (MARS, Yerevan Computer Research and Development Institute and Yer.ACSSRI) 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 the US-based Mentor Graphics Corporation.

Synopsys, Inc. (Nasdaq: SNPS) is the Silicon to Software™ partner for innovative companies developing the electronic products and software applications we rely on every day. Synopsys established a presence in Armenia in 2004 as Synopsys Armenia closed joint stock company (CJSC) after acquiring Monterey Arset and Leda Design, with a combined total of nearly 130 local employees. Later, Synopsys enlarged its presence in Armenia by acquiring HPLA in 2005 and Virage Logic in 2010. Today, Synopsys is one of the largest IT employers in Armenia, with more than 750 employees (including more than 650 engineers), and is among the largest Synopsys sites outside the U.S.

National Instruments (NI) is a leading multi-national technology company with direct operations in 41 countries. NI is a producer of automated test equipment and virtual instrumentation software. National Instruments transforms the way engineers and scientists around the world design, prototype, and deploy systems for test, control, and embedded design applications. The NI academic program is carried out in more than 110 countries. Since 2005, there has been a NI branch in Armenia, with a current employment of around 100 people. Also during these 10 years, the NI Armenian branch has generated more than 15 spin-offs.

Mentor Graphics Corporation (Nasdaq: MENT) is a world leader in electronic hardware and software design solutions, providing products, consulting services, and award-winning support for the world's most successful electronics and semiconductor companies. Mentor Graphics is a global company with product development activities in the USA, Europe, Japan, Pakistan, India, Egypt, and Armenia. In July 2008, Mentor Graphics established its presence in Armenia by acquiring the assets of Ponte Solutions, Inc., in Mountain View, CA.

VMware established its R & D site in Armenia in 2010 through the acquisition of Integrien Corporation, the leader in real-time performance analytics. After the acquisition, VMware changed the name of Integrien's core product from Integrien Alive Enterprise to VMware vCenter Operations, which later became the key component of vCenter Operations Management Suite. This product provides a new and much simplified approach to operations management of physical, virtual, and cloud

infrastructures, which helps enhance VMware vSphere, thus realizing a new technology transformation. The vCenter Operations team has expanded in the past year, adding roughly 40 highly qualified and experienced engineers and researchers. The team is composed of PhDs and Engineers who are in charge of the overall development of the product.

In November 2014, Cisco Systems Development president, Mario Mazzola, visited Armenia and announced that Cisco Systems (an American multinational corporation headquartered in San Jose, California that designs, manufactures, and sells networking equipment) had acquired Memoir Systems Armenian company and will open its office in Armenia. This acquisition will enable the company to increase the manufacture of affordable and high-speed memory for existing ASIC-Cisco switches and circuits.

On June 20, 2014, US-based multinational computer technology company Oracle announced that it signed an agreement to acquire LiveLOOK, for the purpose of strengthening the Oracle Service Cloud with leading co-browse functionality to improve customer experiences through connected real-time engagements. Following this acquisition, Oracle decided to keep the LiveLOOK office in Yerevan as part of its R & D staff, resulting in the first Oracle R & D office in Yerevan. Oracle is even exploring the possibility of expanding in Armenia; during his speech in Armenia, Igor Khalatian, founder and CEO of LiveLOOK Inc., announced that Oracle is planning to open a 200 to 300-member R & D center in Armenia.

The Armenia-based Joomag Company is the pioneer in offering rich interactivity in digital publishing and a leader in the digital publishing services field. The company provides integrated solutions for publishing, distributing, tracking and monetizing publications online to more than 300,000 worldwide publishers, creating digital interactive magazines, newsletters, blogs, catalogues, brochures, and e-books.

Shadowmatic, an iOS app developed by the Yerevan-based Triada Studio, won the prestigious Apple Design Award during Apple's World Wide Developers Conference in San Francisco on June 8, 2015. Triada Studio is a computer graphics and animation studio with over 20 years of industry experience. Shadowmatic is the company's first project that bridges its vast computer graphics experience with an experimental in-house 3D engine. The team began working on Shadowmatic in March 2012. During the development phase, they continually added new features to their original idea, hence the development process took about three years.

The PicsArt mobile photo editing application, developed by Armenian experts, was included in Forbes Magazine's 2015. Hottest Startup list, ranking fifth in the standings. The estimated valuation of the startup is $250 million. At the same time, Google Play recognized the application as one of 2015's best apps. PicsArt is an American brand, designed by Silicon Valley-based company Open Soft Consult, but the programming and marketing are carried out in Yerevan.

Armenian startup SoloLearn is the largest community of mobile code learners. It was among the top 10 hottest Bay Area startups of 2015, with funding of under $10 million. It has raised just $100,000 and employs only six people, but its momentum score from Mattermark is the highest among this top 10. So it appears to be getting good traction on social media. Its backers include Granatus Ventures.

9. Policy Developments and Major Accomplishments

In 2000, the Government of Armenia declared the IT sector as one of the priorities in the development of the Armenian economy. The declaration was followed with a number of specific actions to bring the Government decree into effect. In 2001, the Government, jointly with the World Bank, USAID, universities, various foundations, and private enterprises, developed the ICT Master Strategy and ICT development implementation plan to promote ICT 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 of Armenia, based on the recommendations outlined in the ICT Master Strategy.

In July 2001, the Information Technologies Development Support Council of Armenia (ITDSC), chaired by the Prime Minister, was established by decree of the President of Armenia. The Council's mission 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. Its goals are to assist the Government and the private sector in building a 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 the information technology industry in Armenia. EIF is the largest development initiative within the IT industry in Armenia.

The Government considers information technology an important area for international cooperation, and has initiated various projects within this framework: the European Regional Institute of Information and Communication Technologies in Armenia (ERIICTA), which was established with financial assistance from the European Union; the USAID-funded Competitive Armenian Private Sector Program (CAPS), Enterprise Development and Market Competitiveness Project, and other programs.

In 2008, the Government adopted a new 10-year industry development strategy focused on building infrastructure, improving the quality of IT graduates, and creating venture and other financing mechanisms for start-up companies. The main goals of this new strategy are to 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 technology parks and incubators, establishing a major venture fund, developing a domestic market for local IT products and services, increasing foreign direct investments, developing other measures targeting the expansion of the ICT sector, and developing an information society in Armenia. The Ministry of Economy is the Government body responsible for the implementation of this strategy and overall IT industry development.

Since 2008, allocations have been made from the National Budget to the RA Ministry of Economy for providing government support to development of the IT sector. Those funds are used for IT industry research; industry status survey; preparing guidelines for the industry and enterprise rates; organization of industry related events of local, regional, and international importance in Armenia, including exhibitions, forums, conferences, and competitions; Armenia's participation in major international events abroad; and the co-financing of joint projects and events with foreign governments, international institutions, and transnational organizations of the IT industry.

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

ArmTech congresses are intended to highlight growth in the high-tech industry that has strategic importance for the Armenian economy, promote international collaboration and attraction of investments, foster cooperation between IT specialists, and make the Armenian high-tech industry globally recognizable. The annual forum is organized sequentially in Armenia and the US.

The main goal of the DigiTec Expo is to create a favorable environment for communication between high-tech companies, business consumers, and the general public. The expo serves as the ground floor for studying and understanding the real picture; identifying the achievements, challenges, and opportunities of the Armenian ICT sector; facilitating the market entry of IT companies and the exhibition of their products and services; and strengthening international relations.

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

The Government of Armenia implements targeted projects for the development of IT sector infrastructure. In 2008, particularly, the Government of Armenia approved the Concept Paper and the Action Plan for reconstructing Gyumri to be a technocity. Since 2008, allocations have been made from the State Budget of the Republic of Armenia to the Ministry of Economy to provide state support to the activities of Gyumri Technopark. The program's aim is to turn Gyumri into a Center of Excellence – a Technocity known for being a business environment with large educational institutions; research centers; and strong facilities for development, testing, and realization of innovative information and high-tech projects; and a capacity for starting large-scale production and small and medium high-tech companies.

One of the goals of the Government of Armenia's new ICT Development Strategy is to form an E-society in Armenia, specifically the significant expansion of computer usage and Internet access. To achieve this goal, the Computer for All Program has been launched, with the following goals:

- Make computers affordable and accessible to the population
- Train skillful users of 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 of the Republic of Armenia 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, Hewlett-Packard, EIF, and Unicomp CJSC, for the implementation of Teachers PC and Classmate PC pilot projects in Armenia.

By its Decree N7 of February 25, 2010, the Government of Armenia approved the Armenian E-society Development Concept Paper, to be implemented over 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 of unifying all electronic management tools and databases of the Armenian governmental authorities and providing a comfortable environment for their use. The site allows electronic applications for licensing, electronic registration of organizations, electronic tax reports, electronic visa applications, electronic applications to the Intellectual Property Agency, issue of electronic signatures, electronic procurements, and more. New services are added

continuously to the electronic management portal. At present, efforts are under way to introduce other electronic services, including 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 International 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 industry development, formation of an e-society, and so on. Specifically, the program includes, but is not limited to, the following projects: Pan-Armenian Broadband Access and Management Network, Introduction of Certification Center in Armenia, Computer for All, Gyumri Technology Center, Financial Support to Companies Needing Innovative Knowledge and Technologies, and Assistance to IT/Research Industry Development.

Since July 2011, the Republic of Armenia has undertaken one and a half years of the coordination of the Black Sea Economic Cooperation Working Group on Information and Communication Technologies.

In June 2011, Armenia passed the Law on the Free Economic Zone, and a number of important regulations were put in place by late 2011. The free economic zone "Alliance" is based on "RAO Mars" CJSC and "The Yerevan Computer R&D Institute" CJSC. The "Alliance" free economic zone is oriented to the production and exports of high and innovative technologies in the field of electronics, precision engineering, pharmaceutics and biotechnologies, information technologies, alternative energy, industrial design and telecommunications (elaboration and production of technological equipment, systems and materials for data/information transfer) as well as in the fields producing goods not produced in Armenia. The FEZ residents shall be exempt from all taxes except the payroll taxes:

- profit tax - 0%
- VAT - 0%
- import customs duties - 0%
- export customs duties - 0%
- dividend taxes - 0%
- real estate and property taxes- 0%

No currency restrictions, free repatriation of capitals, profit and dividends

In 2012, the Government of Armenia, USAID, National Instruments (NI), State Engineering University of Armenia (NPUA), and Enterprise Incubator Foundation (EIF) jointly started the project of establishment of the Armenian National Engineering Lab (ANEL). The main goal of the Project is to meet the demand of the engineering industry for quality specialists and graduates. This will help Armenian high-tech businesses address the existing gap in terms of availability of employees and increase value-added and innovative business activities, thus increasing their international competitiveness.

Efforts toward expanding research and development activities in the country, as well as leveraging private sector experience and R & D potential, will allow for implementation of the most challenging part of the project, that is, to establish a strong public-private partnership and promote the development of technological innovation.

The Armenian IT/High-Tech Representative Office was officially launched in December, 2012, at Plug & Play Tech Center in Silicon Valley, California. The office will operate as a hub to foster the development of sales and investment opportunities for Armenian IT and high-tech companies in the US. It will ensure Armenian IT

visibility and presence in the US marketplace and the introduction and marketing of Armenian IT capabilities and products in the US, as well as assistance with the establishment of business ties between Armenia-based companies and US firms and investors.

In December 2012, the Government of Armenia and Intel Corporation signed a Memorandum of Understanding on cooperation in the sphere of education and R & D. Under this Memorandum, Intel will expand its joint efforts with Armenia, toward increasing the rate of computer penetration in schools, training of teachers, creating educational content, and establishing new partnerships in software development and joint research initiatives.

Another Memorandum of Understanding was signed in December 2012 between the Government of Armenia and Corporacion America to establish and launch production of semiconductors and an IT research and development center in Armenia.

In 2012, the first Free Economic Zone (FEZ) was established in Armenia, pursuing the goal to contribute to the increase in export volumes and creation of new jobs, as well as to ensure sustainable economic development through attracting foreign direct investments and introducing advanced technologies. The Free Economic Zone established at RAO MARS CJSC and The Yerevan Computer R & D Institute CJSC is oriented to the production and export of innovative and high technologies in the field of electronics, precision engineering, pharmaceuticals and biotechnologies, information technologies, alternative energy, industrial design, and telecommunications (elaboration and production of technological equipment, systems, and materials for data/information transfer). Free Economic Zone operators are exempted from profit tax, income tax, VAT, property tax, and customs duties.

In 2013, the first venture fund in Armenia was established, with the support of the Ministry of Economy of the Republic of Armenia. The primary importance of such an initiative for Armenian IT companies is its goals of supporting the innovativeness of Armenian companies; promoting networking with the Western market of high technologies and FDI options; and developing the Armenian Information Technology infrastructure in the Republic of Armenia.

A Memorandum of Understanding was signed between the Government of Armenia and IBM in 2013, calling for cooperation in the spheres of education and R & D, specifically the establishment of the Innovative Solutions and Technologies Center.

Granatus Ventures the first Armenian Venture Fund was established in 2014. The Fund is of primary importance for Armenian IT companies, since it seeks to promote their innovative initiatives, facilitate establishment of contacts with western markets, increase capacities, and support the general development of the Information Technology infrastructure in Armenia.

In December 2014, another Memorandum of Understanding was signed between the Government of Armenia and IBM in regard to cooperation in the social services sector, including implementation of IBM Curam technology in Armenia, as well as establishment of Center of Excellence in Social Services.

In 2015, the Government of Armenia and Microsoft signed a memorandum and cooperation agreement that will contribute to the development and implementation of prospective new programs. The new program aims to create the Microsoft Center for Mobile and Cloud Development on base of Microsoft Innovation Center and mLab ECA.

IT Industry Growth Targets for 2018

Home/household computer penetration	70%
Computer penetration at educational institutions	100%
Computer penetration at central and local governments	100%
Internet accessibility for general population	90%
RA Government spending on locally developed IT products, % of national budget	>1%
Domestic consumption of locally developed IT products, % of GDP	>2%
Share of e-services in all services provided by RA state entities	80%
Number of IT companies, of which with foreign capital	1,000 200
IT workforce	20,000
Productivity, output per employee	50,000 USD
Industry revenues	1 bln USD
Exports	700 mln USD
IT companies with ≥ 1,000 employees	>1
IT companies offering R & D services	100-200
Large technocity, Technoparks & 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

ANNEXES

Industry Statistics

	2015	% from Industry	2010	% from Industry	% change 2015/2010	CAGR 2015/2010
Number of Companies						
Industry	450	100%	197	100%	128%	31.7%
Local firms	288	64%	125	63%	130%	32.1%
ISPs	21	5%	16	8%	31%	9.5%
Foreign branches	162	36%	72	37%	125%	31.0%
ISPs	12	3%	3	2%	300%	58.7%
Company Ownership Geography						
Industry	450	100%	197	100%	128%	31.7%
Armenia	284	63%	125	63%	127%	31.5%
USA & North America	75	17%	36	18%	108%	27.7%
Europe	38	8%	18	9%	111%	28.3%
Russia & CIS	35	8%	15	8%	133%	32.6%
Other	18	4%	3	2%	500%	81.7%
Exports Geography, millions of U.S. dollars						
Industry	$214.4	100%	$58.2	100%	268%	54.4%
USA & North America	$169.8	79%	$40.5	70%	319%	61.2%
Europe	$23.2	11%	$11.1	19%	109%	27.8%
Russia & CIS	$17.2	8%	$4.9	8%	250%	51.8%
Other	$4.3	2%	$1.6	3%	168%	38.9%
Productivity (average output per technical employee excluding ISPs), U.S. dollars						
Industry	$39,664	100%	$31,548	100%	26%	7.9%
Local firms	$31,260	79%	$29,186	93%	7%	2.3%
Foreign branches	$48,067	121%	$33,668	107%	43%	12.6%
Software and Internet Services Industry Turnover, millions of U.S. dollars	**2015**	**% from Industry**	**2010**	**% from Industry**	**% change 2015/2010**	**CAGR 2015/2010**

Industry	$559.1	100%	$148.8	100%	276%	55.5%
Local firms	$265.2	47%	$57.8	39%	359%	66.2%
Foreign branches	$293.9	53%	$91.1	61%	223%	47.8%
Domestic market	$344.7	62%	$90.7	61%	280%	56.1%
Local firms	$213.8	38.2%	$46.9	32%	356%	65.8%
Software and IT consulting	$187.4	34%	$32.4	22%	478%	79.5%
Internet services	$26.4	5%	$14.5	10%	82%	22.1%
Foreign branches	$130.9	23.4%	$43.7	29%	200%	44.2%
Software and IT consulting	$23.8	4%	$8.2	6%	190%	42.6%
Internet services	$107.1	19%	$35.5	24%	202%	44.5%
Exports	$214.4	38%	$58.2	39%	268%	54.4%
Local firms	$51.4	9%	$10.8	7%	376%	68.2%
Foreign branches	$163.0	29%	$47.3	32%	245%	51.0%
Industry	$559.1	100%	$148.8	100%	276%	55.5%
Software and IT consulting	$425.6	76%	$98.8	66%	331%	62.7%
Internet services	$133.5	24%	$50.0	34%	167%	38.7%
Workforce Distribution*	**2015**	**% from Industry**	**2010**	**% from Industry**	**% change 2015/2010**	**CAGR 2015/2010**
Industry	12,685	100%	4,960	100%	156%	36.8%
Technical specialists	10,250	81%	4,110	83%	149%	35.6%
Management	2,435	19%	850	17%	186%	42.0%
Software and IT consulting	8,630	68%	3,770	76%	129%	31.8%
Local firms	5,342	42%	1,880	38%	184%	41.6%
Foreign branches	3,288	26%	1,890	38%	74%	20.3%
Internet services	4,055	32%	1,190	24%	241%	50.5%
Local firms	731	6%	240	5%	205%	45.0%
Foreign branches	3,324	26%	950	19%	250%	51.8%
Local firms	6,073	48%	2,120	43%	186%	42.0%
Technical specialists	5,085	40%	1,660	33%	206%	45.2%
Management	988	8%	460	9%	115%	29.0%
Foreign branches	6,612	52%	2,830	57%	134%	32.7%
Technical specialists	5,167	41%	2,450	49%	111%	28.2%
Management	1,445	11%	380	8%	280%	56.1%
Software and IT consulting	8,630	68%	3,770	76%	129%	31.8%
Technical specialists	7,341	58%	3,130	63%	135%	32.9%
Management	1,289	10%	640	13%	101%	26.3%
Internet services	4,055	32%	1,190	24%	241%	50.5%
Technical specialists	2,909	23%	980	20%	197%	43.7%

Management	1,146	9%	210	4%	446%	76.1%
* Totals may differ due to rounding						
Distribution of number of companies by specialization	**Industry, 2014**	**Local firms, 2014**	**Foreign branches, 2014**	**Industry, 2010**	**Local firms, 2010**	**Foreign branches, 2010**
1. Accounting, banking, and financial software	9%	6%	3%	5.3%	4.2%	1.1%
2. Chip design, testing, and related	3%	1%	2%	2.5%	0.4%	2.1%
3. Computer graphics, multimedia, and games	5%	3%	2%	6.4%	5.3%	1.1%
4. Customized software and outsourcing	18%	11%	7%	21.6%	10.2%	11.4%
5. Databases & MIS	7%	3%	4%	6.0%	4.6%	1.4%
6. Internet applications and ecommerce	4%	3%	1%	11.3%	8.1%	3.2%
7. IT services and consulting	8%	5%	3%	11.3%	8.1%	3.2%
8. Mobile application development	12%	6%	6%	*		
9. System design and automatization	15%	8%	7%	*		
10. Networking systems and communications	7%	5%	2%	6.4%	4.2%	2.2%
11. Web design and development	10%	7%	3%	17.7%	14.1%	3.6%
12. Other	2%	1%	1%	7.3%	3.2%	4.1%
13. Internet Service Provider	8%	2%	6%	10.2%	5.7%	4.5%
* Mobile Application Development, as well as System Design and Automatization specializations were separated since 2012						
Distribution of revenues based on specialization	**Industry, 2014**	**Local firms, 2014**	**Foreign branches, 2014**	**Industry, 2010**	**Local firms, 2010**	**Foreign branches, 2010**
1. Accounting, banking, and financial software	$34.0	$12.8	$21.3	$7.8	$5.3	$2.5
2. Chip design, testing, and related	$85.1	$4.3	$80.8	$21.0	$0.7	$20.3
3. Computer graphics, multimedia, and games	$8.5	$4.3	$4.3	$2.7	$1.9	$0.8
4. Customized software and outsourcing	$102.1	$51.1	$51.1	$25.4	$10.5	$14.9
5. Databases & MIS	$8.5	$4.3	$4.3	$3.6	$3.0	$0.6
6. Internet applications and ecommerce	$17.0	$8.5	$8.5	$2.5	$1.6	$0.9
7. IT services and consulting	$25.5	$8.5	$17.0	$12.7	$6.9	$5.8
8. Mobile application development	$21.3	$17.0	$4.3	*		
9. System design and automatization	$38.3	$17.0	$21.3	*		
10. Networking systems and communications	$42.6	$34.0	$8.5	$5.7	$3.0	$2.7

11. Web design and development	$38.3	$34.0	$4.3	$6.6	$4.8	$1.8
12. Other	$4.5	$4.3	$0.2	$10.8	$5.6	$5.2
13. Internet Service Provider	$ 133.5	$ 26.4	$107.1	$ 50.0	$ 15.5	$34.5
* Mobile Application Development, as well as System Design and Automatization specializations were separated since 2012						
Industry Turnover, (Nace classification) millions of U.S. dollars	**2015**	**% of Industry**	**2014**	**% of Industry**	**2015/2014**	**CAGR 2015/2014**
Software and Services	**$425.7**	**100%**	**$349.15**	**100%**	22%	6.8%
58.21 Publishing of computer games	$8.51	2%	$5.38	2%	58%	16.5%
58.29 Other software publishing	$17.02	4%	$13.10	4%	30%	9.1%
62.01 Computer programming activities	$246.8	58%	$209.20	60%	18%	5.7%
62.02 Computer consultancy activities	$68.08	16%	$52.90	15%	29%	8.8%
62.03 Computer resource management activities	$80.85	19%	$63.47	18%	27%	8.4%
62.09 Other information technology and computer service activities	$ 4.5	1%	$5.10	1%	-12%	-4.1%
Telecommunications	$479.97	100%	$474.68	100%	1%	0.4%
61.10 Wired telecommunications activities	$176.1	36.7%	$119.8	25%	47%	13.7%
61.20 Wireless telecommunications activities	$279.3	58.2%	$303	64%	-8%	-2.7%
61.90 Other telecommunications activities	$6.7	1.4%	$13.00	3%	-48%	-19.7%
63.1 Data processing, hosting and related activities; web portals	$1.4	0.3%	$1.59	0%	-9%	-3.3%
Other income in Telecom industry	$16.3	3.4%	$ 37.19	8%	-56%	-24.0%