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## Support to Armenia-Turkey Normalization Process

# Information and Communication Technologies as an Opportunity of Economic Cooperation between Turkey and Armenia

TEPAV, August 2015

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### Introduction

A previous report prepared by TEPAV ‘Strengthening Connections and Business Synergies Between Turkey and Armenia’<sup>1</sup> identified Information and Communication Technologies (ICT) and tourism as target sectors for cross-border economic cooperation. The context of this study, under the “the Support to Armenia Turkey Normalization Process” programme funded by European Union, is to go deeper into the role of ICT as a springboard to mutual economic collaboration between Armenia and Turkey.

Within this context desk research focusing on data analysis and fact finding in the field covering Armenia and Turkey in November 2014 and June 2015 were done (see Appendix 2).

This paper will present the potential of ICT cooperation, focusing on the information technologies (IT). Here information and communication technologies is used for the combination of information technologies (covering hardware and software goods and services in the industry like outsourcing and consulting) and communication technologies (fixed and mobile communication goods and services and network/communication hardware) software and services. In order to accomplish this, first, the indicators of a potential ICT cooperation for both Armenia and Turkey will be shown. The ICT ecosystem of both countries will be investigated. Second, complementary features of the ICT markets in Armenia and Turkey will be determined. Although there are no diplomatic relations between Turkey and Armenia third section will seek potential policy schemes that can be pursued in case of a trans-border cooperation understanding occurs.

The first theme for cooperation builds upon Armenia being a potential supplier of human capital for ICT sector cooperation. The ICT potential of Armenia was built on the strong math and science foundation established during the Soviet era. Soviet Armenia was a center for high-value manufacturing for the USSR. The collapse of the Soviet Union led to an influx of large US companies into Armenia. New entrants in the market created new opportunities for the industry, which gradually shifted from manufacturing to software and service-related areas. This feature has two implications for the utilization of human capital. The first implication is that Armenia served as an information technologies outsourcing base to the world after the collapse of USSR. However, Turkey could not sufficiently utilize Armenia’s IT potential due to Turkey’s

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<sup>1</sup> Available at: [http://www.tepav.org.tr/upload/files/1420818799-5.Strengthening\\_Connections\\_and\\_Business\\_Synergies\\_Between\\_Turkey\\_and\\_Armenia.pdf](http://www.tepav.org.tr/upload/files/1420818799-5.Strengthening_Connections_and_Business_Synergies_Between_Turkey_and_Armenia.pdf)

underdeveloped IT market at that time. The second implication is the ability of Armenian startups and qualified human capital to penetrate the Turkish market and thus form business alliances.

The second theme for cooperation builds upon large and growing consumer demand of ICT services in Turkey. Turkey has a growing ICT market, and both the IT spending of firms and the ICT market in general are trending upward. Turkey's ambitious 2023 targets to expand ICT market size and its share of GDP as well as private sector initiatives in venture capital and angel investment schemes also make Turkey an important market for entrepreneurs and investors in the ICT sector.

Therefore, the cooperation proposed in this report aims to link Armenian ICT supply with Turkish ICT demand. Such cooperation will not only generate economic benefits for both countries but also contribute to the Armenian-Turkey normalization process.

## **1. Armenian ICT Sector**

The ICT sector is one of the most dynamic and promising sectors of the Armenian economy. The ICT potential of Armenia was built on the strong math and science foundations established during the Soviet era. After the collapse of the USSR, multinational companies did not forgo the chance of tapping into the qualified human capital of Armenia. Important examples of these companies are Boomerang Software (Internet applications), Credence Systems (semiconductor design-to-test solutions), Cylink (network security products and VPN solutions), Epygl Technologies (IP PBXs). The new entrants in the market created new opportunities for the industry, which gradually shifted from manufacturing to software and IT service-related areas.

With this shift in the industry and with the increasing establishment of infrastructure, important examples of success emerged from the Armenian IT sector, such as PicsArt (a mobile application for photo editing).

Looking at the Network Readiness Index prepared within the World Economic Forum’s Global IT Report 2015, gives an insight on Armenia’s network readiness. The Index ranks 143 countries based upon four sub-indices: Environment (pillar 1 and 2), readiness (pillar 3, 4 and 5), usage (6, 7 and 8) and impact (pillar 9 and 10). Armenia especially excels past the average in the infrastructure, skills, and affordability pillars. The skills pillars can be related to the influence of the USSR and the presence of foreign investment after its collapse.

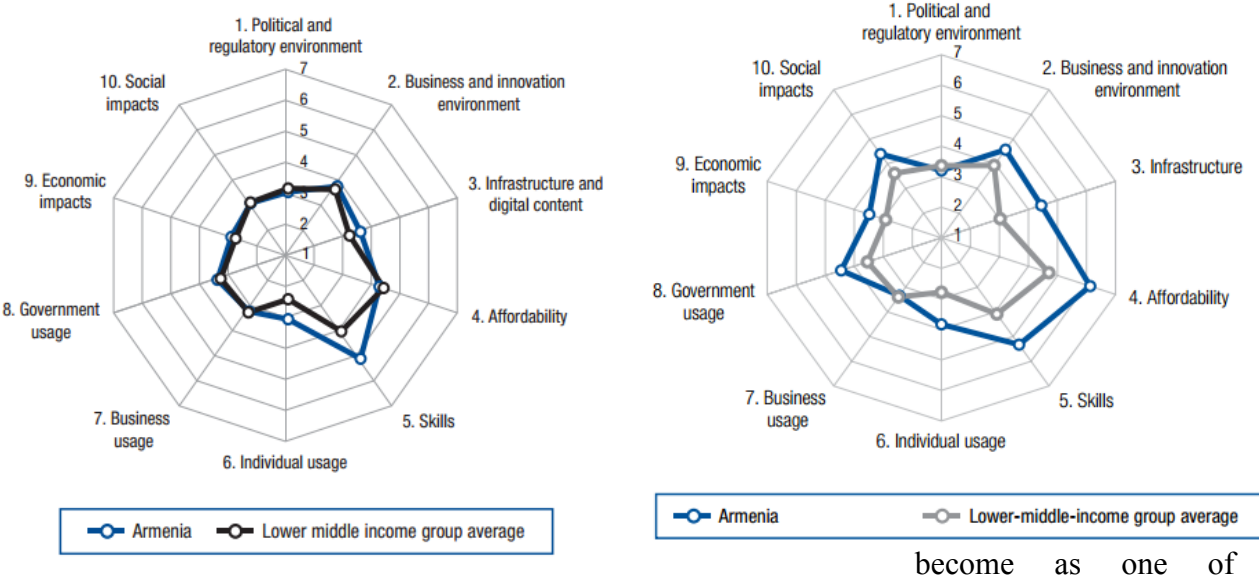
Armenia improved its overall ranking substantially in the past three years jumping from 94<sup>th</sup> in 2012 to 58<sup>th</sup> out of 143 countries in 2015. Although most of the scores of Armenia overlaps with the lower middle income group average in 2012, in 2015 Armenia exceeds the lower middle income group average in almost all ten pillars.

**1.1. ICT sector in the Armenian Economy**

The software and services sector of the ICT accounted for 3.6% of Armenian GDP in 2013. The average annual growth rate of ICT between 2008 and 2013 was remarkably high 21.4% due to increasing economic volume and employment opportunities in the industry.<sup>2</sup>

The high growth rate in the Armenia ICT market is also highly related to the presence of foreign investments in this sector. This, in turn, accelerates technology spillovers and the development of local IT market. With both strong domestic and international players in the market, the IT has

Figure 1: 10 pillars of Network Readiness Index of 2012 (left) and 2015 (right)

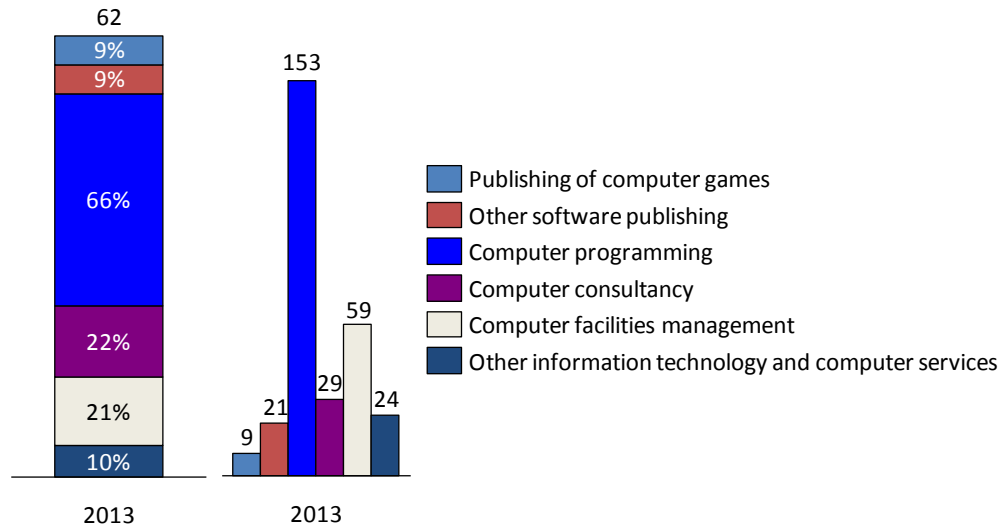


Source: WEF Global IT Report 2015 and 2012

<sup>2</sup>Information and Telecommunication Technologies in Armenia, 2013 State of Industry Report, Ministry of Economy

Armenia's prominent industries.

Graph 1: Specialization of IT firms (on the left). Revenues according to the specialization areas (\$ million)



Source: Armenian Ministry of Economy, ICT market reports

IT services markets in Armenia are mainly focused on 5 areas: the publishing of computer games, other software publishing, computer programming, consultancy, and computer facilities management. The most robust revenue was derived from computer programming in 2013. Computer facilities management witnessed a major increase in revenues, growing 100% from 2012 to 2013 though its share in specialization went down three percentage points<sup>3</sup>.

### 1.2. Human Capital

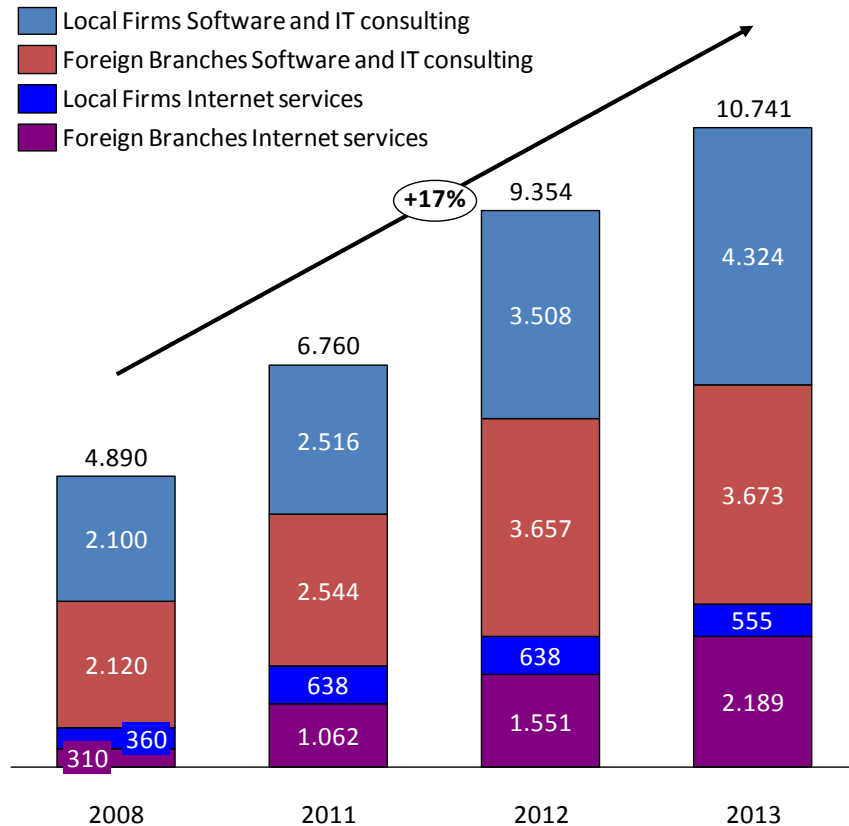
Perhaps one of the most eye-catching features of the IT market is the quality of education. Along with international companies that seek the sustainability of their investment in Armenia by investing in the education of new generations, Armenians living in diaspora invest in schools and education in IT.

Moreover, the facilitator of development and the specialization of the workforce in the IT market has been a result of foreign direct investment in the market. As one of the important channels of international technology transfers<sup>4</sup>, foreign direct investment in the market helped preserve human capital and added to further development of skills.

Graph 2: Number of workforce distribution in IT sector in Armenia

<sup>3</sup> A.g.e.

<sup>4</sup> Hoekman B.M., et al., "Transfer of Technology to Developing Countries: Unilateral and Multilateral Policy Options", World Development Vol.33, 2005



Source: Armenian Ministry of Economy, ICT market reports

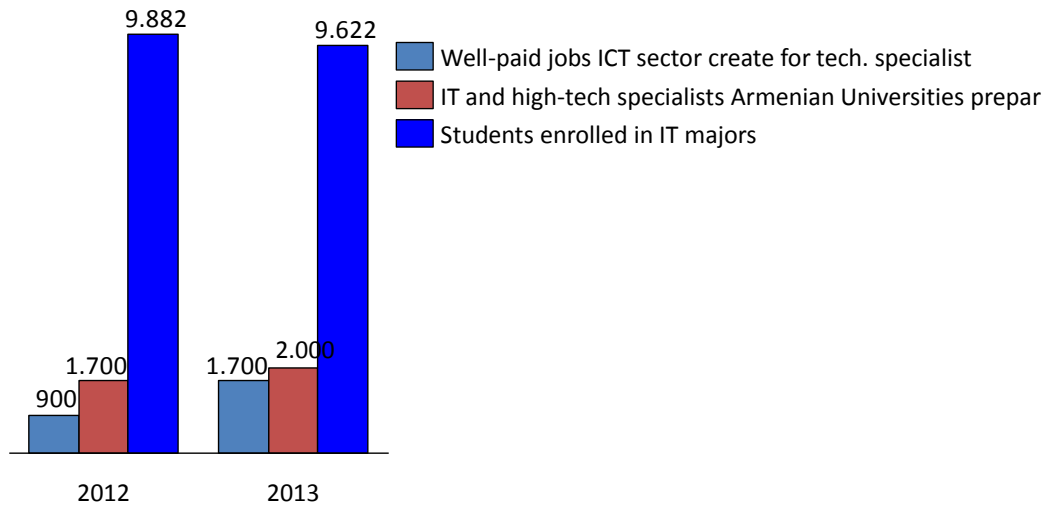
In 2008 while the workforce in the IT sector was generally shared between branches of foreign firms and local firms, 2011 marked the beginning of a seemingly new trend in employment with a focus of foreign branches in Internet services as shown in Graph 2. Local firms increased their presence in the labor market for software and IT consulting by 105% between 2008 and 2013<sup>5</sup>.

The compound annual growth rate of the IT workforce between 2008 and 2013 was 17%. This trend shows steady and fast growth of a segment in the IT market and the job opportunities it creates.

The increasing interest of foreign branches in employing more people in Internet services can imply two things. First, the human capital in Armenian IT market is parallel to the global market and responds positively to the dynamic evolution of the global market. Both foreign investment and local firms have the ability to make strategic maneuvers in the Armenian IT market parallel to the changes in global IT markets. Second, the workforce in the IT market enables such transitions in the market, which means that their capabilities and skills allow for such an evolutionary process.

<sup>5</sup> Information and Telecommunication Technologies in Armenia, 2013 and 2008 State of Industry Reports, Ministry of Economy

Graph 3: Employment opportunities and education in Armenian ICT sector



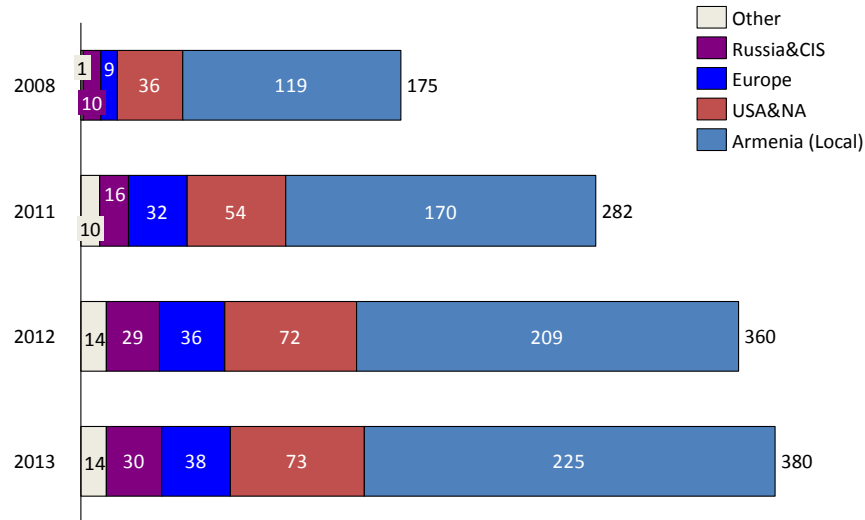
Source: Armenian Ministry of Economy, ICT market reports

Understanding the employment in the Armenian IT market requires insight into both the demand and supply sides of the labor market. From 2012 to 2013 the number of well-paid technology specialist jobs in the ICT sector increased almost 100%, more than the change in students enrolled in IT majors and the number of IT and high-tech specialists Armenian Universities prepare. The demand is increasing more than the supply.

### 1.3. Firms operating in the IT sector

As mentioned earlier the presence of companies with foreign ownership in the IT market is a signal of developed market conditions. Especially the presence of foreign firms doing business in IT products and service development rather than moving with the motivation of market penetration and marketing is very important. That draws the line between; (i) foreign investment penetrating the market in order to generate revenue by only sales and marketing of the products and (ii) foreign investment penetrating the market in order to invest in production and innovation. The latter is the principal reason for technology spillover and transfer in a country, while marketing and sales efforts can benefit an economy in the short-run. In the long-run these would not have any effects on the development of the IT services and products generation market.

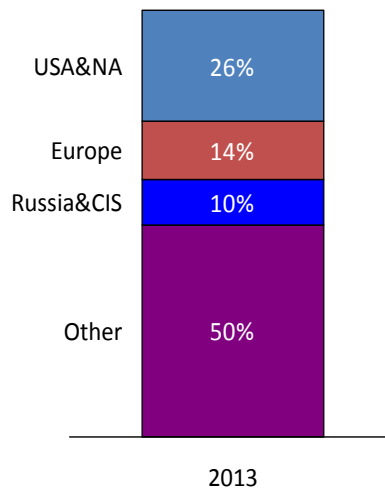
Graph 4: Number of IT companies and distribution of ownership in Armenia



Source: Armenian Ministry of Economy, ICT market reports

The growing presence of Armenian-owned local companies can be viewed as an indicator of improvements in local production and innovation capabilities. The presence of foreign firms and their activities in production and service generation has probably contributed to the emergence of high quality local firms by increasing competitiveness in the IT sector.

Graph5: Ownership distribution of foreign companies in Armenia (%)



Source: Armenian Ministry of Economy, ICT market reports

The share of ownerships according to the origin of foreign companies in the Armenian IT market is also an indicator of positive developments in the sector. The biggest individual share belongs to companies/owners from the US and North America with 26%. Europe follows the US & NA with a 14% share. A 40% share of total ownership from the US/NA and Europe points to the

sophistication of foreign investment regarding the significance of European, American, and Canadian companies in the global IT market.

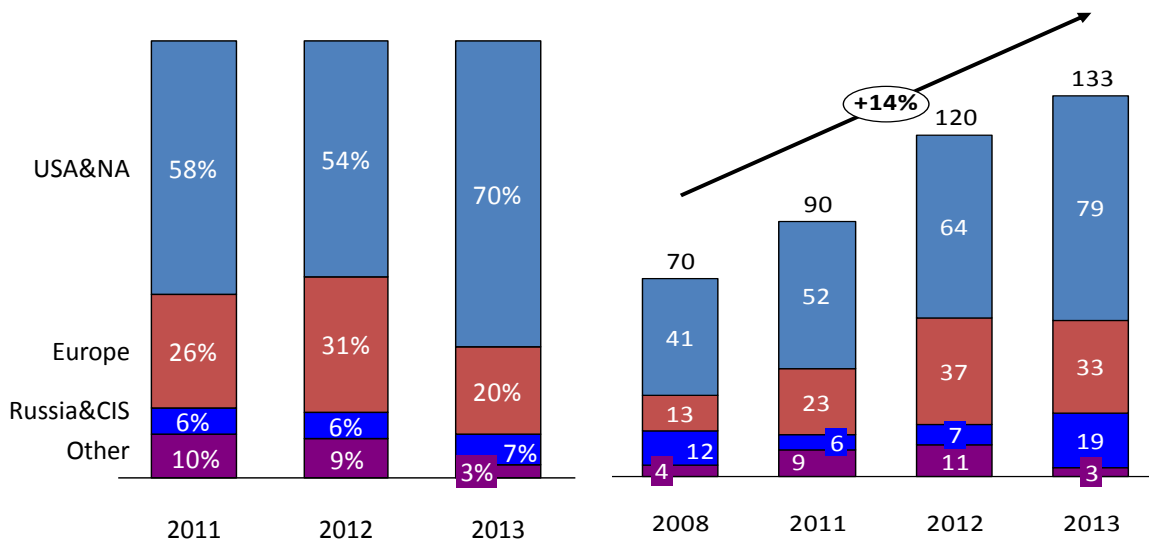
### 1.4. Trade in ICT

Armenia’s ICT service exports accounted for 11% of its total service exports (\$1,6 billion) in 2014, 3.8 percentage points below the 14.8% they accounted for in 2013. In 2008, ICT service exports made up nearly one fifth of total services exports.

Graph 6: Armenian IT export destination by share and value (US dollars)

Source: Armenian Ministry of Economy, ICT market reports

The export value of the Armenian IT market



also has a high compound annual growth rate of 14%. The United States/North America (US/NA) and Europe play an important role in this rapid increase. In 2013, the share for the US/NA increased from 54% to 70% of IT exports, also indicative of the sophistication of the Armenian IT market.

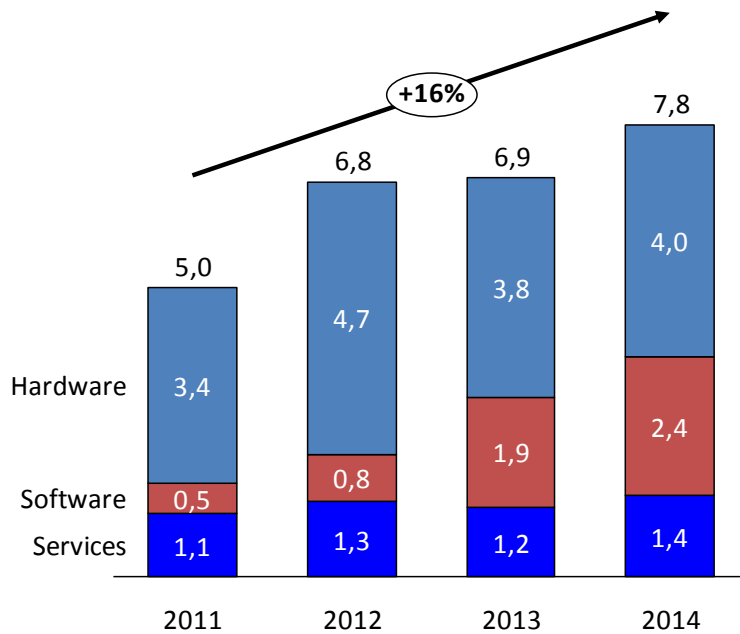
An important process regarding the access to finance in Armenia took place with the introduction of first venture capital firm Granatus Ventures in the market. The firm provides expertise, investment and networks for the technology sector (social, mobile, analytics and cloud computing) oriented start-ups that targets global markets. The presence of venture capital means a potential leverage for the Armenian IT start-ups in the global competitiveness.

## 2. Turkey – Growing Consumer Market and Investment Opportunities

The usage of computers and the Internet is increasing in Turkey, which has led to the expansion of e-commerce and the IT market. The volume of e-trade for Turkey rose from \$5.3 billion in 2014 to \$7.2 billion in 2015.



Graph 7: IT market in Turkey



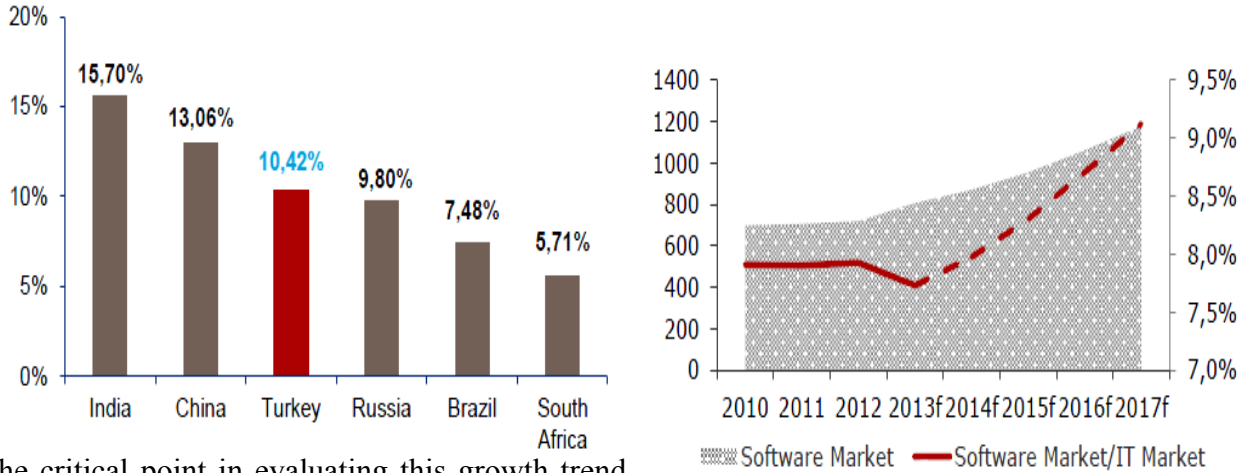
Source: Informatics Industry Association (TÜBİSAD)

The compound annual growth rate of the IT market in Turkey was 16% from 2011 to 2014. The software market played an important role in the expansion of the IT sector in recent years. . With a 48.3% compound annual growth rate (CAGR) between 2011 and 2014, the software market has been a promising part or even the driving force behind IT market expansion. On the other hand, the hardware and services have been growing at a slower rate compared to the software market.

Graph 8: Software market 2012-2017 Compound Annual Growth Rate Comparison (left). Software market development with “f” denoting forecasts, left axis USD million (right).

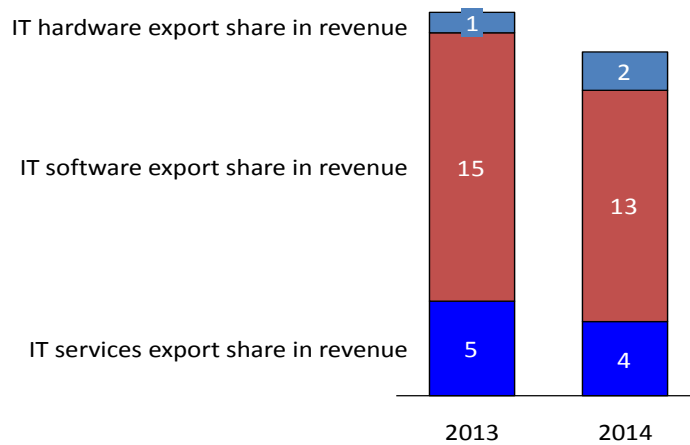
Source: Investment support and Promotion Agency of Turkey, ICT Industry

The CAGR forecast for the software market of Turkey is higher than some BRICS countries including Russia, Brazil and South Africa. The actual figures for 2011-2014 (given in Graph 8) might signal that the CAGR can be even higher than the forecast. Moreover, the software market is expected to grow faster annually than the IT market and increase its share in the market from 7.7% in 2012 to 9.1% in 2017.



The critical point in evaluating this growth trend is to understand whether the expansion in IT and the software market is to satisfy foreign or local demand.

Graph 9: Share of exports in subsector revenues in Turkey IT sector



Source: TUBİSAD

An investigation of the share of exports in the revenues of subsectors in the IT sector reveals that only software exports have a double-digit share in software market revenue. Yet in 2014, the

share of software exports accounted for 13% of software market revenue, which is low in terms of the software market’s total activity, both in local and foreign markets.

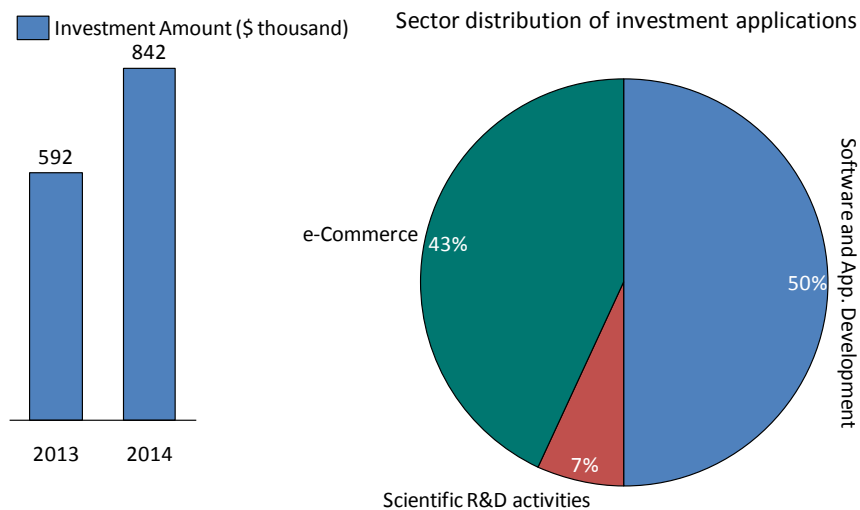
Graph 10 shows that in, products and services in the Turkish IT market are consumed almost totally by the local market. In the near future, unless solid and targeted structural reforms occur in the IT market, majority of revenues in the industry will still continue to be generated by serving the domestic market.

The expected high increase in Turkey’s demand in the IT market provides opportunities for international players. Within this context Technology Development Zones (Technoparks) play an important role for the start-ups. Many incentives and state supports are provided for the firms that start their operations in Technoparks such as promoting their services and products (in the sense of financial supports to attend international fairs) and equipment.

Another important indicator that increase the importance of IT industry in Turkey is the presence many multinational IT firms with their head branches for Middle East North Africa located in Turkey. Although their operations focuses less on research and development, Turkey is still a regional hub for the IT industry.

An important factor that increased the prominence of Turkey IT market is the introduction of an angel investment scheme in 2013 with the enactment of Regulation on Business Angels. The business angel scheme regulates the tax incentives given to angel investors. 75% of the participation shares held by licensed business angels in firms that qualify to be a part of the system are deducted from their annual income tax with the maximum deductible amount being 1 million TL annually.

Graph 10: Investment amount of angel investors (on the left) and the distribution of investment applications to sectors in Turkey (on the right)



Source: Undersecretariat of Treasury

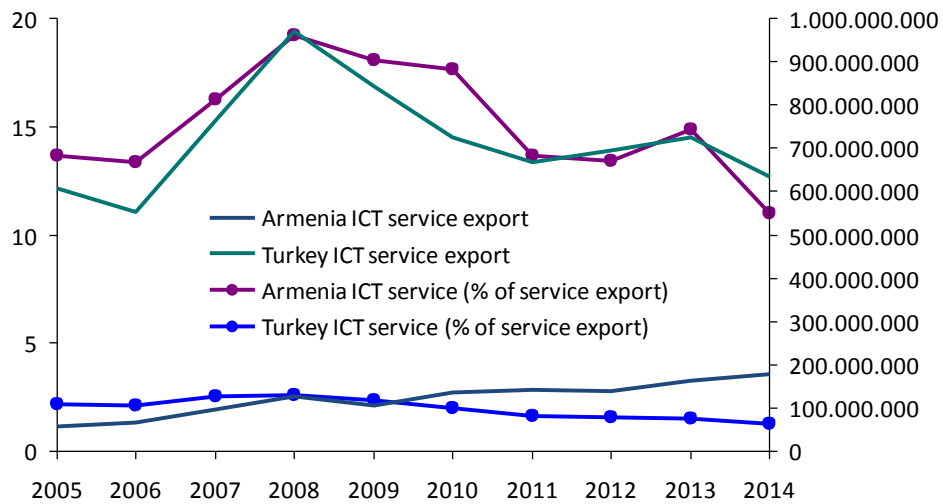
Following the introduction of the scheme, investments of angel investors increased more than 40%; however, as the angel investment scheme is a relatively new environment, the investment amount is still low. The distribution of investment applications provides a good insight into the trends of angel investment portfolios. The software and application development sectors had the highest application rate, which is a promising indicator both for the development of the IT market in Turkey and that of new investors.

In addition to the angel investment scheme, “Decree of the Council on Ministers on Transferring Resources to the Fund of Funds” on 2014 was introduced. According to the new regulation Fund of Funds (FoF) is a system of structures that covers venture capital funds and co-investment funds formed for financing companies. It is a system of structures as it defines the possible structure concerning the stakeholders and regulates their roles in venture capital and co-investment. FoFs that transfer fund to venture capitals that invest in IT, automation and production technologies, digital communication, nanotechnology, surface technologies, materials science, measurement devices, biotechnology and environment technology are given priority by the Undersecretariat of Treasury. Although both the angel investment and the FoF schemes are relatively new in Turkey they are important steps taken towards a more competitive and start-up friendly IT industry.

### **3. Comparison of Armenian and Turkish ICT/IT markets**

Previous sections provided the characteristics of the IT market in Armenia and Turkey within the context of a potential partnership. Therefore complementary features of the markets were investigated namely; IT market, workforce in IT market, origins of firms and exports for Armenia and IT market, export and business angel scheme for Turkey. Although a thorough comparison between two countries’ IT markets is hard due to the lack of data available or the source and content of data presented, some figures that are presented below put two ICT and IT markets in the context.

*Graph 11: ICT service export as a share of total service exports for Armenia and Turkey*



Source: World Bank

As mentioned earlier Armenia's ICT service exports accounted for 11% of its total service exports (\$1,6 billion) in 2014. On the other hand, Turkey's ICT service exports account for a very low share, %1.2 of the country's total service exports (around \$50 billion in 2014).

Armenian IT market exported nearly \$133 million in goods and services<sup>6</sup> in 2013, whereas the goods and services exports of the Turkish IT market were \$366 million<sup>7</sup>. Considering the export volumes of both economies, Armenian IT market has higher share than Turkish IT market. This prioritizes the IT market in the economy of Armenia and incentives for the development and expansion of the market comes naturally within the context of market dynamics. However for the IT market in Turkey, in order to create such an environment systemic approaches from the policy makers are necessary in order to promote and invigorate the IT market, namely; structural reforms in education system, special regulations and state supports. All these can help the IT market prioritization Turkey but they are long-run goals and incentivizing the IT market is not a low hanging fruit. In case of Armenia already prior position of IT market in the economy, makes it easier for the facilitators of the market which are again human capital development and industrial policies to be preserved with less costs.

In order to put IT employment into context and make a comparison with Turkey, around 20,000 people are employed in Turkey's Technology Development Zones and 64,000 people are employed in IT market in total<sup>8</sup>. When the share of IT market employees in the population of

<sup>6</sup> Information and Telecommunication Technologies in Armenia, 2013 State of Industry Reports, Ministry of Economy

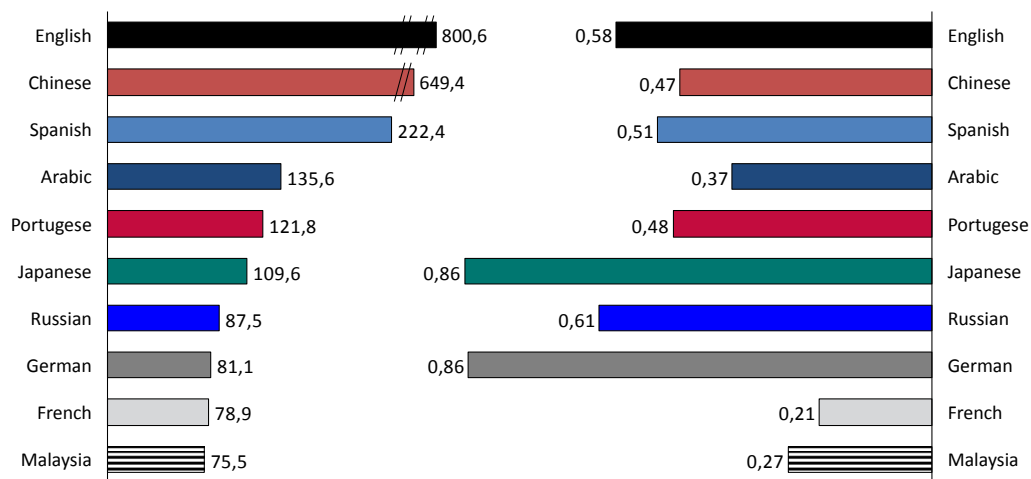
<sup>7</sup> Informatics Industry Association (TUBISAD) Information and Communication Technologies Market Data Report, 2013

<sup>8</sup> Informatics Industry Association (TUBISAD)

both countries is compared the difference is significant, 0,083% for Turkey and 0,35% for Armenia<sup>9</sup>.

An important advantage of the Armenian IT workforce is the linguistic skills the population possess. The place of language is very important when the subject is Internet. When the Internet markets in the world are the topic, linguistics is one of the most important enablers of the demand. The majority of the societies still requires an Internet environment with their own native languages. The examples of local social networks or local search engines are not uncommon in the Internet market.

Graph 12: Number of Internet users in millions with languages (on the left) and the Internet penetration of users with languages in percentage (on the right).



Source:

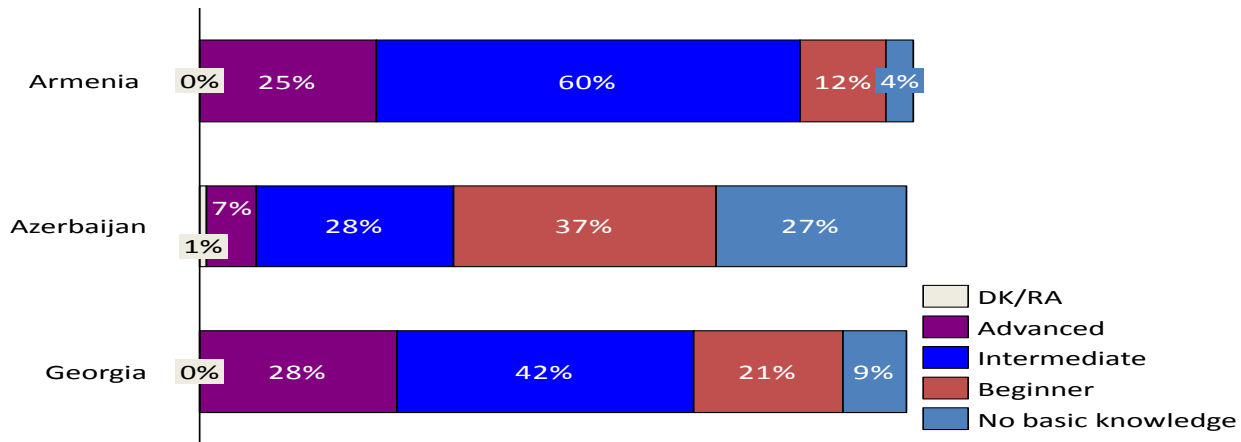
[www.internetworldstats.com](http://www.internetworldstats.com)

Graph 12 gives the size of Internet with languages. In 2013 with the estimate of 143 million Russian speaking people in the world, 61% which corresponds to 87,5 million uses Internet<sup>10</sup>. The opportunity of Armenian population and thus IT market workforce is their ability to penetrate the Russian speaking Internet market with the help of Russian language skills. According to the survey conducted in 2013 by The Caucasus Reseach Resource Centers majority of Armenian citizens have advanced and intermediate Russian language skills.

<sup>9</sup> Populations of countries in 2014, from United Nations World Population Prospects the 2015 revision

<sup>10</sup> Data taken from the [www.worldinternetstats.com](http://www.worldinternetstats.com) website

Graph 13: Russian language skills of Armenia, Azerbaijan and Georgia



Source: The Caucasus Research Resource Centers, Caucasus Barometer 2013

Along with Russian, English is the second foreign language that majority of Armenian citizens talk. According to the same survey conducted by the Caucasus Research Resource Center, 19% of the population is at beginner level, 14 % is at the intermediate and 4% is at advanced level in English. Therefore more than 1/3 of the population has at least basic knowledge of English in Armenia which is also an important indicator of linguistic skills that complements the IT market and workforce

### 3. Conclusion and Policy Recommendations

As explained in the previous sections, the Armenian IT market is an important supplier of IT services. The presence of foreign firms in the market and access to foreign markets also increase the competitiveness of the Armenian IT sector with high quality standards. Turkey, on the other hand, is an important market for IT services and products. This has long been recognized by multinational corporations, as marketing operations became a critical aspect of their presence in Turkey.

Although there is not a diplomatic relationship between Turkey and Armenia, cooperation between their IT markets is possible. In order to facilitate economic cooperation in the IT markets of Armenia and Turkey, following propositions including raising awareness, lowering the transaction costs of doing business between the two countries, and enhancing interaction are made:

- Raising awareness about the IT supply in Armenia and IT demand in Turkey:** In order to accomplish awareness-raising among Turkish and Armenian players, a policy scheme that concentrates on enhancing the individual networks of market actors via field trips and meetings should be designed. In this regard, Exchange of Entrepreneurs-Startup Weekend (see Appendix 1) that started under ATNP and shifted the perceptions of

Turkish and Armenian IT industry specialists, entrepreneurs and thought leaders who took part in the organization constitutes an important example.

- **Lowering the transaction cost of doing business between Armenia and Turkey:** In order to accomplish lower transaction costs of doing business between Turkey and Armenia, a policy scheme on the easing of employing foreign workers should be designed. Moreover a tax regime that can create a healthy and sustainable outsourcing environment between Turkey and Armenia would be mutually beneficial for both countries. A start-up visa system can be the starting point of such an effort<sup>11</sup>.
- **Enhancing interaction:** A major enabler of enhancing the interaction between Armenia and Turkey could be the exchange of students. IT summer camps or conceptual coding camps that would allow students to learn more about the IT markets of both countries and work with their peers in Turkey or Armenia could be a good opportunity for jumpstarting such interaction.

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<sup>11</sup> Policy note by TEPAV for further information on start-up visa, [http://www.tepav.org.tr/upload/files/1391419658-2.Yetenegi\\_Cekebilmek\\_Turkiye\\_icin\\_Yenilikcilik\\_Odali\\_bir\\_Goc\\_Politikasi.pdf](http://www.tepav.org.tr/upload/files/1391419658-2.Yetenegi_Cekebilmek_Turkiye_icin_Yenilikcilik_Odali_bir_Goc_Politikasi.pdf)



## **Appendix 1**

The Entrepreneurship Exchanges between Turkey & Armenia organized by the Public Journalism Club (PJC) from Armenia and The Economic Policy research Foundation of Turkey (TEPAV) from Turkey, had the goal of increasing awareness of actors in Turkish and Armenian ICT markets and creating a chance for young entrepreneurs to interact and cooperate.

91 people, including young startup enthusiasts, successful startup founders, venture capitalists, angel investors, accelerator and technology transfer office managers, and thought leaders on entrepreneurship from Turkey and Armenia, participated in activities and events. 11 startup teams were formed by 39 young entrepreneurs, and two teams were given financial support. Six established cross-border startup teams that are still working on their business ideas.

On November 2014, the Turkish Entrepreneurship Delegation visited Yerevan and Gyumri and Armenia-Turkey Startup Weekend (an international event that is powered by Google for Entrepreneurs that took place in more than 500 cities around the world with more than 150.000 participants and 2000 events) was held alongside the Entrepreneurship Workshop as part of InnoWeekend 2014. The works and ideas of the Armenian-Turkish joint teams were assessed by the jury and the winning team received financial support. This was the first Startup Weekend that took place between two countries that have no diplomatic relations. Another contest took place as a part of Technology Goes Beyond Borders, with 3 Armenian and 3 Turkish teams participating and a winning team eventually named and rewarded. In between the contests, delegations visited important ICT and entrepreneurial centers in both countries. The events were featured in Techcrunch (an important technology blog in the world), Foreign Affairs (major academic international issues publication) and Dünya (an important business newspaper in Turkey).

The Entrepreneurship Exchanges between Turkey & Armenia put forward the importance of initiatives that create the environment and ecosystem of cooperation through increasing awareness between the various actors. The main conclusion of the events and activities was joint entrepreneurship and idea creating processes add to the integration of people where the politics fail.

## Appendix 2

List of interviews from Turkey (18-19.06.2015):

- Arden Agopyan – CloudArena, founder and partner
- Numan Numan – 212, Managing Director
- Ömer Hızıroğlu – Galata Business Angels Network, Co-founder

List of Interviews from Armenia (06-09.11.2014):

- Karen Vardanyan - The Union of Information Technology Enterprises (UITE), Executive Director
- Hayk Chobanyan – The Union of Information Technology Enterprises (UITE), Deputy Director
- Manuk Hergnyan - Granatus Ventures, Co-founder and managing partner