

ПРЕДПОСЫЛКИ И ФАКТОРЫ РАЗВИТИЯ СЕКТОРА ИКТ В СТРАНАХ ВОСТОЧНОГО ПАРТНЕРСТВА

PREREQUISITES AND FACTORS OF ICT SECTOR DEVELOPMENT IN EASTERN PARTNERSHIP COUNTRIES

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РЕФЕРАТ

ИТ-ИНДУСТРИЯ, СТРАНЫ ВОСТОЧНОГО ПАРТНЕРСТВА, СЕКТОР ИКТ, РЫНОК АУТСОРСИНГА, ЭЛЕКТРОННОЕ ПРАВИТЕЛЬСТВО, ИНДЕКС РАЗВИТИЯ

В статье анализируется сектор ИКТ в странах Восточного партнерства и выявляются факторы, влияющие на развитие интернет-экономики. Проведена оценка рейтинга электронного правительства стран Восточного партнерства, рассмотрены основные тенденции развития стартап-индустрии, разработаны рекомендации по развитию сектора ИКТ для стран Восточного партнерства.

ABSTRACT

IT INDUSTRY, EASTERN PARTNERSHIP COUNTRIES, ICT SECTOR, OUTSOURCING MARKET, E-GOVERNMENT, DEVELOPMENT INDEX

The article analyzes the ICT sector in the Eastern partnership countries and identifies the factors influencing the development of the Internet economy. The rating of the e-government of the Eastern partnership countries was assessed; the main trends in the development of the startup industry were considered; recommendations for the development of the ICT sector for the Eastern partnership countries were developed.

INTRODUCTION

Development of ICT sector in EaP countries has been influenced by multifaceted factors that usually could not be limited to common denominators. However, considering geographical proximity and similar historical legacy, also ongoing joint initiatives and programs fostering connections and experience sharing, certain overall trends could be pointed out. Some of these common characteristics could be attributed to the mostly global nature of the IT sector and necessity to address global needs to ensure high-level of growth. That mainly is considered relevant to software products and services development, IT services outsourcing and nurturing IT startup economy.

The aim of the study is to study the ICT sector in the Eastern partnership countries and its impact

on the development of the Internet economy as a whole.

The main objectives of the study were identified:

- study of the development of information services in the Eastern partnership countries;
- evaluation of the e-government rating of the Eastern partnership countries;
- consideration of the main trends in the development of the startup industry;
- development of ICT sector development recommendations for Eastern partnership countries.

PREREQUISITES AND FACTORS OF ICT SECTOR DEVELOPMENT

Due to highly interconnected nature of IT industry regional IT economies common trends and requirements are mostly influenced by the global market trends, and readiness to integrate to

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the global value chains.

Fueling factors for regional leadership in certain sectors are national initiative or policy, international cooperation frameworks, historical strength of an IT sub-sector, human capital development, connections to diaspora, etc.

According to the various indexes and country reports Ukraine and Belarus could be considered region leaders in IT business, followed by Armenia and Moldova. Georgian and Azerbaijan policy-makers have demonstrated strong commitments for development of e-Government and e-services, however their IT business sector is less competitive.

In case of Ukraine and Belarus the larger size of the economy and IT workforce undeniably makes them better positioned for playing noticeable roles in parts of global IT market, especially in IT services outsourcing and more recently in Startups development.

Armenia continues to develop its IT business capitalizing on historic computer engineering tradition, skilled workforce, presence of Multi-National Companies (MNCs), and strong connections with diaspora, that provides resources and access to markets.

Moldova is in the process of confirming itself as a competitive outsourcing destination that includes IT outsourcing.

Georgia is putting its efforts in creating competitive innovation ecosystem, attractive business climate and expands on e-Government services and solutions. Modernizing education and investing in e-skills are also among the priorities of the Government.

Azerbaijan has also prioritized ICT sector development starting with e-Government and e-services successful rollout and investment in education, and lately to Startup and IT entrepreneurship support.

The most common characteristic of IT sector in EaP countries is positioning as outsourcing destination for software development and related services. Ukraine and Belarus are leading the trend with established IT clusters and highly qualified workforce. Many companies from both countries regularly appear in the list of top 100 outsourcing companies. Armenia could also be considered an established outsourcing destination, with continuing growth in number of IT specialists and

innovative IT products and services. Moldova is growing in the similar direction and Georgia has been investing in Business Processes Outsourcing. Azerbaijan investments in IT education might also could lead it in this direction.

Another trend fueling the outsourcing market is growing number of IT specialists. Again Ukraine and Belarus have the largest number of IT specialists with a range of specializations. IT workforce is also growing in Armenia and Moldova, and on a smaller pace in Azerbaijan and Georgia. There is certain regional competition, especially between Ukraine and Belarus, whilst Armenia is a sub-regional leader, with possible emerging competition from Georgia.

Considering the overall growth of the global IT market the outsourcing needs shall also grow, and more IT specialists shall be needed. Even if competition remains, the demand from Western markets and growing domestic markets shall keep the IT specializations competitive. However, negative demographics and workforce compensation raising trends in some countries like Moldova could also risk further expansion of outsourcing services.

Another common attribute of IT industries in EaP countries is their relatively small domestic size or share, with exception of Telecoms. The export orientation is fueled by the mentioned above large share of outsourcing in the IT industry of the countries. The overall size of the domestic market shall also grow with developing of national digital economies and demand for IT services, however the export/global orientation of the EaP countries IT sectors (with probable exception of Azerbaijan) shall remain the core defining factor in medium term.

The trend of developing own IT products and services, complementing outsourcing market is considered by analysts healthy next step in maturing IT industries. Ukraine, Belarus, and on a certain scale Armenia and Moldova started to diversify their IT services portfolio with innovative own solutions.

Countries with higher quality IT workforce are offering R&D outsourcing services in software development, software and hardware testing, research, etc. These efforts are having spillover effects on IT companies' capacity growth to

develop own products and services.

Another common differentiating feature of IT services industries in EaP countries is their focus on quality products and services in contrast to some other global outsourcing destinations, and that already has leveraged the perception of region's outsourcing business to a higher level. This is mainly applicable to leading companies in Ukraine and Belarus who are represented in top 100 outsourcing companies list with 16 and 6 companies respectively. Moldova and Armenia could also provide good examples, and Georgia cases of higher level IT outsourcing projects development are mostly anecdotal but confirmed.

Georgia, Moldova and more recently Azerbaijan have implemented sound e-Government projects. Significant part of the talented IT workforce was concentrated in Government in-house development teams in Georgia. Exporting reforms experience in e-Government is a specific niche market (currently successfully explored by Estonia). Georgian developers and IT project managers have been involved in pilot e-Government projects in other regions (Middle Asia, Middle East), and this direction still holds potential to engage software development teams from Georgia and Moldova.

Ukraine vibrant startup scene has also expanded to the new Civil Tech direction offering innovative solutions and applications serving e-Government and e-Democracy. More IT professionals and companies could be involved in further development or provision of e-services to citizens, and this is applicable on local levels as well. E-participation instruments on local levels could be developed by engaging local IT companies and professionals, innovative informational or citizen reporting tools could be also considered.

Another sub-sector present in the regional IT outsourcing market is Business Processes Outsourcing. Georgia support it on the central level through Enterprise Georgia. In Moldova it has been the established business. If R&D offshoring support is a complex exercise, a Business Processes Outsourcing segment of outsourcing market could be more attractive for local government to consider. That is mostly acknowledged by the national level policy makers, and that should be also considered during developing local projects and IT strategies.

National markets are often driven by FinTech sector that has finances and customer base to develop or purchase core IT systems, applications and analytical tools. Other typical local software packages include Accounting software, ERP, CRM, Document Management systems. IT services include integrations, ad-hoc projects, vendor specific software packages deployment, maintenance and administration. Web-development and web-design is also offered routinely in all countries. Digital and Social Media marketing also is growing in all markets. The niche market exists for e-Healthcare solutions. Other country specific directions include Online gambling solutions (Georgia), Photo Design apps (Armenia), Game development (Belarus), Blockchain based products and services (Ukraine), e-Government applications (Azerbaijan), apps and API development (Moldova).

E-GOVERNMENT

E-Government development could have the indirect effect on the uptake of internet economy and e-services development in general, particularly in local e-commerce, smart-cities and e-solutions for tourism. Local authorities could also consider best practices for innovation in e-services, smart-city IT solutions and Green economy.

E-Government uptake has accompanied the Information Technology revolution spreading out to all countries during the last 2 decades. While in early 2000s the world Internet population was just 5.8 % according to the current conservative estimations it has grown tenfold to reach 57.3 % with growth recorded in every country. The raise of universal connectivity is further bolstered by the mobile penetration rate that is higher and more inclusive than desktop computer technology. While investing in infrastructure was and remains important Government function to keep up with the technological progress, the existing rate of connectivity allows the governments to better provide their services, expand outreach channels and collect feedback from the citizens through digital channels – in another words – developing e-Government.

The e-Government policies, tools and innovations have been rolled-out in developed and developing countries with steady growing pace. The UN e-Government index measures the progress made by countries in biannual surveys

and publishes a comparative ranking based on 3 sub-components: Online Services Index (OSI), Telecommunication Infrastructure Index (TII) and Human Capital Index (HCI). Overall indexes and ranking of EaP countries have been improved since 2010 as seen from the chart 1 below.

Belarus has the linear progress during the last decade climbing to high-performing group of countries with index above 0,75 in 2018. Georgia has progressed from 100th position in 2010 to 60th in 2018 due to significant efforts in e-Government development. Moldova has demonstrated the moderate overall improvement settling at 69th place. Azerbaijan, Ukraine and Armenia have the mixed dynamics.

The current (2018) index values normalized in the range of 0 to 1 puts all countries above the World Average (figure 2).

The more detailed sub-indexes comparison provided below also includes e-Participation index measured separately (figure 3).

Online services index value that might be the most important component for local Governments to consider capitalization on, shows relatively even

middle-tier results for Moldova, Georgia, Belarus and Azerbaijan reflecting the countries' central Government policies to invest in developing and expanding e-services to citizens implemented during the last decade.

Another indicator – Human Capital Index shows groups of 3 countries with relatively higher index - Belarus, Ukraine and Georgia and relatively lower index: Armenia, Azerbaijan and Moldova. Belarus is a leader that is reflected at 21st place in the World, followed by Ukraine at 31st place, and Georgia at 37th. Investing in IT skills and education at local levels could increase the digital literacy and competence levels necessary for efficient implementation of IT projects or developing digitally savvy local businesses.

The e-Participation index gives a different picture. It reflects countries' government efforts to provide their citizens with online tools to participate in governance. There are 2 clear leaders – Belarus and Moldova positioned at 33rd and 38th place respectively.

E-Participation is often considered the most efficient at the local Government level, where a

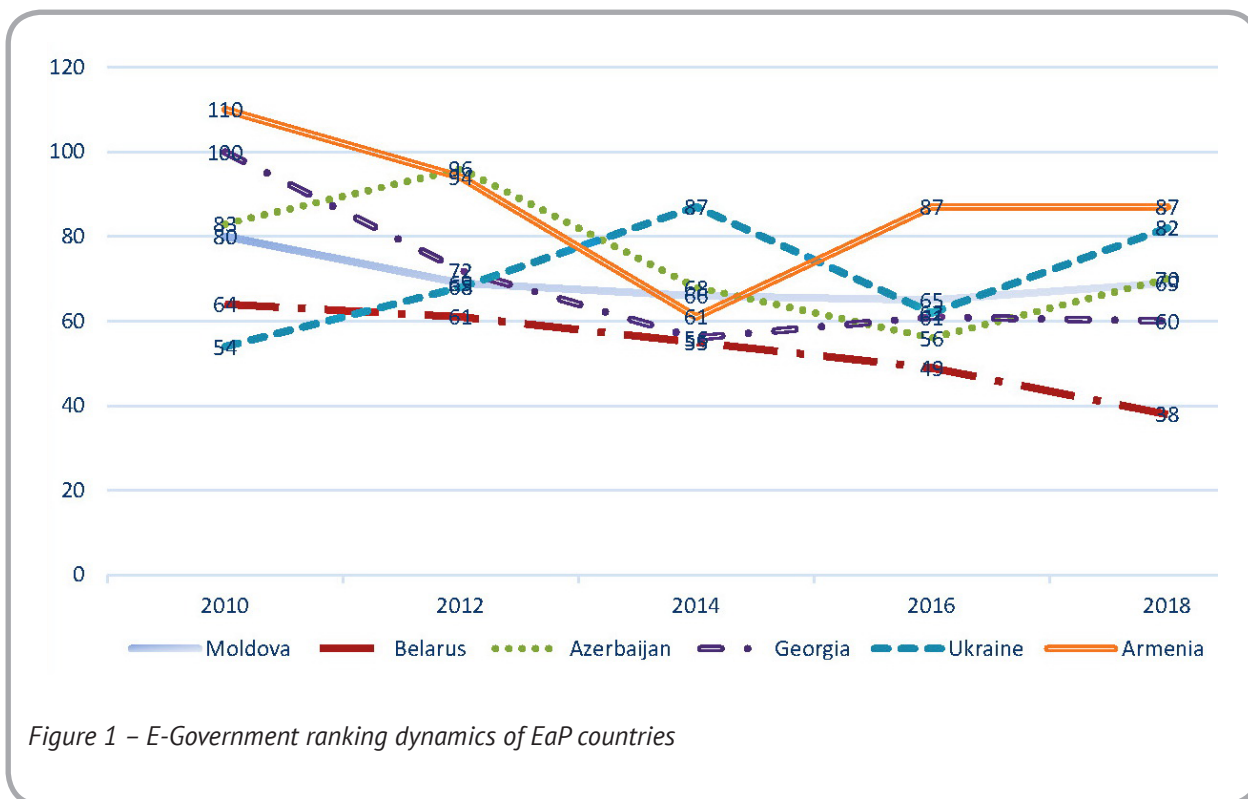


Figure 1 – E-Government ranking dynamics of EaP countries

Source: [1].

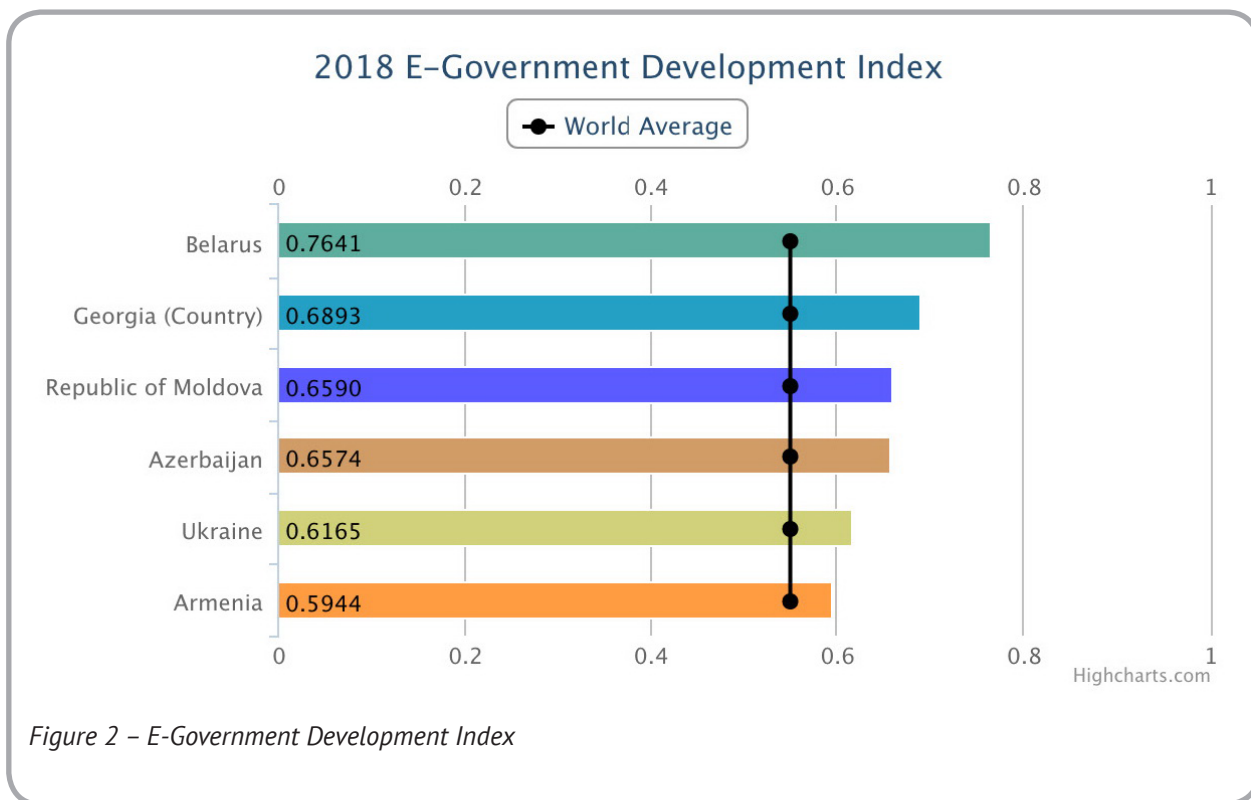


Figure 2 – E-Government Development Index

Source: [2].

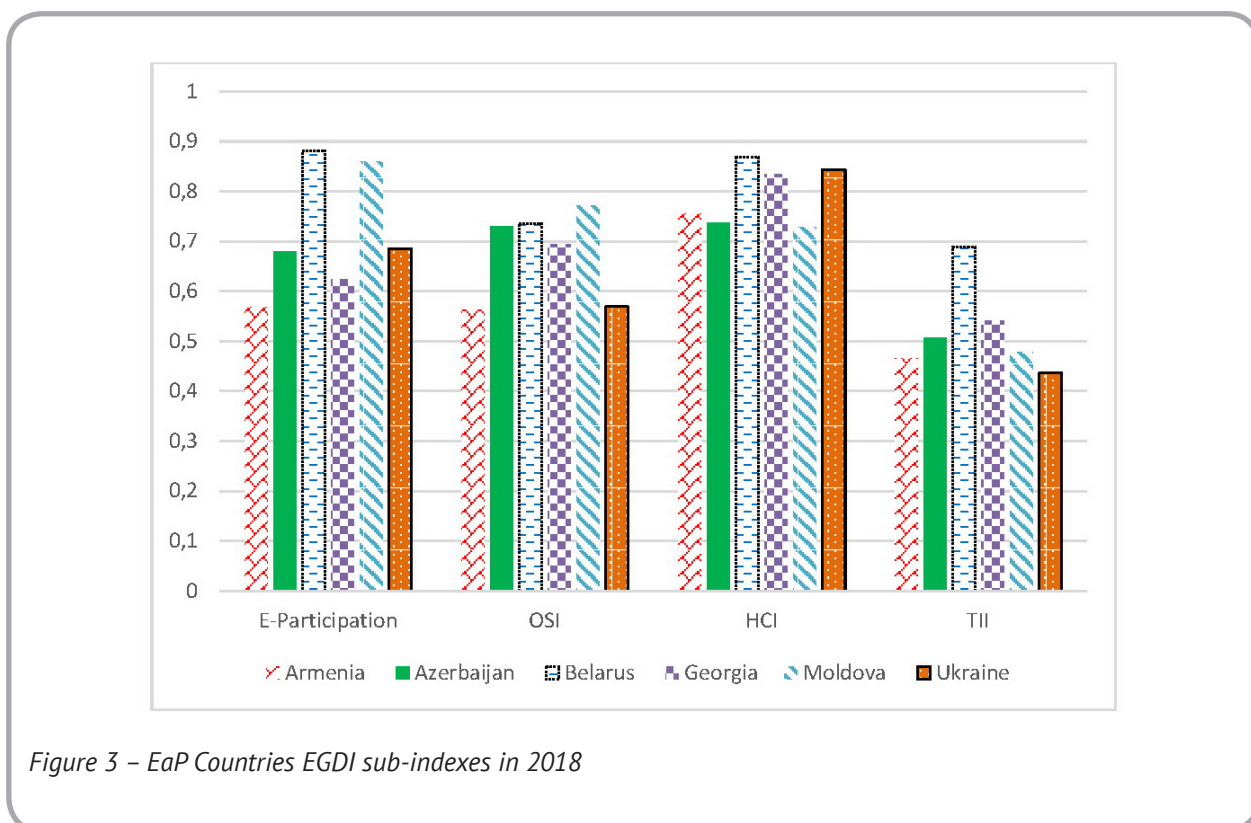


Figure 3 – EaP Countries EGDI sub-indexes in 2018

Source: [2].

variety of proved tools and instruments exist to engage citizens in decision making. Be it e-petitions, e-consultations or e-budgeting. Shall it be considered a priority for local government to focus on, specific projects could be designed and supported from different sources, including donors, central governments, consultancies, EU funds or own budgets.

Government could promote innovation not only by specific programs, but also by supporting procurement of innovative products.

Specific legislative changes are initiated in Georgia to include a term of innovative procurement, and develop relevant regulations and tools. Public Procurement of Innovation (PPI) is an established practice in European countries.

Local governments could consider innovative procurement in their regular purchases that could include any sector of the economy. Innovative procurement tools were launched in Ukraine based on a Blockchain technology. These solutions are scalable to the local government's level, and could not only bring fiscal benefits, but promote the image of local government as innovation supporter.

STARTUP AND ICT INNOVATION ECOSYSTEMS AND ENABLING SERVICES

Another global trend that has funneled resources of international, regional and state actors to rapid IT/digital growth is support of Startup Ecosystems that often are considered mostly digital or connected to disruptive IT service, application or software development. Some local governments are already involved in that trend (e.g. Tbilisi Spark Accelerator, Sevan Startup Camp). Others could consider a relatively low-hanging fruit with spillover implications to IT enabled local development.

The Startup support and development initially associated with the leading technological innovation clusters like Silicon Valley, US East Cost, or Israel, has become a common policy line in many countries and sub-national entities.

The ultimate goal of a technology or high-tech startup is to convert the precious new idea into a running business that could be either rapidly converted into profitable enterprise under the founders' ownership or could be supported by seed-funding and later by VC funds in exchange to

share appropriation. Israel even emerged as a self-proclaimed Startup Nation. The Startup ecosystem itself might be not profitable in the short run, however aiming at high valuations and big exits, and also success stories fuel the expectation that it could contribute to integration to digital economy and global supply-chains.

The dominant US venture capital deals have been concentrated in Internet, Mobile and Telecom, and Software sectors, along with Healthcare. VC backed Internet companies alone got more than half of total VC funding in Q2 2019 (figure 4).

The successes, high returns and growing number of so-called unicorn companies (valuated to cost at least 1bn \$, there were 167 US VCs backed companies as of Q2 2019) keeps the Startup endeavors attractive to both newcomers, Angel Investors, Venture Capital and serial entrepreneurs. US VC funding is projected to grow to 120B \$ in 2019.

According to the PwC report, latest trends show that:

- Internet, Software and Mobile outpace other sectors\$
- Startups selling Internet SaaS (Software as a Service) solutions dominate deal activity\$
- FinTech and AI attract the most deals, followed by Digital Health and HR Tech.

Another key factors contributing to Startup ecosystem success are availability of networking, support organizations, mentorship opportunities and enabling business environment.

The main trends of the external environment affecting the behavior of economic entities are: the dynamism of socio-economic processes; strengthening of international competition; expansion of international specialization and cooperation of production; development of information and communication technologies. All this contributes to the establishment of new relationships and the formation of new forms of organization of production and sales. In response to economic challenges (such as increased competition, rising energy prices, pressure from certain international organizations), entities combine their resources (and not necessarily assets) and create integration structures such as clusters, strategic alliances, joint ventures, financial and industrial groups, holdings, private-

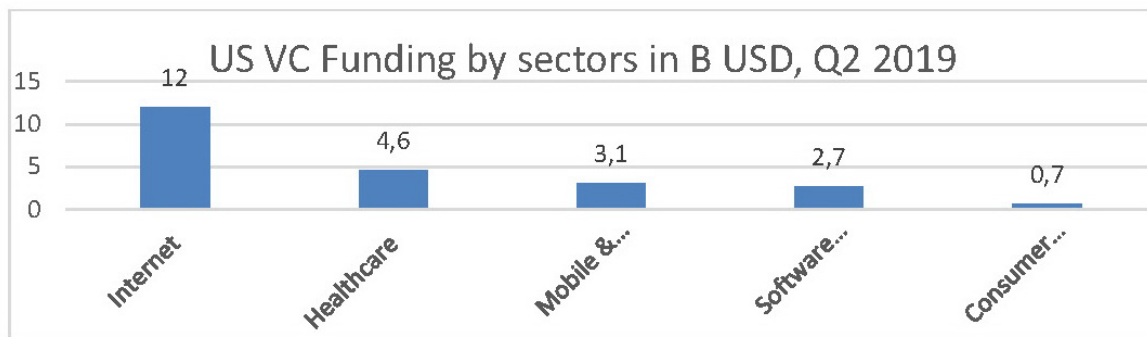


Figure 4 – US VC Funding by sectors in B USD, Q2 2019

Source: [3].

state partnerships. Among integration structures of the most progressive and relevant to the modern challenges are of a clustered structure [4]. GLOBAL CONDENSATION CENTERS FOR STARTUP DEVELOPMENT

The figure 5 shows the visualization of Startup counts of 100 countries and 1000 cities based on the analysis of 50 000 data points performed by Startupblink.

The global startup ecosystem map shows along with US West and East costs clusters one large center around Berlin, and next tier Startup ecosystem centers in UK, Turkey, India, Australia, Midwest US, and Estonia.

As for the index scores, combining Quantity Score, Quality Score and Business Score the US remains the clear leader with distant second – UK achieving only 36 % of the US total score of 44.



Figure 5 – Startupblink startup ecosystem rankings

Source: [5].

The following countries in top ten Canada, Israel, Australia, The Netherlands, Sweden, Switzerland, Germany and Spain reside in relatively close range – with scores between 12 and 16.

Among EaP countries Ukraine and Belarus have the better developed Startup ecosystem. Ukraine occupies #31 in the index and Belarus #55. Georgia, Armenia, Moldova and Azerbaijan got comparable scores and are positioned at 62, 63, 67 and 68 places.

In Ukraine the startup growth momentum is reflected in high number of High-Tech startup support programs and initiatives attracting the large number of innovators and IT startups, also mentioned in the previous section. Capital Kiev is ranked no 34 globally as a vibrant Startup hub. Odessa, Lviv, Kharkov and Dnepropetrovsk are also notable innovation hubs. There are more than 1000 startups around the country and several success stories of high-value exits – acquisitions of startup IT companies by large corporations.

Belarus is ranked #55 in Startupblink Startup Ecosystem rankings. Its success is connected to extraordinary talent pool of local developers

and IT professionals and contribution of High Technology Park described above to development of innovative products and solutions. Capital Minsk is placed at 181th place among best Startup hubs.

Georgia has started its systematic efforts in building a national startup ecosystem with support of the World Bank Genie project. Georgian Innovation and Technology Agency was established in 2014. Technology Parks and Community Innovation Centers were built across the country. Co-working spaces and seed-stage support programs emerge. The number of tech startups accounts for couple of hundreds; almost all though are stuck in the early stage development. The specialization ranges in AI, AR/VR, Big Data and service companies. In 2019 Georgia have climbed 7 positions in Startupblink rating reaching 62th place with capital Tbilisi ranked at #311.

Similarly to Tbilisi centered Georgia, ranked #63 Armenian startup ecosystem is mostly connected to the capital city Yerevan, that has progressed by 36 positions to #159. Innovation and Entrepreneurship is supported by the Armenian government, and Armenian startup ecosystem is

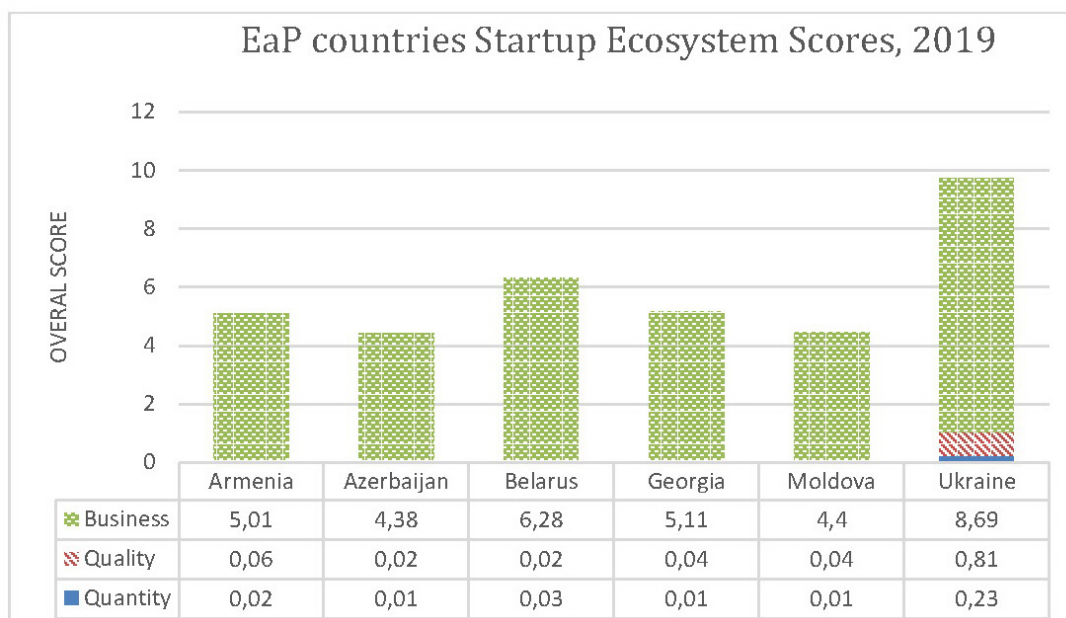


Figure 6 – EaP countries Startup Ecosystem Scores, 2019

Source: [5].

based on a healthy ICT business and bottom-up entrepreneurial activity supported by several VC funds with connections to Armenian diaspora.

Moldova has also progressed in 2019 rankings reaching 66th place, mainly due to improved international ratings. Its small but talented startup community has produced several success stories that include a FinTech startup Salt Edge aiming to innovate financial sector and create an open financial market place. Capital city Chisinau is ranked #216 globally having a potential to progress due to existing talent pool, attractive Geographical location, low cost of living and high internet connection quality.

Azerbaijan entered the Startup ecosystem support trend relatively recently through Government policies aiming to promote entrepreneurship and ICT sector. Social Innovations Center goal is to build a first unicorn company in Azerbaijan. Another competitive sector is Cleantech, with CO2 Catalyzer startup getting international exposure in 2017. Baku occupies #302 spot in global rankings, and is believed to have a potential to progress to becoming a regional hub.

Another important contribution to EaP ICT innovation state of play analysis was EaP countries ICT innovations study (2018) that has attempted to assess relative strengths and weaknesses of EaP countries Startup and innovation services. In overall, it concluded that the relative strength of ecosystems is concentrated on providing the resource base to innovative entrepreneurship and the networking opportunities and the start-up stage and the later stages of the innovation process remain very weakly serviced. The analysis shows that Armenian startup ecosystem support to full lifecycle of Startups development is the most pronounced and rounded. However other countries also could capitalize on their strengths and opportunities [6].

Quite often not only the Technology sector but other leading sectors of national economies that could have a great potential and elasticity to accommodating ICT solutions for growth or in other word – digital transformation. IT-enabled development of different industrial sectors could be more dynamic, competitive and productive to some local economies than investing in IT sector

itself.

As Manufacturing was identified as the most prepare sector to absorb digital transformation opportunities, specific industrial sectors in each economy, and more specifically in each Municipality should be analyzed for potential of integrating existing and emerging digital technologies.

More commonly approachable and cross-cutting sectors are Agriculture and Tourism.

Agritech initiatives were piloted by the newly created associations and other startup supporting organizations during the last years in forms of organizing dedicated Hackathons, Ideathons, and contests in order to design and develop innovative tools for the digital advancement of the sector. The most common solutions are related to use of IoT and Big Data in the sector.

Similarly, innovation in Tourism has also gained attention recently through regional competitions and networks. The simplest form of Tourism innovation is related to improving ICT infrastructure and access to technologies and tools. Specific e-Commerce platforms could be developed, however enhancing digital skills of Tourism entrepreneurs and service providers shall allow them to better utilize existing global marketplaces (such as Booking.com and AirBnb). Relevant programs exist on the central level, but nothing prevents Cities and municipalities from considering relatively low-cost investment in short term basic training in e-Commerce, digital/social media marketing and e-payments, in addition to improving local Tourism entrepreneur skills in online tax reporting and financial accounting.

More focused initiatives could be related to developing digital tourist maps and applications offering first impressions or virtual experiences targeting specific segments (e.g. virtual tours of a specific landmark in several languages).

CONCLUSIONS

Thus, the following conclusions can be drawn. Armenian ICT companies mainly 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. International Companies open R&D centers in

Armenia to support their products development, and also for integration of local innovative solutions. Strategic efficiency needs to take priority over operating efficiency. Armenia's enabling environment has yet to become largely conducive to technology development, innovation, and science-based development. There are important flaws and gaps, particularly in S&T and innovation policies as well as research capabilities in the areas that define the next technological revolution. The technology-enabled leap can be achieved only if those gaps and flaws are addressed quickly and efficiently.

Belarus High Technology Park resident companies specialize in: outsourcing of services, Development of customized technology solutions, Development of customized products Development and support of products for internal needs, Development and support of proprietary products for enterprises, Development of customized industry solutions Development and support of mass market products.

Georgia is putting its efforts in creating competitive innovation ecosystem, attractive business climate and expand on e-Government services and solutions. Modernizing education and investing in e-skills are also among the priorities of the Government. Georgia ICT sector has been

active in core banking solutions, other financial software products and APIs, also in e-Government internal systems and e-Services development and implementation, systems integration, web-development and hosting, more recently it has been praised for Digital Marketing services and advertising that are often exported.

Moldova is in the process of confirming itself as a competitive outsourcing destination that includes IT outsourcing. Moldovan IT industry was successful in FinTech, BPO and Product Development, turn-key custom development, dedicated quality assurance, complete solution development, UX, etc.

Ukraine IT industry accommodates outsourcing, product development, FinTech, blockchain solutions, applications and platforms development, among many others, and a vibrant startup ecosystem. Ukraine expanded to the new Civil Tech direction offering innovative solutions and applications serving e-Government and e-Democracy. More IT professionals and companies could be involved in further development or provision of e-services to citizens, and this is applicable on local levels as well. E-participation instruments on local levels could be developed by engaging local IT companies and professionals, innovative informational or citizen reporting tools could be also considered.

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