UNESCO YouthMobile Initiative in Central Asia

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Report of a Comprehensive Survey and Assessment of Existing Mobile Apps Trainers and Initiatives in Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan

20 July 2015
Foreword

Building knowledge societies in Central Asian region by communication and information important contribution to sustainable development goals in the region.

UNESCO Almaty contributed to promotion awareness of and action on political, social, cultural, humanitarian or human rights issues on national (Kazakhstan, Kyrgyzstan and Tajikistan) and on the global level. UNESCO Almaty assisted to UN DPI Office in Kazakhstan in creation of two multilingual UN Android applications UN news and UN Calendar of Observances. Apart that another mobile ICT solution Voice of Village (Aiyl) for 18 community multimedia centers and 4 Community Radios and improved access to municipal information among 70,000 villagers’ especially rural women and youth in 7 districts of Kyrgyzstan. These efforts are fully meet the new UNESCO YouthMobile initiative.

The YouthMobile initiative empowers youth to resolve identified local issues of sustainable development to reduce chronic youth unemployment through the sale of smart mobile applications and formation of small businesses. The initiative is based on the international experience of many projects that introduce young people to computer science (software development), problem solving (programming development). It also aims to show young people that this computing power can be used to directly meet their personal problems or problems faced by their communities. Eventually, a group of young people can create a business or demonstrate the application of ICT skills for employment at the local, national or international markets.

International Information Technology University (IITU) selected among other partner institutions in Central Asia to implement contract # 4500273738-A1 with UNESCO Almaty Office in order to deliver to UNESCO a final list in English of existing trainers and/or training organizations relevant to YouthMobile Assessment Criteria.

The contract with International Information Technology University was signed in 2015 to conduct an extensive online desk survey of existing initiatives for the training of young people in mobile apps development and collecting samples of training materials.

I appreciated to Dr Damir Shynybekov, IITU Rector; Professor Ravil Muhamediev, Head of Department CSSE&T and Ms Liudmila Kozina for the effort to fulfil the new comprehensive study analysis on YouthMobile initiative in Central Asia.

Sergey Karpov,
National Professional Officer on Communication and Information Programme
UNESCO Almaty Office
Preface

The analysis and report was done by working group of International IT University. The goal of this analysis was to show the actual status of development of mobile programming and opportunities it can give to young people to be employed or start their own business. To complete the report the organizations relating to mobile programming, as like educational, training centers, mobile software developers was analyzed, as well as free organization created by young people’s community to share the knowledge and experience.

The International IT University is interested in development of IT technologies in general, and in mobile programming in particular, so the university is promotes among young people an interest to mobile programming by conducting competitions, as HackDay. Also university collaborates with leading companies in the sphere of IT to create a platform to present and implement young people’s abilities in IT sphere.

As educational institution we are participate the goals of YouthMobile initiative, and UNESCO as well. And I would like to express my appreciation to Sergey Lazarev, Director of UNESCO Almaty Office; Sergey Karpov, National Professional Officer on Communication and Information Programme, UNESCO Almaty Office and to working group headed by Ravil Muhamediev.

International IT University will be pleased to further cooperation.

Dr. Damir Shynybekov
Rector of International Information Technologies University
Almaty, Republic of Kazakhstan
Today information and communication technologies (ICT) are changing rapidly. These changes affect all spheres of human life and transition to Global Information Society. There are many new sub-domains of ICT such as Mobile computing, Big Data, Cloud computing etc. One of them is mobile computing that covers wide range of research and development. Mobile programming as the part of this domain provides possibilities to develop new rapidly growing markets. Mobile programming with cloud computing, Big Data and Visualization is one of the commonly used techniques, which are used as an interface between users, data, and gauges. The market of mobile computing shows rapid growth. Nevertheless it provides possibilities of participation for beginning programmers.

This report is dedicated to analysis of the developing sector of mobile calculations in Kazakhstan, Uzbekistan and Tajikistan, starting with milestone events, related to development and promotion of mobile programming and ending with the market of education. One of the main aspects of analysis is implementation of open-source solutions, including

- Use of free software and open-source software
- Multilingual environment
- Enhancement of rights and opportunities of vulnerable social groups, primarily persons with disabilities
- Educational resources, especially open (OOP/OEP)
- Provision of open data, beneficial to appearance of new solutions and businesses on regional markets

The stress is made upon

- Analysis of public event practice, including contests, conferences, that promote the idea of large-scale participation of young programmers – young girls and men from Central Asia – in development of mobile applications.
- Analysis both of the regional scale market of educational services, and of those courses and programs that can be available free as massive open online courses (MOOC)
- Analysis of mobile applications development platforms, including open-source and shareware
- Analysis of emerging markets of mobile applications

The report addresses basic program developers for mobile applications, mobile technology events, educational services providers etc. The report consists of 4 principal sections:

The introductory section represents the overview of new elements of mobile ICTs and the status of the Republic of Kazakhstan in global scientific contest is considered as an example.
The second section overviews milestone events related to the market of mobile technologies in the republics of Central Asia, aiming to promote mobile programming and applications.
The third section lists educational service providers and some courses of mobile programming developed in Kazakhstan, Uzbekistan and the Republic of Kyrgyzstan, platforms that accelerate the process of development.
The fourth section addresses the market of mobile applications and main developers of mobile applications. Separate part lists developments for people with disabilities.

The list of educational organizations and mobile application developers, which was responded, is given in Appendix 2 and in Table 3.5 of this document.
**Android OS** – operating system for smart phones, tablet PCs, e-books, digital player, watches, game consoles, netbooks, smartbooks, glasses Google, TVs and other devices

**Apple iOS** – is a mobile operating system (OS) based on the Linux kernel and currently developed by Google. With a user interface based on direct manipulation, Android is designed primarily for touchscreen mobile devices such as smartphones and tablet computers, with specialized user interfaces for televisions (Android TV), cars (Android Auto), and wrist watches (Android Wear).

**AppsBuilder** – is an Italian self-service app creator that allows users with no coding skills to build native applications and HTML5 web apps in the cloud, deliver them to seven different operating systems and distribute them on the major application stores.

**Appcelerator Titanium** – это открытый ресурс фреймворков мобильных приложений, который обеспечивает условия для создания родных приложений для нескольких мобильных платформ.

**Development Environment** – интегрированная среда разработки, ИСР (англ. IDE, Integrated Development Environment или Integrated Debugging Environment) — система программных средств, используемая программистами для разработки программного обеспечения (ПО)

**e-Library** - ordered collection of disparate electronic records (including books, magazines), equipped with navigation and search. Maybe the web site, which gradually accumulate a variety of texts (literary, scientific, etc., even the computer programs) and media, all of which is self-sufficient and at any moment of time can be claimed by reader;

**Framework** – software platform, which determines the structure of a software system; software that facilitates the development and integration of the various components of a large software project

**HTML5** – an open platform for creating web applications using audio, video, graphics, animations, and more

**IONIC** – HTML5 framework for building hybrid mobile apps.

**ICT** – Information and communication technologies - a wide range of digital technologies used to create, transfer and dissemination of information and services (computer hardware, software, telephone lines, cellular communications, e-mail, wireless and satellite technology, wireless and cable communications, multimedia, and the Internet;

**Info taxi** - служба по оказанию транспортных услуг людям со специальными потребностями

**MOOC**¹ - A “massive open online course” is an online course aimed at unlimited participation and open access via the web. In addition to traditional course materials such as filmed lectures, readings, and problem sets, many MOOCs provide interactive user forums to support community interactions between students, professors, and teaching assistants (TAs).

**Native** – not modified, with own structure

**Object-oriented programming (OOP)** – is a programming paradigm based on the concept of "objects", which are data structures that contain data, in the form of fields, often known as attributes; and code, in the form of procedures, often known as methods. A distinguishing feature of objects is that an object's procedures can access and often modify the data fields of the object with which they are associated (objects have a notion of "this").

**Operating System (OS)** – is software that manages computer hardware and software resources and provides common services for computer programs. The operating system is an essential

¹ https://en.wikipedia.org/wiki/Massive_open_online_course
component of the system software in a computer system. Application programs usually require an operating system to function.

**People with special needs** - Some laws uses the term "people with disabilities"

**Smartphone** - mobile phone supplemented with functionality of a pocket PC

A startup company or startup\(^2\) (sometimes referred as innovative SME)\(^3\) – is a company established to search for a repeatable and scalable business model, a business initiative focused on the introduction and use of new ICT

**Software** - a set of programs, procedures, rules and associated documentation of the information processing system

**SWIFT**\(^4\) – is a multi-paradigm, compiled programming language created by Apple Inc. for iOS and OS X development. Swift is designed to work with Apple's Cocoa and Cocoa Touch frameworks and the large body of existing Objective-C (Obj-C) code written for Apple products. Swift is intended to be more resilient to erroneous code ("safer") than Objective-C, and also more concise

**A tablet computer** – is a mobile computer with a touchscreen display, circuitry and battery in a single device. Tablets come equipped with sensors, including cameras, a microphone and an accelerometer, and the touchscreen display uses finger or stylus gestures substituting for the use of computer mouse and keyboard.

**Ultrabook** – ultra-thin and light laptop with a small size and less weight in comparison with conventional laptops, but the - most of the characteristic features of a full-fledged laptop

**Vuforia** – is an Augmented Reality Software Development Kit (SDK) for mobile devices that enables the creation of Augmented Reality applications. It uses Computer Vision technology to recognize and track planar images (Image Targets) and simple 3D objects, such as boxes, in real-time. This image registration capability enables developers to position and orient virtual objects, such as 3D models and other media, in relation to real world images when these are viewed through the camera of a mobile device

**WYSIWYG** - is an acronym for "What You See Is What You Get". In computing, a WYSIWYG editor is a system in which content (text and graphics) onscreen during editing appears in a form closely corresponding to its appearance when printed or displayed as a finished product, which might be a printed document, web page, or slide presentation.


\(^{4}\) [https://developer.apple.com/swift/](https://developer.apple.com/swift/)
Contents

Introduction .................................................................................................................................. 8
1  EVENTS ...................................................................................................................................... 11
   1.1  ANDROID HACKATHON ................................................................................................. 12
   1.2  OPEN DATA HACKATHON IN KYRGYZSTAN ................................................................. 27
   1.3  Conclusion of part 1 .......................................................................................................... 31
2  EDUCATION ............................................................................................................................ 33
   2.1  Courses, training centers and educational programs dedicated to mobile programming in the Republic of Kazakhstan ........................................................................... 34
   2.2  Courses, training centers and educational programs dedicated to mobile programming in the Republic of Kyrgyzstan ........................................................................... 38
   2.3  Courses, training centers and educational programs dedicated to mobile programming in the Republic of Uzbekistan ........................................................................... 40
   2.4  Open educational resources ............................................................................................ 44
   2.5  Conclusion of part 2 ......................................................................................................... 46
3  PART 3. MOBILE APPLICATION MARKET .............................................................................. 48
   3.1  Introduction ...................................................................................................................... 48
   3.2  Top 30 mobile applications of Kazakhstan ....................................................................... 48
   3.3  Developers of mobile solutions ....................................................................................... 53
   3.4  Repositories for developers ............................................................................................ 56
   3.5  Developments for people with special needs .................................................................. 57
   3.6  Conclusion of part 3 ......................................................................................................... 60
4  Conclusion ................................................................................................................................. 61
Appendix 1. The curriculum of discipline “Programming for Mobile Devices” ......................... 64
Appendix 2. The summary table of training courses ..................................................................... 66
Appendix 3. Valid web applications purposed to create mobile applications ................................. 69
Introduction

The Information Revolution, which is discussed now because of its huge impact on all spheres of human life and transition to Global IS\(^5\) actually have occurred every 10 years, along with the change of paradigms in information and communication technologies (ICT). Conventionally, they can be denoted as shown in Fig. 1.

![Fig. 1. Leading paradigms of ICT developments](image)

The taxonomy of ICT is based on three big semantic areas: data-processing subsystem, or Clouds, a communication subsystem or network (Pipe) and Devices (Fig. 2). At this stage of development ICT are moving to a new level, improving the resources of all this subsystems.

![Fig. 2. Major ICT domains](image)

Combining wireless sensor network, inter-machine communication systems (Machine-to-Machine (M2M))\(^6\) \(^7\), the broadband network access based on the new communication protocols\(^8\) and other technologies\(^9\) are the development basis of the effective information systems. The key

\(^5\) A. Golyshko, "Information Society: trends and perspectives," Telecommunications, N 4, 2013, pp. 4-9


\(^8\) O. Tihvinsky, "Conceptual aspects of 5G," Telecommunications, N 10, 2013, pp. 29-34

aspects of the systems become the abilities to handle huge amount of data, interact directly with the devices and intellectuality.

It is possible to consider new elements of ICT domain as a semantic network where nodes are the concepts or semantic elements of new stage of ICT revolution.

Fig.3. Semantic network of ICT concepts

The significant element of new information society is mobile computing (MC). MC is the sum of technologies that lies between cloud services, users and devices. We can say that the Cloud and mobile computing are discussed in a group with big data. Internet of Things, mobile computing, machine-to-machine technology, and embedded systems also constitute a group. MC and mobile programming are widely used as technological basis of human computer interaction and data visualization.

Thus, mobile technology is one of the key elements of ICT development in the country, which could contribute to the growth of the labor market especially among young people and persons with disabilities.

The UNESCO 2007 Conference in Dushanbe stated the priority directions of Free Open-Source Software (FLOSS) development: education, culture and access to the information remaining in the field of UNESCO competence in Central Asia. Along with this, UNESCO pays great attention to teaching the basics of mobile application programming for sustainable development.

This program is a part of UNESCO activities in the framework of YouthMobile initiative, based upon experience of numerous worldwide initiatives that aim to promote computer science

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and programming among young people\textsuperscript{11}. YouthMobile education activities aim to widen the scope of rights and opportunities for young people, to empower their skills and development prospective and to promote mobile applications on the local markets, as the type of employment in the fast-growing ICT sector at national and global levels.\textsuperscript{12}

For Central Asia republics and Kazakhstan development and application of open-source solutions and data is most important as the biggest part of population in these republics live in remote areas away from regional and municipal centers, and is poorly provided with traditional tutorial and outreach resources.

Nowadays these republics experience remarkable progress in use of ICT technologies, especially in the domain of mobile communications. Often the prime movers of these changes become national authorities, international organizations, NGOs or physical entities. Developing ICT tools create new channels of communications and interaction between the government and the population, involvement of the population into monitoring of the state authorities and suppliers of state and municipal services, and back-feed opportunity related to service quality and voting right in decision making process at the state level\textsuperscript{13}.

\textsuperscript{11} http://www.unesco.org/new/en/unesco/events/all-events/?tx_browser_pi1%5bshowUid%5d=29037&cHash=4af0f8083b
\textsuperscript{13} Open Solutions Analysis Central Asia. Study analysis. Prepared by Ms Valentina Galich, UNESCO Community Media Expert.
1 EVENTS

Nowadays development of mobile applications is considered to be one of the most essential parts of Software Systems Development. As the whole world is getting used to Information technologies, the relevant supply and demand is growing. The global information space stores absolutely everything about almost everyone in the world. Besides being a great tool of communication the Internet becomes a very powerful platform for software developers especially for those focused on mobile applications. They try to get any private information and use it to harm its owner.

According to the latest statistics provided by the Daily Mobile Advertising Estimates in Turkmenistan mobile applications are becoming steadily more popular among the developers.

According to The SANS Institute, which was established in 1989 as a cooperative research and education organization, and which programs now reach more than 165,000 security professionals around the world. “mobile applications market is increasing rapidly”, and consequently requires more profound investigations.

This is quite evident that modern approach, especially in Central Asia region is still imperfect and inefficient, and does not provide enough space and opportunities And still, different IT companies hire more and more IT Security specialists in order to train its staff or trainees of the basics of mobile development.

In this case organizing free conferences, workshops, master classes and contests devoted to the mobile app development seems to be reasonable.

The problem is, that very students and young developers are not aware of those events, which makes it necessary to investigate the above contests from the point of efficiency and popularity.

The main issue is that in order to prepare professional IT-specialists, we need to give them sufficient knowledge of the definite field of study.

In his work we are going to investigate several events devoted to mobile apps development and to prove or disprove their efficiency.

During this research we are going to investigate the following events:

- Android hackathon
- Azure developer camp in Uzbekistan
- Regional mobile application contest in Tajikistan
- Regional mobile application contest in Uzbekistan
- Astana hackathon
- The application development contest for Kazakhstan media
- Media and social innovations laboratory
- Central Asia-wide social innovation camp
- InnCoding hackathon in Almaty
- Mobile apps hackathon in Tashkent
- Open data hackathon in Kyrgyzstan
- Mobile application development tender in Tajikistan
- Mobile applications development contest in Kazakhstan
- Hackday 2015 in Almaty
- the 3rd International Conference “Mobile services and payments mobievent’14” in Kazakhstan
- The Ventureout challenge

We are also going to find out how could such events stimulate students to learn the basics of mobile software development and motivate developers to elaborate projects in accordance with

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14 http://decisive.is/mobile-advertising-planner/Turkmenistan/app/
principles of sustainable development. Furthermore we are going to reveal the issues of social inequality in the aspect of mobile application development, i.e. software for people with special needs, orphans etc.

This is quite a complicated issue mainly because of the economic side of the question. It is quite possible that certain students after achieving this knowledge won’t try to practice their skills. That is why we should analyze whether the aim of stimulating the mobile app development is worth organizing different events which are in turn very expensive and complicated to manage in some cases.

Finally, this theme is really vivid, mainly because of the increasing number of mobile applications.

Thus, the problem of sustainable development and promoting young and gifted developers in the domain of mobile software requires extraordinary attitude and more detailed investigation in order to realize finally do those events stimulate mobile software development among students and young specialists.

1.1 ANDROID HACKATHON

Contest date: October 1-2, 2011

Organizers: (The “Almaty Google Technology User Group” — Almaty GTUG, together with Astana GTUG)

Country: Kazakhstan

Description: ANDROID HACKATHON is a contest among teams of 2-3 developers realizing their ideas. The main goal of the Hackathon is to develop a working application by special criteria and conditions, according to the topic of the contest section. The current hackathon topic is Android app development.

All in all 32 teams have participated in the hackathon (26 from Almaty, 6 from Astana) with total number of participants 77 (61 from Almaty, 16 from Astana).

24 projects have been developed within 2 days.

Evaluation criteria: By the contest conditions there were only 3 prizes for 3 winning teams. The projects were evaluated by their commercial potential, innovative and social meaning.

Pros – the contest stimulates mobile app development among non-professionals and young developers. In the framework of the contest all the participants are provided with all the needed technical support. Moreover all the participants may participate in the appropriate workshops and master classes. They also may communicate with leading mobile developers.

Fig. 1.1 All the hackathon participants are provided with catering, space and some hardware

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AZURE DEVELOPER CAMP IN UZBEKISTAN

**Contest date:** December 4, 2012, Tashkent, Uzbekistan

**Organizer:** Microsoft Corporation, JSC “BeSmart”

**Partners:** JSC “BePro”

**Country:** Uzbekistan

**Description:** the main idea of this Developer Camp is to explore the latest Microsoft Azure development tools and technologies, and to get acquainted with the basics of app development. Entertaining and informative experts help participants to build their first app and to deploy it into an auto-management environment. This contest provides young developers with unique opportunity to create infrastructure at the "speed of code" and to gain the critical skills that all modern developers need to know.  

During the contest the participants acquired knowledge about how to build the first cloud-native app and to deploy it into an auto-management environment, how to move existing .NET LOB apps to the cloud, learned about securing a database and services with Active Directory, and found out how to build a modern enterprise client for their application.

Microsoft mentors helped participants to build, test and deploy their SaaS, PaaS, IaaS solutions.

Pros – during this camp all the participants could get acquainted with the newest Microsoft technologies in the friendly and creative atmosphere. They were encouraged to build their own solutions and deploy them onto the newest cloud services. Cons – the camp is poorly focused on

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18 [link](http://blog.tech-club.kz)  
19 [link](http://www.microsoftvirtualacademy.com/colleges/azure-dev-camps)
Mobile soft development. The participants were not to build their projects, but to learn how to build them.

REGIONAL MOBILE APPLICATION CONTEST IN TAJIKISTAN

**Contest date:** Thursday, 25 April 2013 from 15:00 to 20:00, Serena hotel  
**Organizers:** Zervana LLC with the contest coordinator Jafar Asimov  
**Country:** Tajikistan  
**Description:** The first stage of the Regional Mobile Application Contest is completed and the winners of the best idea contest are preparing their applications for the final Gala to take place in June. It was held with help of the partners in other countries, who managed to organize and implement successfully the first stage of the contest. The contest registered more than 180 applications from 10 countries.  

In Tajikistan, the partner organization Zervana LLC together with the contest coordinator Jafar Asimov managed to organize a very interactive and interesting Idea Generation workshop. The workshop included presentations by Tajik IT and mobile industry leaders, including Gafur Irkaev, a Representative of the Association of Mobile Operators in Tajikistan, Habib Safarov, the manager of development group in Babilon-Mobile GSM.  

Tajikistan took a leading position in the number of applications. Besides, they had prepared prizes also for other 3 ideas rating high scores, but failed to advance to the next phase of the contest.  

**Conditions:** the number of participants is limited to 50 people

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20 http://www.mlabeca.com

21 https://www.facebook.com/mLabECA/posts/456960681041407
VENTUREOUT CHALLENGE

Contest date: August 9 - September 2, 2013
Organizers: infoDev, CRDF Global
Partners: TechCrunch
Country: Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan.
Description: infoDev at the World Bank and CRDF Global are announcing VentureOut, a new initiative to propel expansion-ready mobile entrepreneurs into enticing international markets. The program will run from August to November 2013 and help hundreds of entrepreneurs through hands-on training, virtual learning opportunities, mentorship, international exposure, and seed funding. Entrepreneurs will come from the entrepreneurial ecosystems developed by six local technology community partners located in six countries: Armenia, Kenya, Macedonia, Nigeria, Senegal, and South Africa.

This program also identifies advanced entrepreneurs during the VentureOut Challenge mobile app competition - applications accepted between August 9 and September 2, 2013. The top 12 entrepreneurs from the competition will meet in Moldova this October 30-31, 2013 for the Dragon’s Den, a pitching exposition to compete for $10,000 in seed funding. Thanks to a great partnership with TechCrunch, one selected VentureOut entrepreneur will also be attending TechCrunch’s Disrupt Europe event in Berlin this October 26-29, 2013.

COMPETITION ELIGIBILITY

The Competition applicants must meet all of the following criteria to be eligible to participate in 2013 Competition:

An application must be written in English.
All members of a team can submit only one entry to the competition.
Each team must select a member who will be the applicant for the team in this competition. This member does not have to occupy a particular position on the team, i.e. CEO. That member is hereafter referred to as the applicant.
The applicant must be affiliated with local partner organizations (listed above) and residents or citizens of Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Georgia, Hungary, Kazakhstan, Kenya, Kosovo, Kyrgyzstan, Macedonia, Moldova, Montenegro, Poland, Romania, Rwanda Senegal, Serbia, Slovakia, Slovenia, South Africa, Tajikistan, Tanzania, Turkmenistan, Uganda, Ukraine or Uzbekistan.

Each mobile app must meet the following criteria:
• Venture is for-profit and less than three years old from date of launching startup
• Entrepreneur is interested in expanding their app into new geographies in the future
• Product or service is currently in a user testing stage, pilot stage, or available on the market
• Venture is either self-funded or has external financing (either from public or private sources)
• Mobile app ventures can be B2C, i.e. targeted towards retail distribution, for use on individual handsets; or B2B, i.e. enterprise solutions powered by or using or enhancing mobile technology.
The applicant must be at least 18 years old and able to both read and speak English proficiently.
The applicant should be ready and available to present her/his technology idea or startup during trainings and business pitch presentations in Chisinau, Moldova on October 30-31, 2013.
The applicant must hold a valid passport and be eligible to travel to Chisinau, Moldova to participate in the workshop and pitch session if selected as a finalist. (Visas will be obtained by finalists).

All awards will be granted to the applicant only.
Applications that fall in the following categories will not be accepted:
• apps with no demonstrable commercial potential
• apps based on charity or foundation (not-for-profit) organizations
• apps that are not yet functional or existent (apps have to be beyond the idea stage)
THE APPLICATION INSTRUCTIONS

In order to participate in the competition, eligible applicants must submit an online application consisting of a Mobile App Internationalization Summary on https://www.younoodle.com/podium/er/VentureOut_Challenge_2013/enter

Fig. 1.5 - InfoDev at the World Bank and CRDF Global organized the VentureOut challenge

REGIONAL MOBILE APPLICATION CONTEST IN UZBEKISTAN

Contest date: May 1, 2013
Organizers: Brand.uz, with the contest coordinator Elene Selzeneva
Country: Uzbekistan
Description: The first stage of the Regional Mobile Application Contest is completed and the winners of the best idea contest are preparing their applications for the final Gala to take place in June. It was made with help of the partners in other countries, who managed to organize and implement successfully the first stage of the contest. The contest registered more than 180 applications from 10 countries.

In Uzbekistan the partner organization was Brand.uz, with the contest coordinator Elene Selzeneva, who did a great job in promoting and ensuring a qualified application form for Uzbekistan. They organized a special pitching event to select the best idea.

The best mobile applications prototypes were chosen to participate in the final contest in Armenia.

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22 http://www.mlabeca.com/eng/regional-mobile-application-contest/
23 https://www.facebook.com/media/set/?set=a.192467377568866.1073741829.183400435142227&type=1
Fig. 1.6 - The contest registered more than 180 applications from 10 countries

Fig. 1.7 - Brand.uz, with the contest coordinator Elene Selzeneva organized the Regional mobile applications contest in Uzbekistan

“MOBILE SERVICES AND PAYMENTS MOBIEVENT’14” THE THIRD INTERNATIONAL CONFERENCE IN KAZAKHSTAN

Contest date: September 12, 2014
Organizers: JSC “Интервэйл Казахстан” (Intervaile Kazakhstan)
Country: Kazakhstan

Description: “Mobile services and payments mobievent’14” is an international conference devoted to the problems of mobile, state, banking and financial services market development, revealing the issues of managing the mobile payment systems.

Goal: Organizing and managing the professional discussion platform in order to create an effective model of mobile-based info and payment services.

Speakers: Public service, banking and financial service representatives, telecommunication operators, money transfer and mobile payment service provider, software developers in the domain of mobile payments, content-providers, the mobile and leading e-commerce experts.

Markets: Kazakhstan, Russia, the CIS members, and foreign countries.25

The conference sessions:
- Mobile financial services
- A profound market outlook

25 www.mobievent.kz
- Beyond the state frontiers: what is in the neighborhood?
- The mobile app development infrastructure
- Mobile advertisements: is it the high time?
- Mobile applications of Kazakhstan ranking

Participation is free only for registered guests.

![Mobi Event 2014 poster](image)

**Fig. 1.8** - The workshop was devoted to the problems of mobile, state, banking and financial service market development

### MOBILE APPLICATIONS DEVELOPMENT CONTEST IN KAZAKHSTAN

**Contest date:** September – October 2014  
**Organizers:** JSC “Национальные информационные технологии” (“The National Information Technologies”)  
**Country:** Kazakhstan  
**Description:** The contest is organized among the students by the JSC “National Information Technologies”

The main target of the open source data portal is to provide the society with all the opportunities of participation in the governing process by using open source data and by creating mobile applications, making analysis and conducting research.

College and university students are free to participate in this contest. It also should be mentioned that nor age, neither specialty are taken into consideration.

**Conditions:** All the participants are to develop their project for iOS (version 6 +) or Android (version 4 +) platforms using open source data launched on data.gov.kz portal with help of API.

**Awards:**
1 place - MacBook Air  
2 place - Apple iPad Air  
3 place - Apple iPad mini

The results will be announced during the eGovernment Global Forum, on October 6-7, 2015.

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The JSC “NIT” specialists will consult the participants during the contest and will answer all the questions concerning mobile applications development.

Fig. 1.9 - All the participants are to develop their project for iOS (version 6 +) or Android (version 4 +) platforms using open source data

ASTANA HACKATHON

Contest date: October 11, 2014. Astana, Kazakhstan, “Multi space” co-working area. (Taulelsizdik street, 34 “Astana Mall” TC)
Organizer: JSC “Astana Innovations” with Astana administration.
Country: Kazakhstan

Description: this contest is a free space where gifted and young developers are able to realize their idea within a short period of time. The participants are able to participate at workshops, training centers, etc.27

All the participants are to develop their own mobile application within 24 hours and to present it at the DemoFest. The project must correspond to the urban needs and should be easily integrated with the existing “Smart Astana” concept. Everyone willing to find a team, or to join an existing one and passionate about his idea may register on the official website www.hackathon2014.kz.

The language and the technology are to be selected by a participant himself. There are no restrictions on platforms and operating systems.

DemoFest is a final presentation of a project prototype where the jury evaluates the social and commercial potential of an application.

Target: the target of this hackathon is to distinguish gifted developers willing to work on their project and passionate about their idea.

Evaluation criteria: all the projects are evaluated according to the such features as innovative potential, commercial attractiveness, design and technical performance.

After the DemoFest the jury announces the contest results and three winning teams are awarded. The total reward budget is 1 000 000 tenge ($ 5 347).

Pros: this contest motivates young developers to realize their projects. It also involves them into the process of modernization of their city and their environment.

THE APPLICATION DEVELOPMENT CONTEST FOR KAZAKHSTAN MEDIA

Contest date:
The application deadline – 01/07/2015
Project realization term – 6 month
The total fund – 5 700 000 tenge ($ 30 481)
Organizer: the Soros-Kazakhstan foundation
Country: Kazakhstan

Description: the Soros-Kazakhstan foundation contest for media support to encourage apps development for iOS and Android.

The mandatory condition for participation is cooperation with professional developers. Grant is donated only for app development. The project budget is not allowed to exceed 1 900 000 tenge ($ 10 160). The target audience is regional and republican media.

Contest goals:
Allow Kazakhstan media develop their own applications in order to enhance their audience;
Encourage innovative attitude among printed and digital media in order to promote multimedia news;
Introduce new models of sustainable media development;

Project evaluation criteria:
• the aims of the project should be correspondent to the goals of the contest;
• the media should have permanent audience;
• innovative part of the idea: the usage of digital technologies to promote high-quality multimedia;
• technical task should correspond to the basic criteria of high functionality, cost and performance quality;
• every participant should have high management capabilities, professional skills and technical equipment in order to provide the sufficient performance level;

Terms and conditions:
All the applications are evaluated by the Soros-Kazakhstan foundation Expert Committee.

Fig. 1.12 - The Soros-Kazakhstan foundation organized the contest in order to stimulate integration of mobile technologies into media

References: application@soros.kz, media@soros.kz, tel. no: +7 (727) 250 38 11 (105).
By the end of the contest the result will have been published on the soros.kz portal.
Pros – app development promotion especially among the media and revealing the social meaning of mobile soft development. Cons – no training or mentorship provided.

MEDIA AND SOCIAL INNOVATION LABORATORY

**Contest date:** June 25-26, 2015, Bishkek, the Kyrgyz Republic.

**Organizers:** Internews Network in Kyrgyzstan and “KLOOP Media foundation”.

**Co-Organizers:** Internews Network in Kazakhstan, Internews Network in Tajikistan, International non-profit organization “Internews Kazakhstan” (Kazakhstan), Independent Telecaster Association of Tajikistan and the International non-profit organization “Homa” (Tajikistan)

**Partners:** United States Agency for International Development, USAID

**Technical partners:** JSC «ALMA Cloud»/V3NA

Internews is an international non-profit organization, whose mission is to empower local media worldwide, to give people the news and information they need, the ability to connect and the means to make their voices heard. Internews provides communities the resources to produce local news and information with integrity and independence. With global expertise and reach, Internews trains both media professionals and citizen journalists, introduces innovative media solutions, increases coverage of vital issues and helps establish policies needed for open access to information. Internews programs create platforms for dialogue and enable informed debate, which bring about social and economic progress. Internews’ commitment to research and evaluation creates effective and sustainable programs, even in the most challenging environments.

**Country:** Kyrgyzstan

**Description:** Media and Social Innovations Laboratory is a social project, whose aim is to unify the professionals of different fields (media specialists, IT-professionals, social entrepreneurs and civil servants) in order to cooperate and solve real social problems by means of IT-technologies and satisfy social needs of Kyrgyzstan, Kazakhstan and Tajikistan. Such kind of public events may be considered as a good tool stimulating young social workers, IT-specialists to participate in social life of their local communities.

The first Laboratory will take place in June 2015, in the city of Bishkek, the Kyrgyz Republic. It will take place in Dushanbe in 2016, Tajikistan, and in 2017 it will be held in Almaty, Kazakhstan. All the partners having take part in the first laboratory will be invited to the next two events. Internews supports such kind of public events, aimed to develop innovative solutions

29 http://internews.kg/?p=6902
30 http://internews.kg/?p=7014
of social issues, starting from 2011. It also should be mentioned that Internews organized social innovation camp Central Asia in Kazakhstan.

Laboratory tasks:
Provide free access to the information concerning social and public issues for the citizens of Kyrgyzstan, Kazakhstan and Tajikistan
Unify the media professionals, local communities, civil servants and IT-specialists in order to develop innovative solution of social problems
Develop practically useful innovative solutions of social issues

Terms and Conditions: Laboratory participants will introduce their own vision of a social issue and will develop their applications aimed to solve social issues in Kyrgyzstan, Kazakhstan and Tajikistan. Also one of the main evaluation criteria is practical usage of the proposed solution i.e. its adaptability and social meaning. Finally, only 9 project authors will be allowed to bring their projects to life. During the Laboratory the participants will develop their app prototypes (mobile apps, sites, interactive cards etc) that will be later sent to the 9 media companies in Kyrgyzstan, Kazakhstan and Tajikistan to be finally developed. Also during the Laboratory the most innovative project chosen by the jury among 9 participants will be given a special prize of $2 000.

30 participants will be invited to the laboratory:
Media professionals, civil journalists, bloggers
State and non-profit organizations
IT-specialists

Pros – revealing social issues in Kazakhstan, Kyrgyzstan and Tajikistan by means of app development, covering also the mobile applications. Cons – no traineeship or mentorship within the Laboratory. Only professionals are encouraged.

CENTRAL ASIA-WIDE SOCIAL INNOVATION CAMP

Contest date: The second annual Central Asia-wide Social Innovation Camp took place from May 31-June 2 in Almaty, Kazakhstan. Fifty young web designers, programmers, bloggers and activists were selected out of 138 applicants from Tajikistan, Uzbekistan, Kazakhstan and Kyrgyzstan to take part in the event.

Organizer: Internews set up on an on-site MediaLaboratory to experiment with multimedia technologies to document the camp creatively through video, audio, photo, and online print materials.

Country: Kazakhstan

Description: Over the course of 36 hours, 420 cups of coffee, and 360 cups of tea, the teams developed seven concepts for socially-oriented online applications into functioning prototypes. In addition, Internews Kazakhstan staff offered master classes on inspiring social online start-ups and monetizing online civic initiatives.31

Between work sessions, participants found a little time to use technology for creation of their own musical entertainment. Watch a Kyrgyz participant Aibek Baratov turning an iPad into a virtual guitar.

Evaluation criteria: A jury of experts from three Central Asian nations as well as from Belarus and the Czech Republic evaluated each project by its ability to do social good, effective use of technology, potential for mobilizing the public and sustainability over the long-term.

Out of seven projects, the top three included a website where people with special needs can use online tutorials to teach themselves basic programming skills, then find paid freelance job opportunities through employment postings on the same site.

31  https://internews.org/our-stories/project-updates/30next/youth-focused-projects-lead-field-social-innovation-camp#sthash.aPpdrhUT.dpuf
An interactive platform for Uzbek teenagers who grew up in orphanages and need assistance finding work, securing housing registration documents, and navigating life in the “real world.”

The online platform that aims to increase communication between public schools in Tajikistan and parents, many of whom are living and working abroad as migrant laborers. Internews Kazakhstan is providing pre-paid hosting and a domain for the winning team, “Employment for the Disabled.” In addition to Internews, Soros Foundation-Kazakhstan and Transitions Online also provided their support to the event.

![Image](image1.png)

Fig. 1.13 - Zhamshid Hakimov from Uzbekistan, who came up with idea for the website offering resources and support for teenagers

Pros: free mentorship, free equipment and free master-classes. The participants are provided with everything needed. The main advantage is social orientation of projects, such as special online courses for people with special needs, which help them to get acquainted with programming basics.

INNCODING HACKATHON IN ALMATY

**Contest date:** January 24-25, 2015  
**Organizer:** MICROSOFT KAZAKHSTAN  
**Cost:** Free  
**Country:** Kazakhstan

**Description:** Participants of the InnCoding Hackathon are to get acquainted with cross-platform app development within 48 hours. Moreover, all the participants have a unique opportunity to communicate directly with leading app developers, experts and mentors of Kazakhstan. 32

Pros – Free mentorship, free trainings, courses, free technical equipment to develop own apps. There is a special prize for those ones who have succeeded in publishing their iOS, Android, Windows 8 and Windows Phone applications to the official repositories.

![Image](image2.png)

Fig. 1.14 - The participants are to get acquainted with cross-platform app development within 48 hours

MOBILE APPS HACKATHON IN TASHKENT

- **Contest date**: January 3-4, 2015, Tashkent, Uzbekistan
- **Organizer**: Shakhruz Ashirov, Westminster University in Tashkent, professor
- **Partners**: JSC “Yaran Consulting”, Rastax group, Akmal Payziev (Newmax Technologies) and Laziz Adhamov (SAP)
- **Country**: Uzbekistan
- **Description**: The first hackathon in Uzbekistan offered several topics as mobile soft, Arduino microcontrollers, Raspberry Pi, applications for Oculus Rift and Samsung Gear VR. Also all the participants had a unique opportunity to communicate with top IT professionals, experts and investors.
- **Everyone willing to work is welcome**
  - The participants organize the teams of 2-5 developers all by themselves
  - Each developer team is to develop an application according to one of the hackathon topics
  - At 17:00, on January 4, all the participants stop working and start demonstrating their projects
  - Experts and sponsors evaluate the projects and define the winning projects
- **What do the sponsors provide?**
  - The “ТЧК” co-working area provides the participants with accommodation, water and other facilities as kitchen where participants are free to prepare their meals.
  - Free Wi-Fi access
  - Devices for development — Arduino, Raspberry Pi, Samsung Gear 2, Oculus Rift DK2, Google Cardboard
- **Everyone is welcome but the participants number is limited (only 100 developers).**
- **Registration fee**: 30,000 sum ($12)

![First mobile apps hackathon in Tashkent proved and revealed a great interest to the mobile technologies among young developers](http://pr.uz/sobitiya/perviy-hakaton-v-tashkente)

![http://ictnews.uz/2015/01/06/uzhackathons](http://ictnews.uz/2015/01/06/uzhackathons)
Hackathon (also known as a hack day, hackfest or codefest) is an event when computer programmers and others software and hardware development specialists, including graphic designers, interface designers and project managers, collaborate intensively on software projects. [1] Occasionally, there is a hardware component as well. Hackathons typically last between a day and a week. Some hackathons are intended simply for educational or social purposes, although in many cases the goal is to create usable software. Hackathons tend to have a specific focus, which can include the programming language used, the operating system, an application, an API, or the subject and the demographic group of the programmers. In other cases, there is no restriction on the type of software being created. [35]

Hackathons typically start with one or more presentations about the event, as well as about the specific subject, if any. Then participants suggest ideas and form teams, based on individual interests and skills. Then the main work of the hackathon begins, which can last anywhere from several hours to several days. For hackathons that last 24 hours or longer, especially competitive

ones, eating is often informal, with participants often subsisting on food like pizza and energy drinks. Sometimes sleeping is informal as well, with participants sleeping on-site with sleeping bags. 36

The 2015 Hack day was divided into several categories, where participants were evaluated by specific criteria, had specific mentors, and specific master classes. 37

The sections were the following:
- Information Technologies
- Content and Media
- Cinema and Video
- Mobile Applications
- Photo
- Design and Animation

The number of participants exceeded 1,000 teams, that makes it the most popular app contest. All the participants are free to attend master classes, workshops and get free consultations from leading experts all over the country.

Fig. 1.18 - The number of participants exceeded 1,000 teams, a great deal of which were mobile developers

Fig. 1.19 - During the contest all the guests could enjoy the robotics show

MOBILE APPLICATION DEVELOPMENT TENDER IN TAJIKISTAN

Contest date: June, 2015
Organizer: “Asia plus” news agency
Country: Tajikistan

36 http://vk.com/hackdayalmaty
37 http://hackday2015.kz/
**Description:** “Asia plus” news agency invites all the mobile soft developers to participate in the news agency mobile application development tender.  

The mobile application development process should satisfy the following evaluation criteria:  
- Full cycle of Android and iOS app development:  
  - Client requirements analysis, design, app and administrative module development, testing and technical support;  
- Development of an Application prototype:  
  - It is necessary in order to be shown to the investor or at the presentation during the conference;  
- Pre-development research:  
  - This item may be necessary while solving complicated problems, concerning the usage of undocumented features of the Android OS;  
- Special requirement: The application should work with website database and is to be integrated with CMS-Drupal;  

The working process  
- The client prepares primary requirement list;  
- Initial rough estimate of the project;  
- Preparation of the technical task;  
- exact cost evaluation, time schedule, calendar plan and estimates of the project;  
- Prepayment (the budget 0%-30%);  
- Project design  
- Development of an application and an administrative part;  
- Payment for development service (the budget 50%-70%);  
- Testing and debugging;  
- Technical support (1 year).  

All the applications are accepted till June 25, 2015, on ztadjibaeva@asiaplus.tj

Fig. 1.20- “Asia plus” news agency invited all the mobile soft developers to participate in the news agency mobile application development tender

### 1.2 OPEN DATA HACKATHON IN KYRGYZSTAN

**Contest date:** June 9 – 13, 2015  
**Organizers:** “IT-Attractor” fund.  
**Partners:** “Soros-Kyrgyzstan” foundation, The World Bank  
**Country:** Kyrgyzstan  
**Description:** Central Asia open data hackathon 2015 was held in Kyrgyzstan, Bishkek and later at Issyk Kul.  

The list of participants was as follows:  
- Kyrgyzstan (6 teams)  
- Kazakhstan (1 team)

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38 http://news.tj/ru/node/208804


40 http://iradche.ru/2015/06/central-asia-od-hackathon/
Tajikistan (1 team)
Each of them consisted of 6 members - 2 programmers, 2 social workers, 2 journalists.
The main theme was development of social projects with help of open source data.
The main task of the hackathon is to train media, social workers and developers to work together with open source data in order to create socially useful projects, such as mobile applications, analytical and informative articles, interactive cards etc.
Trainers and mentors from the USA, Israel and Russia participated in this hackathon in order to consult and to train the participants.
During the contest all the participants are trained and the best projects are awarded after the final demonstration and will be developed further and demonstrated one more time in September, 2015.
<table>
<thead>
<tr>
<th>№</th>
<th>Contest name</th>
<th>Country</th>
<th>Contest Date</th>
<th>Number of participants</th>
<th>Number of Organizers and Partners</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Android Hackathon</td>
<td>Kazakhstan</td>
<td>October 1-2, 2011</td>
<td>77</td>
<td>2</td>
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<td>2</td>
<td>Azure developer camp in Uzbekistan</td>
<td>Uzbekistan</td>
<td>December 4, 2012</td>
<td>No data</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>Regional mobile application contest in Tajikistan</td>
<td>Tajikistan</td>
<td>25 April 2013</td>
<td>180 applications, but only 50 participants</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Regional mobile application contest in Uzbekistan</td>
<td>Uzbekistan</td>
<td>May 1, 2013</td>
<td>50</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>Astana Hackathon</td>
<td>Kazakhstan</td>
<td>October 11, 2014</td>
<td>No data</td>
<td>6</td>
</tr>
<tr>
<td>6</td>
<td>The application development contest for Kazakhstan media</td>
<td>Kazakhstan</td>
<td>July 1, 2015</td>
<td>No data</td>
<td>1</td>
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<td>7</td>
<td>Media and social innovations laboratory</td>
<td>Kyrgyzstan</td>
<td>June 25-26, 2015</td>
<td>No data</td>
<td>8</td>
</tr>
<tr>
<td>8</td>
<td>Central Asia-wide social innovation camp</td>
<td>Kazakhstan</td>
<td>May 31-June 2, 2015</td>
<td>No data</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>Inncoding hackathon in Almaty</td>
<td>Kazakhstan</td>
<td>January 24-25, 2015</td>
<td>No data</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>Mobile apps hackathon in Tashkent</td>
<td>Uzbekistan</td>
<td>January 3-4, 2015</td>
<td>No data</td>
<td>5</td>
</tr>
<tr>
<td>11</td>
<td>Open data hackathon in Kyrgyzstan</td>
<td>Kyrgyzstan</td>
<td>June 9 – 13, 2015</td>
<td>48</td>
<td>3</td>
</tr>
<tr>
<td>12</td>
<td>Mobile application development tender in Tajikistan</td>
<td>Tajikistan</td>
<td>June, 2015</td>
<td>No data</td>
<td>1</td>
</tr>
<tr>
<td>13</td>
<td>Mobile applications development contest in Kazakhstan</td>
<td>Kazakhstan</td>
<td>October 2014</td>
<td>No data</td>
<td>1</td>
</tr>
<tr>
<td>14</td>
<td>Hackday 2015 in Almaty</td>
<td>Kazakhstan</td>
<td>May 1-2, 2015</td>
<td>1500</td>
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</tr>
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</table>
Table 1.2 Number of organizers and partners per year

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Organizers and Partners</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>2</td>
</tr>
<tr>
<td>2012</td>
<td>3</td>
</tr>
<tr>
<td>2013</td>
<td>2</td>
</tr>
<tr>
<td>2014</td>
<td>7</td>
</tr>
<tr>
<td>2015</td>
<td>30</td>
</tr>
</tbody>
</table>

Table 1.3 Average number of partners per contest

<table>
<thead>
<tr>
<th>Country</th>
<th>Number of Contests Found</th>
<th>Number of Partners</th>
<th>Average number of partners per Contest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kazakhstan</td>
<td>7</td>
<td>22</td>
<td>2.2</td>
</tr>
</tbody>
</table>
Table 1.4 Average number of participants per contest

<table>
<thead>
<tr>
<th>Country</th>
<th>Number of Contests Found</th>
<th>Number of Partners</th>
<th>Average number of partners per Contest</th>
<th>Average Number of participants per contest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kazakhstan</td>
<td>7</td>
<td>22</td>
<td>2,2</td>
<td>1577</td>
</tr>
<tr>
<td>Kyrgyzstan</td>
<td>3</td>
<td>11</td>
<td>3,66667</td>
<td>50</td>
</tr>
<tr>
<td>Uzbekistan</td>
<td>2</td>
<td>9</td>
<td>4,5</td>
<td>50</td>
</tr>
<tr>
<td>Tajikistan</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>48</td>
</tr>
</tbody>
</table>

1.3 Conclusion of part 1

It is quite evident that if in 2011 the organizers were presented by local communities as for example GTUGs (Google Technology User Groups), in 2012 there was a dramatic change. In most of cases such organizations as Microsoft regional offices started offering their services and sometimes organized the contests themselves.

The most active organizations are Soros regional offices, Microsoft regional offices and Internews regional networks.

To sum up it is possible to claim that within 4 years there was a dramatic change.
Firstly, if we compare the number of partners and organizers in 2011 and in 2015, we can notice that till the 2014 there was observed steady growth, but starting from the 2014 the number has grown rapidly. The same may be said concerning the number of participants and startups.

One of the main factors is introducing special projects for people with special needs as we mentioned above, especially in the Central Asia-wide social innovation camp, offering a special website where people with special needs can use online tutorials to teach themselves basic programming skills, then find paid freelance job opportunities through employment postings on the same site was proposed.

Also an interactive platform for Uzbek teenagers, who grew up in orphanages and need assistance in finding work, securing housing registration documents, and navigating life in the “real world”, was introduced.

In this case it is possible to claim that such kind of contests motivate developers to find new solutions in solving the problem of inequality in their local communities. Thus, those contests help people with special needs to freely integrate into the society and make the society itself think of its most vulnerable members.

Finally, we can claim that such kind of events, i.e. contests, workshops, conferences and master classes, stimulate mobile software development among young developers. In this case supporting these activities seems to be reasonable.

For all the reasons mentioned above it is quite possible to conclude that nowadays such contests as hackathons and workshops are one of the most effective and powerful tools to teach students the mobile programming basics, and what is the main, they are free and consequently available for the majority of young population.
2 EDUCATION

Almost all domains of the information society are increasingly using mobile digital devices such as ultrabooks, smart phones, tablets, etc. In this context, programming for mobile devices today is one of the most sought-after skills in the labor market of software developers\textsuperscript{41}.

Programming for mobile devices is a special case of programming discipline. Many aspects of this fundamental discipline can be applied without changes or with minimum adoptions of mobile devices, which describes less power of processors, memory and special requirements on saving energy. Almost all educational courses include the fundamentals of OOP. Subjects and classes are the core of modern process of programming.

Learning and practicing the programming of mobile applications mainly provided by three common ways: courses offered by different organizations and / or private individuals (coaches), well-known remote online courses and programs in higher education establishments, as a matter of choice (optional courses). This section will discuss some of the proven mobile programming courses, and mobile application developers.

Despite availability of courses in almost every big city many novice mobile applications programmers prefer to develop their skills via online courses. This is due to the fact that most of the courses are available for free. The most popular online mobile education resources and programming in general are presented on the portals Coursera, Udacity, Google Code University, Codecademy, Udemy etc. These portals contain massive open online courses.

For example, portal Coursera offers the following international courses and specialization, which consist of 5-6 courses\textsuperscript{42} and available on English:

- Programming Mobile Applications for Android Handheld Systems: Part 1 (University of Maryland)
- Programming Mobile Applications for Android Handheld Systems: Part 2 (University of Maryland)
- Creative Programming for Digital Media & Mobile Apps (University of London)
- Programming Mobile Services for Android Handheld Systems: Concurrency (Vanderbilt University)
- Programming Mobile Services for Android Handheld Systems: Communication (Vanderbilt University)
- Programming Cloud Services for Android Handheld Systems (Vanderbilt University)
- Russian portal INTUIT has following educational programs\textsuperscript{43}:
  - The mobile programming of applications of the real time in POSIX standard
  - Programming in POSIX standards
  - Fundamental of programming in Delphi for ОС Android
  - Development of applications for ОС Android
  - Development of applications for iOS
  - Development of hybrid mobile device applications for Windows Phone
  - Programming with Windows Phone for beginners
  - Development of computer games for Windows Phone 7 with help of Silverlight и XNA
  - Introduction to development of applications for ОС Android

However, despite abundance of courses, there is the lack of them offering tutorials in national languages. For example, on Coursera only one course Creative Programming for Digital Media & Mobile Apps (University of London) is given in English and in Kazakh (English & Kazakh subtitles)\textsuperscript{44}.

\textsuperscript{41} D. Prepletaný, The Impact of Digital Technologies on Innovations in Retail Business Models, 2013
\textsuperscript{42} https://www.coursera.org/courses
\textsuperscript{43} http://www.intuit.ru/studies/courses/53/53/info
\textsuperscript{44} https://www.coursera.org/course/digitalmedia
On the other hand, this deficit makes a unique opportunity of creation or adaptation of high-quality educational content in local languages for regional developers.

In general, the goals of educational courses, training mobile programming are as follows: introduction of mobile software platform and its features, such as, Android, Apple iOS and Windows Phone; training of work in the appropriate development environments, for example, Eclipse or XCode; teaching programming languages, for example, Java and Object C. A significant advantage is provision of assistance in employment, and many instructors assist in publication of applications in such networks as Google Play and AppStore for their further commercialization.

Appendix 2 presents data on the local organizations that offer mobile programming training courses. Table 2.1 contains data about open e-libraries and educational portals. The courses of mobile programming by local organizations mostly are conducted on national languages, as Kazakh, Uzbek, and Kyrgyz. Only a few organizations from given list offer the courses on English, 8 in Republic of Kazakhstan and 1 in Republic of Uzbekistan.

2.1 Courses, training centers and educational programs dedicated to mobile programming in the Republic of Kazakhstan

THE BASIC COURSE FOR STUDENTS OF COLLEGES AND UNIVERSITIES, "PROGRAMMING FOR MOBILE DEVICES"

The course is developed by the order for college-level institutions by the group of JSC IITU teachers under the editorship of prof. R.I. Muhamediyev (Appendix 1. The curriculum of discipline "Programming for Mobile Devices"). The main goal of the course is to familiarize students with development of applications for mobile devices based on such operating systems as iOS, Android and Windows Phone. When developing the course skills and knowledge’s of 2-3 year technical college students were considered. The course requires knowing the fundamentals of object-oriented programming. The duration of the course is 75 hours, upon completion students will be able to develop applications and programs for the mentioned above platforms. The course is a pre-requisite for subsequent courses of in-depth study of methods of mobile programming.

SUMMER SCHOOL OF PROGRAMMING ON C++/JAVA/ANDROID/IOS

The organizers of the Summer School present courses in programming for platforms Apple iOS / Android in the corresponding programming environment:
- Apple iOS and fundamentals of programming in SWIFT
- Android and fundamentals of programming in Java.

The purpose of course is to teach the basic skills of mobile programming and practice to create the final application for a mobile device. Duration of each of the courses is 3 months. The courses are designed primarily for university and high school students. This summer school does not issue certificates.

Contact Information: 52B Abay st, Almaty, Republic of Kazakhstan.
Phone number: 8747 19 92123

EDUCATIONAL CENTER KNEWIT

The training center was established at JSC IITU. The program is mainly aimed at students and those, who wish to begin a startup. In addition, attention is paid to potential university entrants - schoolchildren of 9-11 classes. The courses last 24 academic hours, with a periodicity - 2 times a week and with flexible hours. The course tutors are active programmers, and have an experience of working with end-user products in the field of software development.

Upon completion of the course a certificate is issued.

45 http://alma-ata.alm.olx.kz/uslugi/q-ios/
46 http://vk.com/knewit
BAS UNIVERSITY CENTRE OF EDUCATION AND CERTIFICATION

BAS University Educational center offers authorized training and training of their own in 15 domains. The training center has 2 campuses in the cities of Astana and Almaty47.

BAS University is certified for Oracle authorized training with the status of Oracle Authorized Education Partner and the highest status of Oracle Platinum Partner, Microsoft authorized training with the status of Microsoft Learning Solutions; authorized training CISCO with the status Learning Partner Associate; providing training services for Hewlett-Packard, IBM Lotus Domino, ITIL, Red Hat Linux, SUN Microsystems, SAP, information security, project management, SCO, FreeBSD, etc..

Everyone interested in learning the basics of Java programming language and planning to develop applications for Android can gain the training courses, also professionals, who plan to pass any kind of Android related certification provided by Android Authorized Training Center. For professionals Android ATC certification requires preliminary preparation.

Contact information: 86, Dzhumaliyev st. corner of Tole Be st., Almaty, 050026, Republic of Kazakhstan
+7 (727) 357-21-22
Business Center “Arman”, 311 office. pr. Saryarka, Republic of Kazakhstan, 010000
Web page: http://www.bas.kz/university/

TRAINING CENTER INTELLECTION

Intellection - is training center for those interested in mobile technologies and creation of start-ups. The center also offers business cooperation in the field of mobile technology. The Center actively teaches people without programming experience by showing the possibilities of new technologies. Teachers and trainers have extensive experience in start-up business in Kazakhstan, the UK (London) and the US (Palo Alto). The center offers training courses in design and development of mobile applications.

Courses are designed for beginners, so no any prior experience of programming is required. Age restrictions are not specified. At the end of the course the listeners have the opportunity to create applications that can be added to the personal portfolio.

Students are provided with a Mac mini and the all necessary course materials, and, by the agreement with a teacher, students can come to the office at any time for additional engagement. 

**Contact information:** 321 office, 29 Satpayev, Almaty, Republic of Kazakhstan.  
+7 (707) 555 20 27 +7 (727) 367 21 96, bahakz@gmail.com  
**Web page:** [http://intellecction.kz](http://intellecction.kz)

THE YOUTH PROJECT "EXPERIMENT: BE ZUCKERBERG"

In order to popularize mobile programming and start-up projects among young people in the city of Almaty Ahmed Argimbaev and the team of Idea Lab portal was conducted a project called "Experiment: Be Zuckerberg." The purpose of the project is to assemble a team of five highly motivated people and teach them the basics of mobile applications programming for the platform Apple iOS. The experiment was conducted on the basis of JSC IITU. The Project progress and results have been published on the IDEA Lab team's website - [www.idea-lab.kz](http://idea-lab.kz).

The project recruited the course participants on a competitive basis. The duties of the participants included the following:

- Since the beginning of the experiment the participants had to write online diaries about the process of their learning and mobile applications. Online blogs, namely short messages (of 500 words) on each class from each participant were published on the portal [www.idea-lab.kz](http://idea-lab.kz).
- Attendance was mandatory for participation in the experiment.
- It was necessary to publish posts in the status of their profile in the social network Facebook, throughout the experiment.

Courses were held in Almaty in the building of JSC IITU. Education was free of charge. 
**Web page:** [http://idea-lab.kz/e-ksperiment/stan-tsurekbergom/](http://idea-lab.kz/e-ksperiment/stan-tsurekbergom/)

COMPUTER ACADEMY STEP

The Computer Academy STEP is an international educational organization. The branch of the academy in the Republic of Kazakhstan was opened in October 10, 2013. The Academy is represented in 15 largest cities of Ukraine, and also in Russia, the Czech Republic, Estonia, Belarus, Brazil, Romania, Bulgaria, Georgia, Moldova, Cambodia. The Kazakhstan branch of the Computer Academy "STEP" provides computer training on the specialties "Computer graphics and design", "Networking and System Administration", "Software Engineering", as also the Small Computer Academy and the School of Computer Week-end, make it possible to get computer education for children aged from 10 to 14 years.

IT courses include the basics of programming, web programming and mobile programming. This time the Computer Academy "Step" has the following statuses:

- Microsoft Certified Partner
- Microsoft IT Academy
- Authorized testing center Pearson VUE and Prometric
- Local CISCO Academy
- Cisco Entrepreneur Institute

The Kazakhstan branch also held events related to IT-technologies, where everyone can participate. Workshops concerned the topics related to IT sphere as a whole. The leading industry experts are invited as the speakers and mentors.

Age category for IT courses is from 15 to 55 years. Provides courses for students aged from 10 to 14 years.

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48 [http://idea-lab.kz/authors/](http://idea-lab.kz/authors/)
EDUCATIONAL CENTER UPGRADE

Educational center «UP-Grade» organizes courses for people interested in IT knowledge\(^{51}\). Educational center offers the following courses:
- Computer courses for beginners;
- Web-programming (HTML, CSS, JavaScript);
- Development of mobile applications for IOS and Android;
- Fundamentals of programming in C #.

Also, educational center offers courses associated with the use of programs such as CorelDraw and PhotoShop.

Classes are individual, group. Upon completion students are given certificates complying to the national standard. The Centre keeps in touch with potential employers of students, and is able to support in finding employment.

Schoolchildren and students receive a discount for studies. No age restriction. Course materials are not available freely on the internet.

**Contact Information:** 61/1 Burov st., Uskemen, +7(7232)51-29-17

**Web page:** [http://upgrade-uk.kz/](http://upgrade-uk.kz/)

SUMMER STARTUP SCHOOL "CREATE ORIGINAL IPHONE-APP IN 8 WEEKS"

The summer school is organized with the purpose to develop the skills of mobile programming, both for beginners and for people with programming experience. The targeted audience is people between the ages of 12-35 years\(^{52}\). The duration of school is 8 weeks. Full time education, from 9 AM till 7 PM. Summer School is carried out from June 8, 2015 on July 31, 2015.

In addition to the mobile application development training, teaching is planned marketing and promotion of products in the App Store, guest lectures with leading mobile developers and designers from Facebook, Instagram, Google, Microsoft, Yahoo, as well as leaders of Silicon Valley start-ups, and the competition among students application.

**Web page:** [http://thesummerstartupschool.com/](http://thesummerstartupschool.com/)

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GOOGLE DEVELOPER GROUP ALMATY (GDG)

GDG Almaty (earlier GTUG Almaty) - a non-profit IT community, which is based on the exchange of experience and knowledge of technology for Google Developers - Android, Google Maps, App Engine, Chrome, Web Toolkit, Google Plus and other. GTUG members gather for seminars, competitions Hackathon, exchange of experiences and discuss developments and other issues related to the use Google technologies. For the first time in Kazakhstan in early October 2014 in Almaty and Astana GTUG held the competition Hackathon, with main title as Android-app. The meetings are free and are held on a regular basis - at least twice a month - in Almaty classrooms provided by partners.

Date of establishment of Group is April 16, 2011.

Figure 2.3. Seminar held by GDG Almaty

Contact information: Almaty, Republic of Kazakhstan

EPAM SYSTEMS

EPAM SYSTEMS is experienced in development of both, native applications for all kinds of mobile platforms and mobile versions of Internet portals. The company provides opportunity of free training in modern software development and testing technologies for 2-4 year students, undergraduates and professionals with technical background. This kind of training programs are primarily focused on those, who aspire to become a member of EPAM Systems. For effective training of young specialists and their further employment in the EPAM, the company opened their own training centers in cities Astana and Karaganda.

Contact information: Auezov st., 8 010000 Astana Republic of Kazakhstan
+7-7172-475-970
Web page: http://www.epam.com

2.2 Courses, training centers and educational programs dedicated to mobile programming in the Republic of Kyrgyzstan

NATIONAL INFORMATION TECHNOLOGIES CENTER (NATIONAL IT CENTER)

National Information Technology Center was established in 2004 with assistance of the Japan International Cooperation Agency (JICA) in the course of implementation of the joint Kyrgyz - Japanese project "Development of human resources in the field of IT-technologies in the Kyrgyz

53 https://www.facebook.com/GDGAlmaty
54 http://www.epam.com/careers
Republic.". The main activity of the Centre focuses on information and communication technologies education. Within the framework of this activity with the help of the Japanese government, a modern material and technical infrastructure for the implementation of the educational process in 16 directions of modern IT-technology was created.

By the decision of the State Inspectorate for licensing and certification of educational institutions, National Information Technology Center is authorized to conduct educational activities in the sphere of additional education (license number ASH 2061) in the following domains:

- project management;
- system analysis;
- databases
- software development, mobile application development;
- network technologies.

Educational Activities carried out by means of training courses and professional retraining of specialists in information and communication technologies.

The courses primarily focused on professional training:
- companies specialists working in the software industry;
- IT-specialists at public institutions, private companies and various organizations of service sector (banks, telecommunication companies, mobile operators, and others);
- students and graduates;
- unemployed, who would like to find worthy and interesting work in the field of information technologies.

Training materials for authorized courses are developed and produced by manufacturing companies and are only available during the course timeframe. Training materials for authorized courses have been prepared on the basis of materials developed by Japanese experts.

Figure 2.4. Members of National Information Technologies Center

Contact information: 265, Chui pros., Bishkek 720071 Kyrgyz Republic
Phone number: (996-312) 900-151
Web page: http://www.it.kg/
AIPERI TECHNOLOGY MEETUP & GOOGLE DEVELOPER GROUP BISHKEK

Google Developer Group Bishkek (abbreviated GDG Bishkek) - is an open and independent community of people using Google products and technologies, wishing to learn more about them, to share experiences and to talk about these issues with other Google users\(^{55}\). GDG members gather together to take part in seminars, hold Hackathon, share experiences and discuss developments and other issues related to Google technologies.

**Web page:** https://developers.google.com/groups/chapter/107766380565023451691/

FREE (AUTHOR) TRAININGS ON MOBILE PROGRAMMING.

The peculiarity of the training is that participants can learn how to create an application from scratch. The course is designed for programmers, who have experience developing Java projects. The training was conducted by the developer of mobile applications Kuban Dzhakipov\(^{56}\), who has extensive experience in the field of mobile application development.

FUND "SOROS-KYRGYZSTAN"

Fund "Soros-Kyrgyzstan" (SFK) - an international non-governmental private foundation - aspires to create conditions for building an open society in the Kyrgyz Republic by supporting development of public institutions and initiatives in all public spheres\(^{57}\).

The Fund’s Educational program on the mobile apps programming is designed for students and graduates.

![Image](image.jpg) Figure 2.5. The courses of mobile programing by the "Soros-Kyrgyzstan"

**Contact information:** 55-a. Logvinenko st. Bishkek, Kyrgyz Republic 720040, Phone number: +996 (312) 66-34-75

**Web page:** http://soros.kg/

2.3 Courses, training centers and educational programs dedicated to mobile programming in the Republic of Uzbekistan

IT-AGENCY INFO XIZMATI

IT-Agency is the official name of Info Xizmati, but they create projects in Internet network under the name Brand.uz.

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\(^{55}\) https://developers.google.com/groups/chapter/107766380565023451691/

\(^{56}\) https://www.linkedin.com/in/kdzhakipov

\(^{57}\) http://soros.kg/archives/16648
In the spring of 2013 Brand.uz delivered educational initiatives - the learning courses Ginza IT Course, where experienced professionals lead courses for beginners in several domains: mobile application development for iOS and Android, PHP-development training and training in work on the platform Magenta58.

The program also included the seminars with leaders of IT companies, case studies, meetings with designers and experts to promote products, as well as with the Project Management.

For those who showed their best, the company offers training with further employment.

Figure 2.6. Courses of mobile programming from Ginza IT-Agency Info Xizmati

Contact information: 6, Osie st. offices №116-117, Republic of Uzbekistan.  
+(998-71) 150-11-46,  
Web page: http://brand.uz/ info@brand.uz

BEPRO EDUCATION CENTER

Center BePro programmers working for more than 10 years in the IT-market of Uzbekistan. Before 2013, the center was known as the "Center for training and support of young programmers", abbreviated CPSYP 59

Center’s academic programs are developed in accordance with national and international standards. The center is a member of Microsoft IT Academy Program and an authorized business partner of IBM, as well as the official representative of Prometric and Pearson VUE, a global leader in the field of testing and issues official certificates. By results of examinations students can obtain an international certificate from leading software vendors: Apple, Microsoft, IBM, Intel, Huawei, Nokia, HP, Adobe, Cisco, Linux, Oracle and others. Center also tested GMAT. Center performs training in the field of mobile software development.

Web page: http://bepro.uz/

Licensed Educational Center «JahonStudy»

Educational center «JahonStudy» offers a range of services in computer skills, foreign languages as well as higher education studies, both in Uzbekistan and the countries of near and far abroad. The center offers lots of free educational materials, such as training manuals, guidelines, training presentations and lecture notes. Part of educational materials is freely available on the Internet.

Computer courses:
- Office programs – Microsoft Office

58 http://www.pc.uz/org/53801.html
59 http://beproedu.uz/ru-RU/Page?code=100
• Designed for polygraphs– Photoshop, CorelDraw
• Web programming– PHP, HTML, JavaScript, Web design
• Development of applications for mobile devices – iOS, Android APPs Development
• 3D Design – Auto Cad, Archi Cad, 3D MAX
• Animation – Flash (Action Script)

Classes are conducted in groups and individually, in Uzbek and Russian languages.

Contact information: 27/9/24 Kunayev st., Mirabad dist., Tashkent, Republic of Uzbekistan, (+998 93) 577 60 60
Web page: http://jahonstudy.uz/ jahonstudy@gmail.com

INDEPENDENT EDUCATIONAL INSTITUTION "CHIRCHIQ ILM OSIYO MASKANI"

For 10 years CHIRCHIQ ILM OSIYO MASKANI CHIRCHIQ ILM OSIYO MASKANI has been providing training in the cities of Tashkent and Chirchik. It offers professional training and qualification of specialists, employees and population in modern specialties being constantly demanded in the labor market. The courses are conducted in the following fields: mobile programming, programming.

All the interested people can pass the courses. Before starting their studies participants are interviewed. The course materials are not available for free in the Internet.
TRAINING BY UCELL IN COOPERATION WITH QUALCOMM

Mobile operator Ucell in cooperation with Qualcomm organized the first training for young programmers on "Development of mobile applications - augmented reality" in August 29, 2013 at the Dedeman Silk Road, Tashkent in Uzbekistan\textsuperscript{60}.

The main objective of this training was training young programmers the fundamentals of mobile application development using augmented reality technology. During the event, young developers got acquainted with tools Vuforia - a leading technology in the industry of mobile application development. Also there was an opportunity for the members to develop mobile applications for smart-phones and tablets, using Vuforia SDK. Training language – English, participation in the training - free of charge.

Students and university graduates in specialization "Information Technology" were invited to participate, as well as specialists, and developers of mobile applications.

\textsuperscript{60}http://ucell.uz/ru/news/2013/08/15/training
AZURE DEVELOPER CAMP

First Azure Developer Camp in Uzbekistan was held at December 4, in 2013. Windows Azure Developer Camps — is an event, carried out in a relaxed, free form by developers for developers.

It was organized by Microsoft and BeSmart. Participants included developers of the companies based in Tashkent and involved in creation of software products using Microsoft technologies.

Was considered the latest cloud platform Windows Azure, and all the features and benefits provided by it to developers. How to build IAAS solutions, what SaaS is and what are their benefits to companies creating applications or Web services. All questions were represented by the expert in Microsoft technology development Andrey V. Andreev and discussed in detail with the participants of Azure Dev Camp.

The developers particularly noted the ease of creation and scalability of the new cloud server. They also highlighted the opportunities provided by Windows Azure for developers of mobile applications.

Figure 2.10. The Azure Developer Camp

Web page: http://blog.tech-club.kz/?p=642

2.4 Open educational resources

Besides traditional courses in programming for mobile phones, as well as all over the rest of the world, in Central Asian states are exist open access educational recourses. Such as e-Libraries or educational portals, which provide access to a wide range of training materials in different fields of science and technology. In these resources students can find training materials related to programming for mobile phones and mobile technologies: video-tutorials, lecture notes, presentation and etc.

Existing and actively developing electronic libraries in the Central Asian countries are given in Table 2.

Table 2.1 Open educational resources in programming for mobile devices

<table>
<thead>
<tr>
<th>№</th>
<th>Web address of eLibrary</th>
<th>Short description</th>
<th>Available resources</th>
<th>Access</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><a href="http://www.elibrary.kz/">http://www.elibrary.kz/</a></td>
<td>Integrated information system for collecting and storing of various electronic documents, equipped with navigation and search, and providing the ability of multi-dimensional processing and reuse of information to meet the information needs in operational distributed multi-user access through a single interface</td>
<td>Electronic resources of universities in Kazakhstan, e-books in different formats,</td>
<td>Free</td>
</tr>
</tbody>
</table>

61 http://blog.tech-club.kz/?p=642
<table>
<thead>
<tr>
<th></th>
<th></th>
<th>The Republic of Kyrgyzstan</th>
<th>normative documents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><a href="http://www.kyrgyzstanvsl.org/">http://www.kyrgyzstanvsl.org/</a></td>
<td>Kyrgyz Virtual Scientific Library. The purpose of the program is to improve the Kyrgyz GDP dissemination of scientific resources for research institutes and universities in Kyrgyzstan to meet the demand of the scientific community in Kyrgyzstan.</td>
<td>Scientific articles, publications. The site is available for university students and professors.</td>
</tr>
<tr>
<td>2</td>
<td><a href="http://kyrlibnet.kg/">http://kyrlibnet.kg/</a></td>
<td>The network of academic libraries of Kyrgyzstan &quot;Kyrlibnet&quot;, exchanges library and information resources among the university libraries of Kyrgyzstan. This project is EU budget funded by TEMPUS partners from Eastern Europe and Central Asia.</td>
<td>Books, manuals, publications, periodicals, monographs, dissertations, etc. Free access to library archives of Kyrgyzstan universities.</td>
</tr>
<tr>
<td>3</td>
<td><a href="http://www.codecademy.com/ky-KG/">http://www.codecademy.com/ky-KG/</a></td>
<td>Web portal for free interactive learning of different programming languages. The Portal users can take online courses in Kyrgyz language, as well as participate in development and transfer of these courses.</td>
<td>Online courses Free access</td>
</tr>
<tr>
<td>4</td>
<td><a href="http://students.com.kg">http://students.com.kg</a></td>
<td>Students portal</td>
<td>Books, periodicals, articles. Free access</td>
</tr>
<tr>
<td>5</td>
<td><a href="http://oel.bik.org.kg/">http://oel.bik.org.kg/</a></td>
<td>Website &quot;KRAD, Science of Central Asia&quot; contains the texts of abstracts, theses, monographs, research papers on various disciplines prepared both in Kyrgyzstan and elsewhere in Central Asia</td>
<td>Abstracts, theses, monographs, research papers and magazines. Free access</td>
</tr>
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<tr>
<th></th>
<th></th>
<th>The Republic Of Tajikistan</th>
<th>normative documents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><a href="http://www.innovation.tj">http://www.innovation.tj</a></td>
<td>Internet portal of innovative development of the Republic of Tajikistan.</td>
<td>All information concerning innovative activities of the Republic of Tajikistan, the results of scientific research. Free access</td>
</tr>
<tr>
<td>2</td>
<td><a href="http://www.nlrt.tj">www.nlrt.tj</a></td>
<td>Web page of the National Library of the Republic of Tajikistan. Library provides users with an electronic catalog containing more than 50 thousand bibliographic publications. Since 2006, the library has a room of electronic publications, which provides readers with more than 115 thousand copies of electronic books and publications on CD-ROM.</td>
<td>Books, manuals, publications, periodicals, monographs, dissertations, etc. Free access</td>
</tr>
<tr>
<td>3</td>
<td><a href="http://www.aclib.tj">www.aclib.tj</a></td>
<td>Fund of the Central Scientific Library named Indira Gandhi Academy of Sciences of the Republic of Tajikistan currently contains about 1,400 million units of literature in wide range of science and technology.</td>
<td>Books, manuals, publications, periodicals, monographs, dissertations, etc. Free access</td>
</tr>
</tbody>
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<tr>
<th></th>
<th></th>
<th>The Republic of Turkmenistan</th>
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</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><a href="http://www.atlascopco.com/7mun/">http://www.atlascopco.com/7mun/</a></td>
<td>Atlas Copco Turkmenistan portal provides a free e-library with the possibility to download a book</td>
<td>Electronic books, tutorials. Free access</td>
</tr>
</tbody>
</table>
of students. The electronic library presents tutorials and books in the following categories: engineering, business, IT books and MS Office and statistics. The Category IT books includes such subjects as artificial intelligence, programming languages C, C++, and C#; information systems and management of information systems, Java programming and programming for mobile devices.

The Republic Of Uzbekistan

| 1 | http://www.natlib.uz / | National Library of Uzbekistan named after Alisher Navoi. It provides remote access to catalogues and some digitized resources. | Books, manuals, publications, periodicals, monographs, dissertations, etc. | Free access |

2.5 Conclusion of part 2.

Currently in such Central Asian states, as the Republics of Kazakhstan, Kyrgyzstan, Uzbekistan and Turkmenistan the process of training in programming for mobile devices is mostly provided by private educational courses, usually held by organizations or individuals. (The list of courses is given in Appendix 2. The summary table of training courses).

Central Asian states actively develop electronic resources for learning as for instance electronic libraries and educational or data portals. (The list of open electronic libraries including resources for learning mobile programming is given in Table 2.) Hold free workshops and trainings aimed to acquaint participants with the basics of mobile programming, software and products, which provide rapid application development. An important trend is the possibility to pass free courses on educational portals such as Coursera, CodeAcademy, INTUIT, and others. For example, the portal Coursera registered about 18 international courses related to mobile programming, and Portativ INTUIT offers 9 international courses on English.

Despite the fact that the materials of many educational courses are not available to everyone in the public domain, there are sufficient numbers of free tutorials available on the Internet.

A particular problem is the fact that almost all the educational courses are concentrated in the big cities like Astana and Almaty (in Kazakhstan), Tashkent (Kyrgyz Republic), Bishkek (Republic of Uzbekistan). However, in spite of the good abundance of courses, there is the lack of them in the national languages. For example, on Coursera only one course of Creative Programming for Digital Media & Mobile Apps (University of London) is available in English with Kazakh subtitles (English & Kazakh subtitles).

On the other hand, this deficit offers regional developers a unique opportunity of creation or adaptation of high-quality educational content in local languages.

Despite the fact that mobile programming is actively promoted and developing in Central Asian states, there is no national environment or framework for development, such as AppsBuilder for instance. But not always mobile application should be complex project, sometimes only few functions are required. So for these goals every user of internet can find a numerous web based applications, which help to create simple mobile application without technical or programming knowledge. In Appendix 3 given the list of valid web applications, which purposed to create mobile applications. In one hand, these applications can stimulate users to learn more about mobile programming process and programming at all. In other hand, they can challenge the developers to create more usable and functional applications as like existing’s.

From the mentioned organizations to cooperate with UNESCO, the followings can be recommended, International IT University (Kazakhstan), the Computer Academy STEP (Kazakhstan), National Information Technology Center (Kyrgyzstan), IT-Agency InfoXizmati (Uzbekistan).

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64 Appendix 3. Valid web applications purposed to create mobile applications.
Furthermore, some organizations for people with special needs are also ready for cooperation and to become a ground for mobile ICT trainings, they are described in the current report (3.5 Developments for people with special needs).

In order to enhance education of young people from rural areas can be developed online courses, are common to Central Asian, focused on the support of national languages such as Kazakh, Uzbek, Kyrgyz and Tajik.
3 PART 3. MOBILE APPLICATION MARKET

3.1 Introduction

Mobile application market is not constrained by the borders of different states. On the one hand, this means that people of Central Asian countries use applications of foreign developers. On the other hand, local developers have to compete at an international level, which requires an appropriate level of training. Experts think that investors are interested in the prospects of mobile application market of Central Asia countries, but there are not enough qualified developers, which doesn’t meet the existing demand and hinders growth rate of number of applications. For companies ordering an application from a foreign developer substantially raises development costs.

Currently, the main work of local developers includes orders from local companies, which are trying to find new methods of advertising and very often it’s a mobile version of already existing web applications. There are too few unique applications, they require both finance for promotion and a special effort to increase their ability to compete in the global market.

An accurate assessment of the volume of mobile apps market is difficult for certain countries, because stores (App Store, Google Play and others) don’t offer the possibility statistical output for applications or developers of a particular country. However, over the past years several studies have been conducted, which give evidence of the current situation.

3.2 Top 30 mobile applications of Kazakhstan

Kazakhstan rating of mobile applications implemented by the Association of Kazakhstan Internet business and mobile commerce and the Intervale Kazakhstan Company was the first project, which analyzed and presented the situation on the market of mobile applications in Kazakhstan\(^{65}\).

In a study of more than 100 products of Kazakhstan market, submitted to the contest by developers, organizers have formed the top 30 applications. Information for evaluation was represented by both developers and open data of applications markets: AppStore and Google Play. Applications were evaluated by the following criteria: number of sessions, ranking in the app stores, number of platforms, increase of sessions during the period, support, languages, design, usability. The distribution of points for each of them is presented in Table 3.1.

<table>
<thead>
<tr>
<th>Rating criteria</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>number of sessions</td>
<td>50</td>
</tr>
<tr>
<td>ranking in the app stores</td>
<td>10</td>
</tr>
<tr>
<td>number of platforms</td>
<td>10</td>
</tr>
<tr>
<td>increase of sessions during the period</td>
<td>10</td>
</tr>
<tr>
<td>support</td>
<td>5</td>
</tr>
<tr>
<td>languages</td>
<td>5</td>
</tr>
<tr>
<td>design and usability</td>
<td>10</td>
</tr>
<tr>
<td>total</td>
<td>100</td>
</tr>
</tbody>
</table>

\(^{65}\)http://akib.kz/ratings/mobile
Points are awarded according to the following rules:

1. Number of sessions. Information can be presented in the form of guest access to Google Analytics or Yandex Metrics. Points are awarded according to the average number of sessions per month. The maximum rate among candidates was taken for possible maximum - 50 points.

2. Ranking in the app stores. Ratings in App store and Google Play are taken into account. Rating evaluation was the sum of the two evaluations: the evaluation in App store (max 5 points) and the evaluation in Google Play (max 5 points).

3. Number of platforms. Three main platforms iOS, Android and Windows Phone were considered, for which could be awarded up to 9 points (3 points for each OS) and 1 extra point for an additional platform.

4. Increase of sessions during the period. It is calculated from the percentages, the maximum number of 10 points was awarded for 100% or more.

5. Support of mobile application (feedback, etc.). Support information should be presented within the application. If the support works, and it was possible to consult, then the application got 5 points.

6. Languages of mobile application. It was based on three languages: Kazakh, Russian and English. For each of these languages was assigned by 1.5 points, for an additional language were added 0.5 points.

1. Design and usability. Each application is evaluated by the jury by 10 point scale independently from each other. Average rating from each jury members was considered.

Results of the first rating were announced in September 2014 (Tables 3.2 and 3.3). The study is expected to be an annual event. To apply for participation in 2015 rating it is necessary to fill in the questionnaire on the website of the organizer: http://akib.kz/ratings/mobile.

<table>
<thead>
<tr>
<th>Rating position</th>
<th>Name</th>
<th>Short description</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Kolesa.kz</td>
<td>Filing, edit and search for ads in the Kazakhstan’s largest car site “Kolesa” using a mobile phone.</td>
<td>79.3</td>
</tr>
<tr>
<td>2</td>
<td>OlX.kz</td>
<td>Mobile app for the site of free ads OLX in Kazakhstan. Search, publishing and editing ads of ads.</td>
<td>69.17</td>
</tr>
<tr>
<td>3</td>
<td>TengriNews</td>
<td>Application of informational portal Tengrinews.kz . News of policy, economy, society, technology and culture of Kazakhstan and the world. Tengrinews.kz for iPad has won the National Internet Award &quot;Award.kz&quot; 2011 in the category &quot;Best Mobile Application&quot;.</td>
<td>51.04</td>
</tr>
<tr>
<td>4</td>
<td>Kiwi</td>
<td>The official application of the video service Kiwi.kz. Viewing, commenting and publication of videos using a mobile phone.</td>
<td>36.65</td>
</tr>
<tr>
<td>5</td>
<td>Pit-Stop.kz</td>
<td>Mobile application for motorists with a basic help information. Prize-winner of the National Internet Award &quot;Award.kz&quot; 2013 in the category &quot;Best Mobile Application&quot;.</td>
<td>36.27</td>
</tr>
<tr>
<td>No.</td>
<td>Application Name</td>
<td>Description</td>
<td>Rating</td>
</tr>
<tr>
<td>-----</td>
<td>------------------</td>
<td>-------------</td>
<td>--------</td>
</tr>
<tr>
<td>6</td>
<td>My Beeline KZ</td>
<td>Application for Beeline subscribers: management of fees and balance, use of services, software downloading, and etc. Winner of the National Internet Award &quot;Award.kz&quot; 2013 in the category &quot;Best Mobile Application&quot;.</td>
<td>36.15</td>
</tr>
<tr>
<td>7</td>
<td>Point+ Kazakhstan</td>
<td>Financial application with locations of ATMs, exchange offices, banks and other services. Winner of the National Internet Award &quot;Award.kz&quot; 2012 in the category &quot;Best Mobile Application&quot;.</td>
<td>36.1</td>
</tr>
<tr>
<td>8</td>
<td>Vesti.kz</td>
<td>Official application of the Kazakhstan's sports portal Vesti.kz. News, results of competitions, tournament statistics.</td>
<td>35.68</td>
</tr>
<tr>
<td>9</td>
<td>Homebank</td>
<td>Mobile application for «Kazkommertsbank&quot; cardholders. Checking the status of accounts, payment of services, etc.</td>
<td>35.61</td>
</tr>
<tr>
<td>10</td>
<td>SpringFruit</td>
<td>Social dating application that allows contact with people who are nearby as well as the search for the location of friends on the map.</td>
<td>35.6</td>
</tr>
<tr>
<td>11</td>
<td>SMARTBANK</td>
<td>The application for &quot;Eurasian Bank&quot; customers - management of accounts, payments and transfers, loan repayments, etc.</td>
<td>34.85</td>
</tr>
<tr>
<td>12</td>
<td>Chocolife.me</td>
<td>Mobile application from the service of collective purchases Chocolife.me. Search on the map of shares, the acquisition of coupons with a mobile phone.</td>
<td>33.83</td>
</tr>
<tr>
<td>13</td>
<td>MyPay.kz</td>
<td>Payment mobile application. Instant payment services with bank cards via mobile phone. Prizewinner of the National Internet Award &quot;Award.kz&quot; 2011 in the category &quot;Best Mobile Application&quot;.</td>
<td>33.33</td>
</tr>
<tr>
<td>14</td>
<td>Kino.kz</td>
<td>Mobile application of Internet project &quot;Kino.kz &quot;</td>
<td>33.13</td>
</tr>
<tr>
<td>15</td>
<td>VOXPOPULI</td>
<td>Application of Kazakhstan's first resource of photo reports Voxpopuli.kz. The possibility to view and download publications to a mobile phone.</td>
<td>33.04</td>
</tr>
<tr>
<td>16</td>
<td>Sajde KZ</td>
<td>Mobile application that notifies about Namaz time for all major cities of Kazakhstan.</td>
<td>32.7</td>
</tr>
<tr>
<td>17</td>
<td>Air Astana</td>
<td>Official mobile application of the airline Air Astana. Purchase of tickets, check-in, flight status checking, online consultation.</td>
<td>32.33</td>
</tr>
<tr>
<td>18</td>
<td>Ticketon</td>
<td>Application of the service Ticketon.kz. Current poster, purchase of tickets to movies, theater, concerts and other events, as well as a selection of comfortable seats in the hall using mobile phones.</td>
<td>31.58</td>
</tr>
<tr>
<td>No.</td>
<td>Name</td>
<td>Description</td>
<td>Score</td>
</tr>
<tr>
<td>-----</td>
<td>--------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-------</td>
</tr>
<tr>
<td>19</td>
<td>Taxi call</td>
<td>Mobile application that allows to select and to order services, to leave comments, to view ratings of the major taxi companies in major cities of Kazakhstan.</td>
<td>31.4</td>
</tr>
<tr>
<td>20</td>
<td>BeSmart</td>
<td>Application of the coupon service BeSmart - possibility of search, browse and purchase of coupons with mobile phones.</td>
<td>30.55</td>
</tr>
<tr>
<td>21</td>
<td>Egov.kz</td>
<td>Mobile application is designed for citizens of the Republic of Kazakhstan, users of the web portal &quot;e-government&quot;. Payment of fees, penalties and interest, receipt of certificates and notices.</td>
<td>30.53</td>
</tr>
<tr>
<td>22</td>
<td>Sozdik.kz</td>
<td>Official application of the site Sozdik.kz. Russian-Kazakh and Kazakh-Russian dictionary for mobile phones.</td>
<td>30.31</td>
</tr>
<tr>
<td>23</td>
<td>Abay - Book of words</td>
<td>Mobile application, which collected 45 words of edification of Abay Kunanbayev.</td>
<td>30.28</td>
</tr>
<tr>
<td>24</td>
<td>Halyk</td>
<td>Official application of &quot;Halyk Bank of Kazakhstan&quot;. Software for mobile phones on basic banking services.</td>
<td>28.77</td>
</tr>
<tr>
<td>25</td>
<td>Mp.kz - Tenders and government purchases</td>
<td>Official application of Kazakhstan's electronic trading platform for commercial purchases MP.kz. Search and browse of conditions of commercial tendering and tenders from public procurement portal.</td>
<td>28.05</td>
</tr>
<tr>
<td>26</td>
<td>Infobus Mobile</td>
<td>Application for optimization of waiting time for public transport. Online information about routes, stops, current position of transport.</td>
<td>27.89</td>
</tr>
<tr>
<td>27</td>
<td>Personal cash box (Kassa24)</td>
<td>Mobile application of the service &quot;Cash box 24&quot; to pay for local and foreign providers using mobile phone.</td>
<td>26.2</td>
</tr>
<tr>
<td>28</td>
<td>BTA Insurance</td>
<td>Official application of &quot;BTA Insurance&quot;. Getting information about services, cost calculation, sending photocopies of documents and order of the insurance policy with a mobile phone.</td>
<td>26.09</td>
</tr>
<tr>
<td>29</td>
<td>ENPF Mobile</td>
<td>Application for customers of &quot;Single accumulative pension fund&quot;. Functionality allows receiving relevant information about the Fund as well as detailed information on the status of your retirement account.</td>
<td>25.6</td>
</tr>
<tr>
<td>30</td>
<td>Tele2</td>
<td>Application with a personal cabinet function of Tele2. Application provides background information as well as balance check, detailed subscriber’s account and management of tariff plan.</td>
<td>25.5</td>
</tr>
</tbody>
</table>
Table 3.3. Evaluations of the first rating of mobile applications in Kazakhstan (September of 2014)

<table>
<thead>
<tr>
<th>Position</th>
<th>Name</th>
<th>Evaluation for number of sessions</th>
<th>Stores evaluation</th>
<th>Evaluation for sessions increase</th>
<th>Evaluation for number of platforms</th>
<th>Support evaluation</th>
<th>Languages evaluation</th>
<th>Total (without jury evaluation)</th>
<th>Jury evaluation for design and usability</th>
<th>Total (with jury evaluation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Kolesa.kz</td>
<td>50</td>
<td>8.4</td>
<td>0.4</td>
<td>10</td>
<td>0</td>
<td>1.5</td>
<td>70.30</td>
<td>9</td>
<td>79.3</td>
</tr>
<tr>
<td>2</td>
<td>OLX.kz</td>
<td>38.87</td>
<td>8.2</td>
<td>0.6</td>
<td>6</td>
<td>5</td>
<td>1.5</td>
<td>60.17</td>
<td>9</td>
<td>69.17</td>
</tr>
<tr>
<td>3</td>
<td>TengriNews</td>
<td>17.64</td>
<td>7.1</td>
<td>2.8</td>
<td>9</td>
<td>5</td>
<td>1.5</td>
<td>43.04</td>
<td>8</td>
<td>51.04</td>
</tr>
<tr>
<td>4</td>
<td>Kiwi</td>
<td>5.59</td>
<td>7.8</td>
<td>10</td>
<td>6</td>
<td>0</td>
<td>1.5</td>
<td>30.89</td>
<td>7.5</td>
<td>36.65</td>
</tr>
<tr>
<td>5</td>
<td>Pit-Stop.kz</td>
<td>3.17</td>
<td>9.1</td>
<td>0</td>
<td>9</td>
<td>5</td>
<td>3</td>
<td>29.27</td>
<td>7</td>
<td>36.27</td>
</tr>
<tr>
<td>6</td>
<td>My Beeline KZ</td>
<td>10.15</td>
<td>8.5</td>
<td>0</td>
<td>9</td>
<td>0</td>
<td>1.5</td>
<td>29.15</td>
<td>9</td>
<td>36.15</td>
</tr>
<tr>
<td>7</td>
<td>Point+ Kazakhstan</td>
<td>0.13</td>
<td>7.2</td>
<td>2.5</td>
<td>9</td>
<td>5</td>
<td>4.5</td>
<td>28.33</td>
<td>8</td>
<td>36.1</td>
</tr>
<tr>
<td>8</td>
<td>Vesti.kz</td>
<td>4.61</td>
<td>8.2</td>
<td>0</td>
<td>6</td>
<td>5</td>
<td>4.5</td>
<td>28.31</td>
<td>8</td>
<td>35.68</td>
</tr>
<tr>
<td>9</td>
<td>Homebank</td>
<td>0.03</td>
<td>7.4</td>
<td>1.3</td>
<td>10</td>
<td>5</td>
<td>4.5</td>
<td>28.23</td>
<td>6</td>
<td>35.61</td>
</tr>
<tr>
<td>10</td>
<td>SpringFruit</td>
<td>0.3</td>
<td>8.9</td>
<td>0</td>
<td>9</td>
<td>5</td>
<td>5</td>
<td>28.20</td>
<td>9</td>
<td>35.6</td>
</tr>
<tr>
<td>11</td>
<td>SMARTBAN K</td>
<td>8.53</td>
<td>9.1</td>
<td>0</td>
<td>9</td>
<td>0</td>
<td>1.5</td>
<td>28.13</td>
<td>6.5</td>
<td>34.85</td>
</tr>
<tr>
<td>12</td>
<td>Chocolife.me</td>
<td>0.15</td>
<td>9</td>
<td>0</td>
<td>9</td>
<td>5</td>
<td>4.5</td>
<td>27.65</td>
<td>8</td>
<td>33.83</td>
</tr>
<tr>
<td>13</td>
<td>MyPay.kz</td>
<td>0.4</td>
<td>7.7</td>
<td>10</td>
<td>6</td>
<td>0</td>
<td>3.5</td>
<td>27.60</td>
<td>5</td>
<td>33.33</td>
</tr>
<tr>
<td>14</td>
<td>Kino.kz</td>
<td>1.55</td>
<td>8</td>
<td>0.5</td>
<td>9</td>
<td>5</td>
<td>3</td>
<td>27.05</td>
<td>5</td>
<td>33.13</td>
</tr>
<tr>
<td>15</td>
<td>VOXPOPULI</td>
<td>0.58</td>
<td>8.8</td>
<td>4.5</td>
<td>6</td>
<td>5</td>
<td>1.5</td>
<td>26.38</td>
<td>7.5</td>
<td>33.04</td>
</tr>
<tr>
<td>16</td>
<td>Sajde KZ</td>
<td>3.53</td>
<td>8.3</td>
<td>1.7</td>
<td>6</td>
<td>5</td>
<td>1.5</td>
<td>26.03</td>
<td>10</td>
<td>32.7</td>
</tr>
<tr>
<td>17</td>
<td>Air Astana</td>
<td>0.54</td>
<td>9.7</td>
<td>1.4</td>
<td>9</td>
<td>0</td>
<td>4.5</td>
<td>25.14</td>
<td>5.5</td>
<td>32.33</td>
</tr>
<tr>
<td>18</td>
<td>Ticketon</td>
<td>0.5</td>
<td>4.4</td>
<td>10</td>
<td>3</td>
<td>5</td>
<td>1.5</td>
<td>24.40</td>
<td>8.5</td>
<td>31.58</td>
</tr>
<tr>
<td>19</td>
<td>Taxi call</td>
<td>2.85</td>
<td>7.4</td>
<td>0</td>
<td>6</td>
<td>5</td>
<td>3</td>
<td>24.25</td>
<td>8</td>
<td>31.4</td>
</tr>
<tr>
<td>20</td>
<td>BeSmart</td>
<td>0.27</td>
<td>8.7</td>
<td>1.9</td>
<td>6</td>
<td>5</td>
<td>1.5</td>
<td>23.40</td>
<td>6</td>
<td>30.55</td>
</tr>
<tr>
<td>21</td>
<td>Egov.kz</td>
<td>0.41</td>
<td>8.4</td>
<td>0.5</td>
<td>9</td>
<td>0</td>
<td>4.5</td>
<td>22.81</td>
<td>8</td>
<td>30.53</td>
</tr>
<tr>
<td>22</td>
<td>Sozdik.kz</td>
<td>1.5</td>
<td>9.2</td>
<td>1</td>
<td>6</td>
<td>0</td>
<td>5</td>
<td>22.70</td>
<td>7.5</td>
<td>30.31</td>
</tr>
<tr>
<td>23</td>
<td>Abay - Book of words</td>
<td>0.23</td>
<td>7.9</td>
<td>0.3</td>
<td>6</td>
<td>5</td>
<td>3</td>
<td>22.43</td>
<td>9</td>
<td>30.28</td>
</tr>
<tr>
<td>24</td>
<td>Halyk</td>
<td>0.08</td>
<td>9.7</td>
<td>2</td>
<td>6</td>
<td>0</td>
<td>4.5</td>
<td>22.28</td>
<td>6</td>
<td>28.77</td>
</tr>
<tr>
<td>25</td>
<td>Mp.kz - Tenders and government purchases</td>
<td>0.08</td>
<td>9.3</td>
<td>0</td>
<td>6</td>
<td>5</td>
<td>1.5</td>
<td>21.88</td>
<td>7.5</td>
<td>28.05</td>
</tr>
</tbody>
</table>
According to the applications rating’s results a rating of mobile developers has been created (Table 3.4).

**Table 3.4. Rating of mobile application developers in Kazakhstan**

<table>
<thead>
<tr>
<th>Rating position</th>
<th>Company name</th>
<th>Applications from the rating Top 30 (Position in the rating Top 30)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Crystal Spring</td>
<td>Pit-Stop.kz (5), Point+ Казахстан (7), BTA Insurance (28), MP.KZ (25)</td>
</tr>
<tr>
<td>2</td>
<td>Beemobile</td>
<td>Kiwi (4), Kino.kz (14),</td>
</tr>
<tr>
<td>3</td>
<td>iBEC Systems</td>
<td>Chocolife.me (12), VoxPopuli (15)</td>
</tr>
<tr>
<td>4</td>
<td>Intervale</td>
<td>MyPay.kz (13), Halyk (24)</td>
</tr>
</tbody>
</table>

According to the rating results an attempt was made to determine market trends and the following conclusions were made:

1. There are no paid applications among the top 30 mobile applications. Currently this indicates the absence of tendency to monetize this trend in Kazakhstan.
2. Until recently most of mobile applications were continuations of relevant online versions, but now independent applications start to appear and also show strong marks.
3. Among the developers there is commitment to the platform Android.
4. Many owners of mobile applications including big companies do not appropriately appreciate the relevance of mobile development and they almost do not count a number of active users. For this reason not all applications were considered in this rating.
5. It was noticed that more than a half of mobile projects is not created by programming companies, but created by individual developers. According to organizers, it indicates birth of the mobile applications market and its rapid growth can be planned in the near future.

### 3.3 Developers of mobile solutions

How it was noticed in the previous part 3.1, currently more than half of mobile applications are created not by companies of development, but by individual developers. Despite that, there are companies on mobile applications market of Central Asia countries, which have a strong position. Rating of developers from Table 4 can be a proof of this. Current part contains a list of major
companies, which carry on development of mobile applications, with names of platforms, for which applications are made (Table 3.5). The most used operation systems are Android and iOS. According to developers' evaluations, their relation can be estimated like 70/20. Although iOS is less popular, its audience is more active at purchase.

Table 3.5. Mobile application developers

<table>
<thead>
<tr>
<th>Organization/company name</th>
<th>Apps platform</th>
<th>Official web-site</th>
<th>Cooperation with companies/applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>the Republic of Kazakhstan</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crystal Spring</td>
<td>Android, iOS</td>
<td>crystalspring.kz</td>
<td>Halyk Bank, Sberbank, БТА Insurance, TemirBank, Nomad, ATF Bank</td>
</tr>
<tr>
<td>Bee Mobile</td>
<td>Android, iOS</td>
<td>beemobile.kz</td>
<td>BeSmart, Yvision, Kino.kz AO Kazkommersbank, Kiwi.kz, Radio NS</td>
</tr>
<tr>
<td>Intervale</td>
<td></td>
<td>intervale.kz</td>
<td></td>
</tr>
<tr>
<td>9buttons</td>
<td>Android, iOS, Windows Phone</td>
<td>9buttons.kz</td>
<td>Car Expenses, Handbook Galaxy Y Duos, BeeRoaming, ProDengi, NewsBox</td>
</tr>
<tr>
<td>Glatis</td>
<td>Android</td>
<td>glatin.kz</td>
<td></td>
</tr>
<tr>
<td>Rocket firm</td>
<td>Android, iOS, Symbian</td>
<td>rocketfirm.comhttp://rocketfirm.com/</td>
<td>Large consulting companies</td>
</tr>
<tr>
<td>Kaznetmedia</td>
<td>Android, iOS</td>
<td>kaznetmedia.kz</td>
<td>JSC «Fund of national commonwealth “SARMUK-KAZINA”Confederation of combat and strength sports, Altel, LLP Kcell, JSC Казахтелеком</td>
</tr>
<tr>
<td>Mobile Creators</td>
<td>Android, iOS</td>
<td>mobicreators.comhttp://mobicreators.com/</td>
<td>Great Coffee App, The Great Photo App</td>
</tr>
<tr>
<td>MobyDev</td>
<td>Android, iOS, Windows Phone</td>
<td>mobydev.kzhttp://mobydev.kz</td>
<td>JSC AirAstana, JSC MUIT, British Council, National bank of the Republic of Kazakhstan</td>
</tr>
<tr>
<td>Almas Adilbek</td>
<td>Android, iOS</td>
<td>mixdesign.kz</td>
<td>Kiwi 2.0, Abay. Book of words, Sajde KZ, Smart Memory</td>
</tr>
<tr>
<td>City Soft</td>
<td>Android, iOS, Windows Phone</td>
<td>citysoft.kz</td>
<td>participant of the «Park of Innovative technologies»</td>
</tr>
<tr>
<td>New Project</td>
<td>Android, iOS</td>
<td>newproject.kz</td>
<td>Asyl Mobile, RESMI MobileBroker, Friatec FIP Kazakhstan, Dots Catalog</td>
</tr>
<tr>
<td>Bimash</td>
<td>Android, iOS</td>
<td>bimash.kz</td>
<td>SozKomek</td>
</tr>
<tr>
<td><strong>the Republic of Kyrgyzstan</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>KG Mobile Apps</td>
<td>Android, iOS</td>
<td>facebook.com/apps.kg/<a href="http://facebook.com/apps.kg">http://facebook.com/apps.kg</a></td>
<td>Navigator UZ</td>
</tr>
<tr>
<td>Spalmalo</td>
<td></td>
<td>spalmalo.com</td>
<td>Baraktar, picypic</td>
</tr>
<tr>
<td>Amanjet</td>
<td></td>
<td>Amanjet.kg</td>
<td>SmartTaxi</td>
</tr>
<tr>
<td>MobiCom.kg</td>
<td>Android, iOS</td>
<td>mobi.on.kg</td>
<td>Naydi KG, Pattaya Tour</td>
</tr>
<tr>
<td>AVISA Web Solutions</td>
<td>Android</td>
<td>avisa.kg</td>
<td>Iyik (Ыйык) Quran</td>
</tr>
<tr>
<td>Yaros Business Solutions</td>
<td></td>
<td>yaros.kg</td>
<td>mobile solutions for business</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>the Republic of Uzbekistan</strong></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Info Xizmati (Brand.uz)</td>
<td>Android, iOS</td>
<td>brand.uz</td>
<td>Hazilkash, Credit Asia, Weather Navigator, Samarkand: Orient Dream, Bukhara: Orient Dream, Uzbek cuisine, Gudok.uz, New Millennium</td>
</tr>
<tr>
<td>Global Solutions</td>
<td>Android, iOS, Windows Phone</td>
<td>globalsolutions.kz</td>
<td>mobile applications for governmental bodies and commercial structures</td>
</tr>
<tr>
<td>mulokot.uz</td>
<td>Android</td>
<td>mulokot.uz</td>
<td>GAP Anor</td>
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<td>datasite.uz</td>
<td>no data available</td>
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<tr>
<td>Open Engine</td>
<td>Android, iOS, Windows Phone</td>
<td>oe.uz</td>
<td>no data available</td>
</tr>
<tr>
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<td>md.uz</td>
<td>no data available</td>
</tr>
<tr>
<td>SmartLab</td>
<td>Android, iOS</td>
<td>smartlab.uz</td>
<td>no data available</td>
</tr>
<tr>
<td>OzLab</td>
<td>Android</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crisp Keys</td>
<td>Android, iOS</td>
<td>crispkeys.com/<a href="http://crispkeys.com/">http://crispkeys.com/</a></td>
<td>Darakchi, News of Uzbekistan</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>the Republic of Tajikistan</strong></th>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>IT ideas</td>
<td>Android, iOS</td>
<td>itideas.tj</td>
<td>Asset management terminal for Ltd Management Adviser</td>
</tr>
<tr>
<td>Smart-Soft</td>
<td>Android</td>
<td>smart-soft.tj</td>
<td>SmartService, Mobile Taqvim, Tarjuma.tj, Market prices of Tajikistan</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th><strong>the Republic of Turkmenistan</strong></th>
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<tbody>
<tr>
<td>Gleb TM</td>
<td>Android, iOS, Windows Phone</td>
<td><a href="http://www.glebtm.us/http://www.glebtm.us/">www.glebtm.us/http://www.glebtm.us/</a></td>
<td>no data available</td>
</tr>
</tbody>
</table>
Some of developments are successful not only at the local market, but at the global space too. For example, The Great Photo App by Mobile Creators became "Editor's choice" in more than 100 countries, #1 top paid app in 19 countries and #1 top paid app in "Photo & Video" category in 43 countries. Furthermore, Great Coffee App by the same developers became "Editor's choice" in South Korea, #1 top paid app in 8 countries and #1 top paid app in "Food & Drinks" category in 30 countries. The application Navigator UZ by developers from Kyrgyzstan KG Mobile Apps occurred in top 5 free applications of Google Play in 2013.

3.4 Repositories for developers

During the study of mobile developments status in the countries of Central Asia no public repositories with source code for developers of mobile applications was find. However there are services, which embrace sets of open data.

For example, sets of open data for public open use were represented on the e-government site of Kazakhstan. For programmers it discovers opportunities for development of new applications, including mobile applications. Link of the open data portal: data.egov.kz. Every user without registration can search, download and use data sets, which are created by the government bodies and other organizations. There is a special section for developers.

For usable search data is distributed by the following categories: family, health, education, job search, social support, citizenship, out-migration and immigration, realty, dues and fees, legal help, transport and telecommunications, touring and sports, security. Moreover, the service presents applications developed with the sets of open data with descriptions and links for downloading. Currently a list of projects consists of 10 applications: Astana Project, Post offices, ATMfinder, AstanaExpert, Meken, Cultural Astana, AstanaPage, Kindergartens of Astana, Statistic of region, Kazakhstan people know. To trigger creation of applications in September of 2014 a press office of National Information Technologies announced a contest of mobile applications' development based on open data. Details of the contest are described in section MOBILE APPLICATIONS DEVELOPMENT CONTEST IN KAZAKHSTAN of this report. In sum, 24 projects participated in the contest. Results of the contest are available from the link.

On the 19 March, 2015 the Uzbekistan Portal of open data data.gov.uz starts functioning. The portal is published in two languages (Uzbek and Russian) and contains 363 data sets (June of 2015) by the following sections: territory, economics, health, education, population, transport, culture, ICT, realty, business.

The same work is executed in Tajikistan, the project name is Open Data Initiative Tajikistan: opendata.tj. It was created by the initiative of ICT4D.TJ magazine. The goal of the service is to collect in a single database all open public information for public access. There are round table discussions on the 15-16th of June 2015 in Dushanbe, they were dedicated to open data. During the discussions the results of study about preparedness to use open data in Tajikistan (April – June of 2015) were represented. The study demonstrated that for successful development of this project the government support is necessary. Full report is available from the link.

In Kyrgyzstan creation of the governmental open data portal also was announced data.srs.kg. The project is implemented with support of Global Bank and representation of the United Nations. It is one of the steps of transition to electronic government in 2017. Planned data categories: health, education, municipal services, statistics, environment.

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66 data.egov.kz
67 http://egov.yvision.kz/post/435437
68 data.gov.uz
69 opendata.tj
70 http://opendata.tj/2015/07/otsenka-gotovnosti-k-ispolzovaniyu-otkrytyih-dannyih-v-tadzhikistane/
71 http://data.srs.kg
72 http://www.vb.kg/doc/308853_v_kyrgyzstane_sozdadyt_portal_otkrytyh_dannyh_gosstrykyttr.html
3.5 Developments for people with special needs

Definite indicator of application market development and social structure of society is existence of social initiative. This chapter represents developments for people with special needs. Now there are not so many applications as such, but some of them are created in terms of preparation of diploma projects and master thesis.

MOBILE APPLICATION "MAP OF SOCIAL OBJECTS' ACCESSIBILITY"

Application "Map of social objects' accessibility" is made for people with wheelchairs and executed by developers from Kostanay. Mobile application, which is implemented by the programmers from the branch of the youth party's wing "Zhas Otan" within the project "Future without barriers", is developed to help people with special needs find information about accessible objects of city infrastructure all the country round: governmental institutions, objects of public health, education, social, sports, leisure and other objects.73

The application is filled in by inhabitants themselves. For this purpose it is necessary to take a photograph of a site, upload a photo, write a comment and evaluation and send this information. The application is free and available in App Store and Google Play. Screenshots of the app are represented in figures 3.1 - 3.3.

Application was already tested and put on in the territory of Kazakhstan74, at Google Play.75

UNIVERSITY MOBILE APPLICATION BY STUDENTS OF NAZARBAYEV UNIVERSITY

Another one mobile application for people with special needs was created by students of Nazarbayev University (Aisulu Izmailova, Alfiya Kulmuhanova, Akzharkyn Izbasarova, Aybek Ryskaliev), which participated in the student experience exchange program in Kerala (India) at the International Centre for Free and Open Source Software (ICFOSS)76.

The project includes a device fixed on a belt, which communicates with a smart phone. The application with a camera built in the device will "scan" surrounding objects in front of a man, and

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75 https://play.google.com/store/apps/details?id=kz.nurotan.map&hl=ru
send signals about obstacles. A user will be warned of obstacles with different tones of signals depending on their distance.

SURDO.KZ

The project description on the site says "Surdoserver is created to help the deaf people and all people wishing to get online access to resources of Kazakh gesture language and gesture languages of the world". The web application consists of the following parts: video, search and view system with gestures of Kazakh language, world alphabets, references to sites with other world gesture languages (international, American, German, etc.), songs, sayings and fairytales in gesture Kazakh language, education, dictionary. The project was completed with support of the Ministry of Education and Science of the Republic of Kazakhstan. The web application is published in three languages (Kazakh, Russian and English) and has its own YouTube channel. The screenshot is presented on Figure 3.4.

Fig. 3.4 – The project Surdo.kz

PROJECTS OF INTERNET AVENUE 2014

On the Internet Avenue 2014 the special section for problems of online services for people with special needs was established by the Ministry of labour and social protection. First of the proposed projects "Service of online surdotranslation" should allow deaf people to call surd translators for help in conversation. A user presses a button on the site, the system finds a free surd translator and he helps to translate. The system works like a video conference. Creators want to work with surd translators from different cities. They should have only access to Internet and a web camera.

Also the online system for ordering an inva-taxi (a special taxi for people with special needs) was presented. Now such taxis work in 20 cities of Kazakhstan and the offered system is created to facilitate the use of this service. The project was developed with sponsorship of the Association of Afghanistan war invalids in the Republic of Kazakhstan and it was offered to all inva-taxis for free.

Next project was proposed by "Namys" committee, which developed a cycle of webinars for people with special needs. Webinars explain particularities of lawmaking and governmental support.

HEALTH-MONITORING SYSTEM FOR PEOPLE WITH SPECIAL NEEDS

A great deal of research has been done on home health monitoring. The main motivation for this project was the possibility to create a functional health-monitoring system (like heart-rate, body mass and BMI monitoring, detection of emotions and heart-attack) that has not been implemented before, at least not for commercial use. A system that could be tested on a specific user case that was eager to test such a system. The medical personnel involved in the specific user

77 Surdo.kz
78 http://www.e-event.kz/olnajn-servisy-dlya-lyudej-s-povyshennymi-potrebnostyami
case were also positive about such a solution, which meant that they had faith that the system could improve people’s life. The goal of this project is to help elderly and disabled people maintain healthy lifestyles as well as independent living in their places. Disabled or elderly people can be healthier if they participate in daily activities, attain relevant health information and timely interact with caregivers through a new model of health-care system. Elderly and disabled people can educate themselves with some useful information about their health issues or healthy habits which they can incorporate into their daily routines by using this system. They can be more proactive in their health lifestyle by monitoring and getting a feedback on their health conditions and daily routines. Lastly, the system enables the elderly/disabled people to be a part of the community so that they can enhance their social well-being, along with physical and mental well-being.

Fig. - 3.5 - Application screenshot

The developer of this system also belongs to this category of people, this year he received his Master degree in Computer Systems and Software Engineering at International IT University.

TRAINING OPPORTUNITIES FOR PEOPLE WITH SPECIAL NEEDS

The main goal of modern society is social and labour adaptation of people with special needs. Nowadays this problem has a special attendance in Kazakhstan, government’s policy is destined for education and work. Several special needs organizations are ready to become a ground for mobile ICT trainings: "Zhiger", "Sharapat", "Kenes". Each of them uses training methods and they are ready to introduce mobile ICT for their focus groups with given needs. For example, in the "Zhiger" organization there are two programmers. Contacts of these organizations are given in Table 3.6.

Table 3.6 - Special needs organizations

<table>
<thead>
<tr>
<th>Organization</th>
<th>Contact person</th>
<th>Address</th>
<th>Contact data</th>
<th>Additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Youth organization of people with disabilities «Sharapat»</td>
<td>Raushan Temirbekovna Mamanbay evac hairman</td>
<td>Gogolya str., 111 (Damu foundation building, room 627)</td>
<td>87057272416, <a href="mailto:moisharapat@mail.ru">moisharapat@mail.ru</a></td>
<td>own training centre for 10 people</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><a href="mailto:moisharapat@mail.ru">moisharapat@mail.ru</a></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><a href="mailto:docent6@rambler.ru">docent6@rambler.ru</a></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>600 active members</td>
<td></td>
</tr>
<tr>
<td>Youth organization of people with disabilities «Жигер»</td>
<td>Farhat Yusupzhanov, chairman</td>
<td>muratbayeva str., corner Bogenbay batir str.,214 (building of Republican Library)</td>
<td>87055318485, <a href="mailto:docent6@rambler.ru">docent6@rambler.ru</a></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><a href="mailto:docent6@rambler.ru">docent6@rambler.ru</a></td>
<td></td>
</tr>
</tbody>
</table>
3.6 Conclusion of part 3

Though mobile applications market of Central Asian countries are at the initial level of development, it is developing according to global trends, has positive dynamics and by expert estimates its rapid growth can be expected in the nearest future. One of the peculiarities, which denotes this is the fact that currently more than a half of mobile projects are not created by companies of development, they are created by individual developers.

However some problems exist. The results of "Top 30 mobile applications of Kazakhstan" rating indicated absence of tendency to monetize this trend. Often developers create and promote projects at their own expense and despite this the number of individual interesting projects is increasing. Mobile applications market of Central Asian countries become attractive for investors, but many big companies still evaluate this trend quite skeptical and do not see the ways to enhance company operations and income with help of local mobile applications.
4 Conclusion

The UNESCO 2007 Conference in Dushanbe stated the priority directions of Free Open-Source Software (FLOSS) development: education, culture and access to the information remaining in the field of UNESCO competence in Central Asia.

Mobile technology is one of the key elements of ICT development in the country, which could contribute to the growth of the labor market especially among young people and persons with disabilities.

Along with this, UNESCO pays great attention to teaching the basics of mobile application programming for sustainable development. This program is a part of UNESCO activities in the framework of YouthMobile initiative, based upon experience of numerous worldwide initiatives that aim to promote computer science and programming among young people.

YouthMobile education activities aim to widen the scope of rights and opportunities for young people, to empower their skills and development prospective and to promote mobile applications on the local markets, as the type of employment in the fast-growing ICT sector at national and global levels.

For Central Asia republics and Kazakhstan development and application of open-source solutions and data is most important as the biggest part of population in these republics live in remote areas away from regional and municipal centers, and is poorly provided with traditional tutorial and outreach resources.

Nowadays these republics experience remarkable progress in use of ICT technologies, especially in the domain of mobile communications. Often the prime movers of these changes become national authorities, international organizations, NGOs or physical entities. Developing ICT tools create new channels of communications and interaction between the government and the population, involvement of the population into monitoring of the state authorities and suppliers of state and municipal services, and back-feed opportunity related to service quality and voting right in decision making process at the state level.

With regard to achieve these farming aims it is necessary to develop regional market of mobile applications.

The market of mobile applications in Central Asia and Kazakhstan is becoming attractive for investors, nevertheless a lot of large companies continue estimating this field rather skeptically and do not see the ways to enhance their operations and profits on account of local mobile applications. Often programmers develop and promote their projects at their own expense. To confirm this, research results have shown an absence of monetization trend for this area of ICT. 

According to the research, currently the market of mobile applications consists more of individual developers, than companies (although they also exist). By expert estimates, this fact indicates the initial stage of market development and its substantial growth in the nearest future. Often employers in developing companies confirm a lack of qualified developers of mobile applications and appropriate education at the present time.

For education of young professional workforce of mobile apps oriented programmers Central Asian states should make some more steps that will update this process to a corresponding level of the market.

Currently in such Central Asian states, as the Republics of Kazakhstan, Kyrgyzstan, Uzbekistan and Turkmenistan the process of training in programing for mobile devices is mostly provided by private educational courses, usually held by organizations or individuals (The list of courses is given in Appendix 2. The summary table of training courses).

Central Asian states actively develop electronic resources for learning as for instance electronic libraries and educational or data portals.

(The list of open electronic library with resources for learning mobile programming is given in Table 2.) Conducts free seminars and trainings aimed to acquaint the participants with the basics
of mobile programming, software and products which provide rapid application development. An important trend is the possibility to pass free courses on educational portals such as Coursera, CodeAcademy, INTUIT, and others. For example, the portal Coursera registered about 18 courses related to mobile programming, and INTUIT offers 9 courses.

Despite the fact that the materials of many educational courses are not available to everyone in the public domain, there is a sufficient number of free tutorials available on the Internet.

A particular problem is the fact that almost all the educational courses are concentrated in the big cities like Astana and Almaty (in Kazakhstan), Tashkent (Kyrgyz Republic), Bishkek (Republic of Uzbekistan). However, in spite of the good abundance of courses, there is the lack of them in the national languages. For example, on Coursera only one course of Creative Programming for Digital Media & Mobile Apps (University of London) is available in English with Kazakh subtitles (English & Kazakh subtitles).

This deficit offers regional developers a unique opportunity of creation or adaptation of high-quality educational content in local languages.

Despite the fact that mobile programming is actively promoted and developing in Central Asian states, there is no national environment or framework for development, such as AppsBuilder for instance.

Today is a time of mobile devices and IoT. The necessity for various mobile applications is keep growing. But not always this application should be complex project, sometimes only few functions are required. So for these goals every user of internet can find a numerous web based applications, which help to create simple mobile application without technical or programming knowledge. In Appendix 3 given the list of valid web applications, which purposed to create mobile applications.

At the same time, a large number of activities aimed at increasing the motivation of young programmers in developing mobile applications, to familiarize them with the latest development environments and technologies, especially in recent years.

Nowadays contests are becoming the most available and the most popular tool of teaching young developers mobile programming basics and distinguishing the most gifted ones. In this case organizing free conferences, workshops, master classes and contests devoted to mobile app development seems to be reasonable. That is why UNESCO found it necessary to analyze such kind of contests in order to give profound and detailed understanding of the mobile market status in Central Asia region. It would be a good idea for UNESCO to act as an organizer or to support a contest of mobile applications with social orientation. This contest may include different categories such as «for people with special needs», «for vulnerable groups», «healthy lifestyle and sport», etc. Participants of a competition can use portals with open data, which were mentioned in 3.4 Repositories for developers.

It is quite evident that if in 2011 the organizers were presented by local communities as for example GTUGs (Google Technology User Groups), in 2012 there was a dramatic change. In most of the cases such organizations as Microsoft regional offices started offering their services and sometimes organized the contests themselves.

The most active organizations are Soros regional offices, Microsoft regional offices and Internews regional networks.

To sum up it is possible to claim that within 4 years there was a dramatic change. Firstly, if we compare the number of partners and organizers in 2011 and in 2015, we can notice that till the 2014 there was observed steady growth, but starting from the 2014 the number has grown rapidly. The same may be said concerning the number of participants and startups.

Moreover, along with these conclusions it is possible to notice the increasing usage of the open source data during the events. For example, during the mobile applications development contest organized by the JSC “NIT”, where all the participants were to develop their project for iOS (version 6 +) or Android (version 4 +) platforms using open source data launched on the data.gov.kz portal with the help of API.
The same is true about the open data hackathon in Kyrgyzstan, where the main theme was development of social projects with help of open source data. The hackathon main task is to learn media, social workers and developers to work together with open source data in order to create socially useful projects, such as mobile applications, analytical and informative articles, interactive cards and etc. Trainers and mentors from the USA, Israel and Russia participated to this hackathon in order to consult and train participants. This shows not only the increasing importance of open source data but also the increasing efficiency of mobile applications and open data.

To sum up, all the given evidences make it possible to claim that if few years ago mobile applications contest were to teach student mobile programming basics, nowadays they become more sophisticated and focus on social and commercial potential of projects. The developers, especially the young ones are steadily moving towards effective usage of open sources and are starting to integrate their projects with cloud solutions and consequently, are getting more opportunities to promote their software.

In this case, we can confirm that mobile events are an essential part of modern ICT education, and lead to economical prosperity, firstly, because they make students get acquainted with very vast market of mobile applications, secondly, because they provide students with all the tools not only to develop their applications using open source data, but also motivate them to use cloud solutions, SaaS models, etc., and finally, because such contests are revealing social an economic problems, thus making developers and the society as a whole, think of its most vulnerable members, i.e. people with special needs.

Thus, economic and social effectiveness of mobile market in general, and mobile events particularly is undoubtful for all the reasons, facts and evidences that we mentioned and revealed above.
Appendix 1. The curriculum of discipline "Programming for Mobile Devices"

Course name: Programming for Mobile Devices
Total hours: 75 hours
Type of educational institution: College

Course goals:
The course focuses on the design and creation of software for mobile devices based on a wide range of operating systems as iOS, Android and Windows Phone 7. During the course, students will become familiar with the development of applications for mobile devices based on these operating systems.

Prerequisite:
Students taking this course should already be familiar with the paradigm of object-oriented programming, the syntax of the C-like languages (JAVA, C#, C++, Objective C) and have a basic knowledge of the use of graphical software development tools, compilers and debuggers.

Post requisite:
The development of the network applications for mobile devices.

Knowledge and skills:
Upon completion of the course, students will be able to develop applications and programs for different platforms and devices running under operating systems as like, Android, iOS, Windows Phone.

Topics of lectures:
1. Introduction into mobile devices.
2. “Anatomy” of mobile devices.
3. Operation system iOS Apple.
4. Model-View Controller.
5. Operation system Android.
6. Introduction into development of software for mobile devices
7. Graphical User Interface in mobile devices.
8. Operation system Windows Phone.
10. Basics of processing, collecting and storing of data on mobile devices.
11. Content providers.
12. Work with touch on different mobile devices.
13. Processing of images, audio and video.
14. Optimizing of mobile applications.

Topics of laboratory works and practical classes:
1. Preparation of the working space for the development of Android OS application, installation and configuration of SDK. Creating of the first application for the Android OS.
3. Support for multiple devices: language, permits, and different versions of the platform.
4. The dynamic user interface. Work with templates of interfaces.
5. Interaction with other applications and devices.
6. Acquaintance and configuration environment XCODE on Mac OS X. The first application for iOS.
7. Work with threads and memory blocks.
8. User interfaces
10. Interaction with other applications and devices.
11. Acquaintance with software development for mobile devices on the MS Visual Studio, configuration SDK. The first application for Windows Phone 7.
13. The user interface, work with templates.
15. Interaction with other applications and devices.

**Hours per week:**
- Lectures – 1 hour;
- Laboratory work – 3 hours;
- Students’ independent works with tutor (SIWT) – 1 hour;

The approximate lectures outline:
- The teacher must provide information on a given topic. Respond to questions from the students during the lectures.

The approximate laboratory works outline:
- The teacher gives the task to be performed by students. Answers students’ questions during the class. Monitor the safety of the work and records the tasks. Evaluates the performance of tasks.

The approximate SIWT outline:
- The teacher should answer students' questions. The teacher can conduct a quiz on the studied material.
## Appendix 2. The summary table of training courses

<table>
<thead>
<tr>
<th>№</th>
<th>Organisation name</th>
<th>Web page</th>
<th>Education type</th>
<th>The issuance of certificate</th>
<th>Age restriction</th>
<th>Work experience</th>
<th>Language of training</th>
<th>The format and accessibility of training material</th>
<th>Ensure of technical training facilities</th>
<th>The practice of teaching in other countries</th>
<th>Education fee</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The Republic Of Kazakhstan</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Summer school: courses of programming in C++/Java/Android/i OS</td>
<td>Not available</td>
<td>In groups</td>
<td>-</td>
<td>15 – 35 years</td>
<td>2 year</td>
<td>Russian and Kazakh</td>
<td>printed copies of materials, not available to free access</td>
<td>not</td>
<td>no</td>
<td>paid</td>
</tr>
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<td>2</td>
<td>Educational center KNEWIT</td>
<td><a href="http://knewit.kz/">http://knewit.kz/</a></td>
<td>In a group, independently.</td>
<td>certificate</td>
<td>14 – 35 years</td>
<td>3 year</td>
<td>Kazakh, Russian and English</td>
<td>digital and printed copies of materials, not available to free access</td>
<td>computers</td>
<td>no</td>
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</tr>
<tr>
<td>3</td>
<td>BAS UNIVERSITY center for training and Certification</td>
<td><a href="http://www.bas.kz/university/">http://www.bas.kz/university/</a></td>
<td>In a group, individually, independently.</td>
<td>Certificate of Android ATC, Сертификаты Oracle, CCNA, CCNP</td>
<td>18 + since 2009 year</td>
<td>Kazakh, Russian and English</td>
<td>digital and printed copies of materials, available to free access</td>
<td>completely equipped classrooms</td>
<td>no</td>
<td>paid</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Training center Intellection</td>
<td>Intellection.kz</td>
<td>In a group, independently.</td>
<td>certificate</td>
<td>15 – 35 years</td>
<td>1 year</td>
<td>Kazakh, Russian and English</td>
<td>digital and printed copies of materials, not available to free access</td>
<td>providing of each student with Mac Mini</td>
<td>no</td>
<td>paid</td>
</tr>
<tr>
<td>5</td>
<td>Experiment: Be Zuckerberg</td>
<td><a href="http://idea-lab.kz/.../Stan-tsarekbergomy">http://idea-lab.kz/.../Stan-tsarekbergomy</a></td>
<td>В группе, Молодёжная творческая организация</td>
<td>certificate</td>
<td>15 – 35 years</td>
<td>1 year</td>
<td>Kazakh, Russian and English</td>
<td>digital and printed copies of materials, not available to free access</td>
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<td>free</td>
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<td>Computer Academy STEP</td>
<td><a href="http://itsstep.kz/">http://itsstep.kz/</a></td>
<td>In the group individually, independently</td>
<td>International diploma of Academy STEP,</td>
<td>9 – 14 years – Junior Academy,</td>
<td>since 1999 year</td>
<td>Kazakh, Russian and English</td>
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<td>in 12 countries all over the world</td>
<td>paid</td>
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<td></td>
<td>Educational center UpGrade</td>
<td><a href="http://upgrade-de-uk.kz/">http://upgrade-de-uk.kz/</a></td>
<td>In the group individually. There are special offers for people with disabilities.</td>
<td>State certificate</td>
<td>15+ since 2012 year</td>
<td>Kazakh, Russian</td>
<td>digital and printed copies of materials, not available to free access</td>
<td>completely equipped classrooms</td>
<td>no</td>
<td>paid</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---------------------------</td>
<td>--------------------------</td>
<td>--------------------------------------------------------------------------------</td>
<td>------------------</td>
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<td>----------------</td>
<td>-------------------------------------------------</td>
<td>---------------------------------</td>
<td>----</td>
<td>-----</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Summer Startup School: create an original iPhone-app within 8 weeks</td>
<td><a href="http://thesummerstartupschool.com/">http://thesummerstartupschool.com/</a></td>
<td>In a group, individually, independently. Competitions and creative evenings.</td>
<td>certificate</td>
<td>14+ 1 year</td>
<td>Kazakh, Russian and English</td>
<td>digital and printed copies of materials, not available to free access</td>
<td>no</td>
<td>no</td>
<td>paid</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Google Developer Group Almaty (GDG)</td>
<td><a href="https://vk.com/edgalmaty">https://vk.com/edgalmaty</a></td>
<td>Trainings and seminars, a creative meeting</td>
<td>no</td>
<td>15+ since 2011 year</td>
<td>Kazakh, Russian and English</td>
<td>digital</td>
<td>no</td>
<td>no</td>
<td>free</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>EPAM SYSTEMS</td>
<td><a href="http://www.epam.kz">http://www.epam.kz</a></td>
<td>Trainings and seminars</td>
<td>certificate of EPAM Systems</td>
<td>20+ since 1993 year</td>
<td>Kazakh, Russian and English</td>
<td>digital and printed copies of materials, not available to free access</td>
<td>completely equipped classrooms</td>
<td>Russian F., Kazakhstan R., USA</td>
<td>free</td>
<td></td>
</tr>
</tbody>
</table>

### The Republic of Kyrgyzstan

<table>
<thead>
<tr>
<th></th>
<th>National IT Center</th>
<th><a href="http://www.it.kg/">http://www.it.kg/</a></th>
<th>In a group, individually</th>
<th>certificate</th>
<th>18+ since 2004 year</th>
<th>Russian, Kyrgyz</th>
<th>digital and printed copies of materials, not available to free access</th>
<th>completely equipped classrooms</th>
<th>нет</th>
<th>paid</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Aiperi Technology Meetup &amp; Google Developer Group Bishkek</td>
<td>no</td>
<td>Training</td>
<td>no</td>
<td>15+</td>
<td>Russian, Kyrgyz</td>
<td>digital copies</td>
<td>no</td>
<td>no</td>
<td>free</td>
</tr>
<tr>
<td>3</td>
<td>Fund &quot;Soros-Kyrgyzstan&quot;</td>
<td><a href="http://soros.kg/">http://soros.kg/</a></td>
<td>In a group, individually</td>
<td>certificate</td>
<td>18+ since 2001 year</td>
<td>digital and printed copies of materials, not available to free access</td>
<td>completely equipped classrooms</td>
<td>branches of funs all over the world</td>
<td>paid</td>
<td></td>
</tr>
</tbody>
</table>

### The Republic Of Uzbekistan

<p>|   | IT-Agency Info Xizmati | <a href="http://brand.uz/">http://brand.uz/</a> | In a group, individually, on their own. Trainings | certificate | 18+ 2 years | Russian | digital and printed copies of materials, not available to free access | completely equipped classrooms | no | paid |</p>
<table>
<thead>
<tr>
<th></th>
<th>Educational Institution</th>
<th>Website</th>
<th>Type</th>
<th>Age</th>
<th>Certification</th>
<th>Languages</th>
<th>Materials Access</th>
<th>Classrooms</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>BePro Education Center</td>
<td>-</td>
<td>In a group, individually, independently</td>
<td>certificate</td>
<td>18+</td>
<td>since 2005 year</td>
<td>Uzbek, Russian, English</td>
<td>digital and printed copies of materials, not available to free access</td>
<td>completely equipped classrooms</td>
</tr>
<tr>
<td>3</td>
<td>Educational center «JahonStudy»</td>
<td><a href="http://jahonsstudy.uz/">http://jahonsstudy.uz/</a></td>
<td>In a group, individually, independently</td>
<td>certificate</td>
<td>15+</td>
<td>Uzbek, Russian</td>
<td>digital and printed copies of materials, not available to free access</td>
<td>completely equipped classrooms</td>
<td>no</td>
</tr>
<tr>
<td>4</td>
<td>Independent Educational Institution &quot;CHIRCHIQ ILM OSIYO MASKANI&quot;</td>
<td><a href="http://azizbek.uz/">http://azizbek.uz/</a></td>
<td>In groups</td>
<td>certificate</td>
<td>no restrictions</td>
<td>since 2005 year</td>
<td>Uzbek, Russian</td>
<td>digital and printed copies of materials, not available to free access</td>
<td>completely equipped classrooms</td>
</tr>
<tr>
<td>5</td>
<td>Training of Ucell in cooperation with Qualcomm</td>
<td>-</td>
<td>Training</td>
<td>certificate</td>
<td>no restrictions</td>
<td>2013</td>
<td>Uzbek, Russian</td>
<td>no</td>
<td>no</td>
</tr>
</tbody>
</table>

68
### Appendix 3. Valid web applications purposed to create mobile applications

<table>
<thead>
<tr>
<th>№</th>
<th>Name</th>
<th>Web page</th>
<th>Based platform</th>
<th>Focused mobile platform</th>
<th>Cost</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Appmakr</td>
<td>appmakr.com/</td>
<td>Web</td>
<td>Apple iOS</td>
<td>$999, Free if submit app in store</td>
<td>Web-based application that helps to create applications for iPhone quickly and easily</td>
</tr>
<tr>
<td>2</td>
<td>AppsBuilder</td>
<td>apps-builder.com/</td>
<td>Web</td>
<td>Native iOS, Native Android,</td>
<td>$15$/m</td>
<td>Application and web applications development in 3 steps for android, iPhone, iPAD and tablets. The ability to insert images, videos, music and more others.</td>
</tr>
<tr>
<td>3</td>
<td>Bizness Apps</td>
<td><a href="http://biznessapps.com/">http://biznessapps.com/</a></td>
<td>HTML5</td>
<td>iOS, IPad, Android</td>
<td>$39/ m</td>
<td>This application is a simple and affordable solution for businesses to create and manage applications for the iPhone, iPad, Android</td>
</tr>
<tr>
<td>4</td>
<td>Buildanapp</td>
<td><a href="http://buildanapp.com/">http://buildanapp.com/</a></td>
<td>Web</td>
<td>iOS, Android, Blackberry, Mobile</td>
<td>$49 for Android Publication, $149 for appstore</td>
<td>Build application in six simple steps. Creation of applications for iPhone, BlackBerry, Windows Mobile, Android, and mobile Internet</td>
</tr>
<tr>
<td>5</td>
<td>Buzz Touch</td>
<td><a href="http://buzztouch.com/">http://buzztouch.com/</a></td>
<td>Web</td>
<td>Apple iOS, Android</td>
<td>Free</td>
<td>Buzztouch is an open source &quot;app engine&quot; that powers tens of thousands of iPhone, iPad and Android applications. Buzztouch is used in conjunction with the iOS and Android software developer kits (SDK's).</td>
</tr>
<tr>
<td>6</td>
<td>iBuildApp</td>
<td><a href="http://ibuildapp.com/">http://ibuildapp.com/</a></td>
<td>Web</td>
<td>iOS (Android to come, mobile sites in development)</td>
<td>Free</td>
<td>iBuildApp, a free Do It Yourself platform for building native mobile application, allows individuals, publishers and corporations to create, customize and manage their own iPhone/iPad/Android application via online application creation engine and host in CMS. User-friendly interface makes it easy and affordable for any business to create and manage mobile applications. iBuildApp developed a mobile community to create mobile prilozheniy.ations.</td>
</tr>
<tr>
<td>7</td>
<td>iFactr</td>
<td><a href="http://ifactr.com/">http://ifactr.com/</a></td>
<td>Web</td>
<td>iOS, Android, WM7, Palm, Desktop</td>
<td>Free</td>
<td>Build Breakthrough apps. With it’s single codebase, amazing futures, and abstract UI model, iFactr is the framework for cross-platform application deployment</td>
</tr>
<tr>
<td>8</td>
<td>Magmito</td>
<td><a href="http://magmito.com/">http://magmito.com/</a></td>
<td>Web</td>
<td>Symbian, Java, Blackberry, Droid, Windows, iPhone</td>
<td>FREE with advertising, $399 without</td>
<td>Easy to usMagmito Application Developer Certification Programe (web-based), fully functional (video, RSS, mobile coupon, tell-a-friend viral component, map, feedback forms), variable distribution (auto generated QR code for each app, GetJar app store integration, Facebook posting, built in SMS engine). WINNER of Frost &amp; Sullivan Best Enabling Mobile Tech of Year award, Scandinavia Best Business Mobile Solution and 2010 MobileTrax Best App Creation Tool for Marketing</td>
</tr>
<tr>
<td>9</td>
<td>Mippin</td>
<td><a href="http://mippin.com/">http://mippin.com/</a></td>
<td>HTML5</td>
<td>iOS Apple, Android, Nokia, Blackberry, Samsung and Sony Ericsson</td>
<td>Free</td>
<td>Create high-quality mobile apps. Build branded app Delivered news from website, posts from blog or images from photo collection</td>
</tr>
<tr>
<td></td>
<td>App Name</td>
<td>URL</td>
<td>Platform(s)</td>
<td>Price</td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>---</td>
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<td>------------------------------</td>
<td>-------------------</td>
<td>-------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>MobiCart</td>
<td><a href="http://mobicart.com/">http://mobicart.com/</a></td>
<td>HTML5</td>
<td>Free open source</td>
<td>MobiCart is a free and simple way to build and manage m-commerce store as a native or web app. MobiCart works on its own, or link it up to an existing website. MobiCart is a startup that is taking m-commerce to a new level of personalization by enabling anyone to quickly deploy a native storefront application on mobile devices. MobiCart is a completely free solution that combines a customized application development platform with an online ecosystem for sharing extensions.</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Mobile Store Maker</td>
<td><a href="http://mobilestoremaker.com/">http://mobilestoremaker.com/</a></td>
<td>Web</td>
<td>$110 - $215 /m</td>
<td>Mobincube is a website that allows anyone with no technical knowledge to develop advanced applications for mobiles and smartphones due to its visual interfaces.</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Mobincube</td>
<td><a href="http://mobincube.com/">mobincube.com/</a></td>
<td>Web</td>
<td>2.99 – 99.99€ /m</td>
<td>Mobincube is a website that allows anyone with no technical knowledge to develop advanced applications for mobiles and smartphones due to its visual interfaces.</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>MobiFolder</td>
<td><a href="http://www.mobify.com/">http://www.mobify.com/</a></td>
<td>Web</td>
<td>$300 + $49.95/m</td>
<td>The MOST powerful iPhone app builder. User-friendly interface makes it easy and affordable for any business to create and manage mobile applications.</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>MoSync</td>
<td><a href="http://www.mosync.com/">http://www.mosync.com/</a></td>
<td>Apple, Android, WinMobile 5, 6, Symbian 2.3 &amp; 5 ed, j2me, Moblin 2.x.</td>
<td>Dual licensed open source GPL / commercial starts at €199 per year allowing closed sourced apps.</td>
<td>MoSync transforms a single C/C++ source code into native binary executables, integrated w. Eclipse. Based on open standards. MoSync is developed by a dedicated and enthusiastic team of developers who are committed to making the development of mobile applications faster, easier, and more cost-efficient.</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>My App Builder</td>
<td><a href="http://myappbuilder.com/">http://myappbuilder.com/</a></td>
<td>Web</td>
<td>$ 29/m</td>
<td>My App Builder uses Phonegap framework which allows to create apps using standardized web APIs for the platforms as iOS and Android.</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>NS Basic</td>
<td><a href="https://www.nsbasic.com/">https://www.nsbasic.com/</a></td>
<td>iOS, Android, Blackberry, WebOS</td>
<td>$99.95</td>
<td>NS Basic/App Studio is a complete development environment to develop apps on Windows for mobile devices. Programming language is a large subset of Visual Basic or JavaScript. Use Geolocation and Google Maps, WebKit, HTML5 features, royalty free distribution, Lots of sample code, 200 page Handbook. Can be used with PhoneGap.</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>PhoneGap</td>
<td><a href="http://phonegap.com/">http://phonegap.com/</a></td>
<td>HTML5</td>
<td>Open source, free</td>
<td>PhoneGap is an HTML5 app platform that allows to author native applications with web technologies and get access to APIs and app stores. PhoneGap leverages web technologies developers already know best… HTML and JavaScript.</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Roambi</td>
<td><a href="http://roambi.com/">http://roambi.com/</a></td>
<td>Web</td>
<td>Free</td>
<td>Roambi is an innovative business app that transforms your company's reports and data into immersive mobile analytics that leave traditional</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>HTTP/URL</td>
<td>Platform</td>
<td>Features</td>
<td>Cost</td>
<td>Notes</td>
</tr>
<tr>
<td>---</td>
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<td>----------</td>
<td>----------</td>
<td>----------</td>
<td>------</td>
<td>-------</td>
</tr>
<tr>
<td>21</td>
<td>Sencha Touch</td>
<td><a href="https://www.sencha.com/">https://www.sencha.com/</a></td>
<td>HTML5</td>
<td>iOS Apple, Android</td>
<td>Free</td>
<td>Sencha Touch, the first HTML5 mobile JavaScript framework that allows to develop mobile web apps that look and feel native on iPhone and Android touchscreen devices, has just hit the big 1.0.</td>
</tr>
<tr>
<td>22</td>
<td>ShoutEm</td>
<td><a href="http://www.shoutem.com/">http://www.shoutem.com/</a></td>
<td>Web</td>
<td>iOS Apple, Android</td>
<td>Discount system depending on app quantity</td>
<td>Focused on taking web content and putting it on the phone. Easy to use interface, no technical background or knowing of coding required.</td>
</tr>
<tr>
<td>23</td>
<td>Socialight</td>
<td><a href="http://www.socialight.io/">http://www.socialight.io/</a></td>
<td>Web</td>
<td>iOS Apple</td>
<td>$500</td>
<td>Socialight gives an opportunity to publisher app, but it is part of the Socialight community. Socialight lets anyone build their own location-aware living map in minutes. It's as simple as starting a blog to create apps (including for iPhone) used by local experts to capture and share real world knowledge and experiences.</td>
</tr>
<tr>
<td>24</td>
<td>SpotSpecific</td>
<td><a href="http://spotspecific.com/">http://spotspecific.com/</a></td>
<td>Web</td>
<td>iOS Apple</td>
<td>Open source, free</td>
<td>Easy to use drag-drop-tool that allow to developers design and create native apps.</td>
</tr>
<tr>
<td>25</td>
<td>Sweb Apps</td>
<td><a href="http://swebapps.com/">http://swebapps.com/</a></td>
<td>Web</td>
<td>iOS Apple</td>
<td>$399 and up</td>
<td>Very similar to many of the other App Builder websites — pick from a series of features (RSS, Location, contact) assign them to buttons and go.</td>
</tr>
<tr>
<td>26</td>
<td>tersus</td>
<td><a href="http://www.tersus.com/">http://www.tersus.com/</a></td>
<td>Web</td>
<td>iOS Apple, Android</td>
<td>Free</td>
<td>Tersus development is 100% visual and codeless. No coding or scripting is needed. The diagram of the application (called «the model») defines it all: screen layout, rich client side behavior, and server side processes.</td>
</tr>
<tr>
<td>27</td>
<td>Trendy App Builder</td>
<td><a href="http://trendyflash.com/">http://trendyflash.com/</a></td>
<td>Web</td>
<td>iOS Apple, Android</td>
<td>$99 for premium</td>
<td>No knowledge of programming required to create stunning flash websites for mobile phones. Web site offers a large number of examples and templates for creating applications.</td>
</tr>
<tr>
<td>29</td>
<td>Unlimited Publishing</td>
<td><a href="http://www.unlimitedpublishing.com/">http://www.unlimitedpublishing.com/</a></td>
<td>Web</td>
<td>iOS Apple</td>
<td>Keep 70% of revenue</td>
<td>Web site where user can create books for mobile phone.</td>
</tr>
<tr>
<td>30</td>
<td>Wapple</td>
<td><a href="http://wapple.net/">http://wapple.net/</a></td>
<td>Web</td>
<td>Mobile</td>
<td>Free for personal, licensing options for commercial</td>
<td>Mobile Website Builder. Building a site using the leading mobile web technology products Canvas &amp; Architect.</td>
</tr>
<tr>
<td>31</td>
<td>Wirenode</td>
<td><a href="http://wirenode.com/">http://wirenode.com/</a></td>
<td>Web</td>
<td>Mobile Websites</td>
<td>0 – 259$/m depending on account type</td>
<td>Editor for creating web pages for mobile devices.</td>
</tr>
<tr>
<td>32</td>
<td>PapTap</td>
<td><a href="http://paptap.com/">http://paptap.com/</a></td>
<td>Web</td>
<td>Apple iOS or Android</td>
<td>Free</td>
<td>PapTap means Personal Application Processor in a Tap. It is a unique patent-pending combination of a super simple app creator and an “app catalog”.</td>
</tr>
</tbody>
</table>