

Marija Zahar Đorđević¹⁾
Nikola Komatina¹⁾
Nemanja Ignjatov²⁾

1) University of Kragujevac,
Faculty of Engineering, Serbia,
maja_199@yahoo.com,
nkomatina@kg.ac.rs

2) University of Vienna, Faculty
of Computer Science, Austria,
nemanja.ignjatov@univie.ac.at

ANALYSIS OF STARTUP COMPANIES AND PROJECTS IN THE REPUBLIC OF SERBIA

Abstract: *In this paper, the startup companies are analysed as well as their projects and an incentive for their development in Republic of Serbia. The programs and strategies of innovation development and development of innovative activities are presented, with an overview of the support programs for a new business starting in Republic of Serbia. Also, the paper analyzes startup projects approved by the Innovation Fund, which have been started in the period from 2011 to 2017. Comparing the support to the startup in Serbia and in European Union, an analysis of startup projects that are directly supported by European Commission was performed.*

Keywords: *Startup, innovations, ICT, recycling*

1. INTRODUCTION

Considering global trends, startup companies with variety of projects are increasingly emerging, i.e. projects and companies that appear with the aim to quickly expose themselves on market with some new or on innovative product. Their strategy is based on fast, often short-term success, which brings high profits. Some of the well-known startups that have created their distinctive brand and great earnings with their innovative products and services are *Apple, Google, Microsoft, eBay, Facebook, HP* and others. Startup companies are largely presented in ICT sector, and presented examples of startup companies confirm this.

The term startup may include different types of companies or projects. According to the legal regulations and law of the Republic of Serbia, the term startup includes all enterprises / projects that are in the initial stage of development, i.e. a business that is at the very beginning. Unlike the definition of startups in Serbia, in the European Union, under the term startup are meant companies/projects are based on innovations and improvement of existing technological solutions. So, in Serbia, all of the new companies or projects can be considered as startups, while in European Union they have to have an innovative basis, which is actually the essence of the startup. This gap between the different definitions of the startup concept can make the research much more complex, but it is certainly more correct to base itself on

researching startups that are supported by certain innovative and technologically advanced solutions.

Although the startup of the company is not only present in the field of ICT, many startup projects in some other areas rely on modern ICT technology. The most well-known and most profitable startup projects in the field of recycling are related to this technology. The newest and most successful startup projects around the world have been presented at the fair of new technologies for processing waste water, sewage, waste and raw materials (IFAT 2018) in Munich, e.g. projects such as the reclamation technology of multilayer plastic packaging (APK Aluminum and Kunststoffe AG from Germany), a vehicle for waste collection with precise navigation (Enway GmbH from Germany), as well as technology for reducing energy consumption in filtering drinking water (Sani Membranes from Denmark) [1].

Looking at the world trends and the importance of the development of startup companies, which can represent the engine of the development of the most developed countries, Serbia has also begun to cultivate and support their progress.

2. SUPPORT FOR STARTUP COMPANIES AND PROJECTS IN EU MEMBER STATES

In European Union (EU) startup projects are recognized as key drivers of the economy.

The European Union provides support to the development of startup companies through the Startup Europe organization, which is under the auspices of the European Commission (EC), which greatly facilitates the operations of selected companies and helps overcome initial problems at the very beginning of the development of a business idea. Startup Europe under the startup considers projects/companies of the following characteristics [2]: 1) the project is not older than 10 years; 2) the project is based on a highly new technology or new business model; and 3) hiring new staff or striving to increase the earnings of existing ones. Thus, the EU does not finance exclusively new projects, but also projects that are already in the development phase, but with the tendency to improve the performance of operations. According to the data of this organization, the average "age" of startup projects that have been applied and supported

by Startup Europe is 2.5 years.

Startup Europe organization has issued two statistical reports on the success of startup projects in the EU [2,3]. In 2015, 2,365 startups were launched in the EU, while 2,515 is started in 2016, which shows an increased interest in support for this organization. The main task of Startup Europe is to link a startup companies and their projects with a potential stakeholders. The survey was conducted in 28 EU countries and Israel, which is included in this program. According to the report for 2016, the most startups in these countries were in the field of IT and software development, or 15% of the total number of startups. Slightly fewer startups were launched in the area of software development as a service (12.2%), and industrial technology, manufacturing and hardware (8.3%). Table 1 shows the share of various startups in different areas expressed in percentages [3].

Table 1 - The share of startup projects by areas expressed in percentages

Sector	Percentage	Sector	Percentage
<i>IT and software development</i>	15,0%	<i>Consulting companies / agencies</i>	4,6%
<i>Software as a service</i>	12,2%	<i>Online portal service</i>	4,2%
<i>Industrial technology, manufacturing and hardware</i>	8,3%	<i>Green technology</i>	4,0%
<i>Mobile and web applications</i>	6,8%	<i>Food</i>	3,4%
<i>e-commerce</i>	6,6%	<i>Media and creative industries</i>	3,3%
<i>Bio and medical industry</i>	5,8%	<i>Games</i>	1,3%
<i>Finance and Financial Technologies</i>	5,2%	<i>Offline services</i>	1,3%
<i>Online stores</i>	4,9%	<i>Office supplies and equipment</i>	0,6%
<i>Education</i>	4,8%	<i>Other</i>	7,7%

From the attached report it can be concluded that most of the projects are directly related to the development of ICT technology. In the implementation of the above 2,515 startups, there were 6,340 founders, and 23,774 people were employed, according to the information provided by Startup Europe from these companies and stakeholders [3].

3. SUPPORT FOR THE DEVELOPMENT OF STARTUP COMPANIES IN SERBIA IN 2018

The development of the Serbian economy largely depends on the improvement of the

conditions for the progress and competitiveness of micro, small and medium-sized companies and entrepreneurs, and therefore of the startups. In order to successfully complete the process of European integration of the Republic of Serbia, various strategies have been adopted that determine the measures and programs of support for the development of entrepreneurship, economy and society as a whole, as well as the promotion of excellence in science. The key documents in this area are the "Strategy for the Support to Development of Small and Medium-Sized Enterprises, Entrepreneurship and Competitiveness for the Period from 2015 to 2020", the "Strategy on Scientific and Technological Development of

the Republic of Serbia for the period 2016–2020-Research for Innovation” and “Information Society Development Strategy in the Republic of Serbia until year 2020”. From these strategies different programs that support start-up businesses, the development of young innovative companies and technologies have evolved. These programs provide a good opportunity for launching Start Up companies that can build their competitiveness based on knowledge, application of new technologies and innovation. Through the programs of stimulating entrepreneurship, new jobs are generated and the continuous development of the Serbian economy is affected.

3.1 Support Program for Business Startups – Startup Program

One of the programs which supports the establishment and successful operation of the new Start Ups in 2018 is the Support Program for Business startups – START UP PROGRAM, implemented by the Development Agency of Serbia in cooperation with Regional Development Agencies [4].

The condition for the allocation of funds is that a micro, small, medium-sized company or entrepreneur at the time of filing the application does not operate for more than two years. Also, the selected beneficiary needs to provide his own participation of at least 30% if he is engaged in production or processing, or a minimum of 50% if deals with service activities.

This program provides support to the development and operation of 357 Start Ups, where, in addition to awarding grants of up to 1 million dinars, training and mentoring are also provided.

3.2 Startup Loans under the Program for Encouraging Entrepreneurship Development through Financial Support for Beginners in Business in 2018

The Ministry of Economy with the Development Fund of the Republic of Serbia in 2018 published an announcement that the newly established micro and small companies, and entrepreneurs can allocate grants of up to 30% of assets, with financing of the remaining amount from the Fund loan [5].

The maximum amount of grants is 1.8 milion dinars, with a loan of 4.2 milion dinars, which can be used for upgrading / reconstruction / renovation / rehabilitation of business or production space, purchase of equipment or permanent working capital.

3.3 Mini Grants Program

The Mini Grants Program, implemented within the Competitiveness and Jobs Project, is aimed at young micro and small enterprises that operate in Serbia less than three years, and develop technological innovation for which there is a need in the market [6].

The program represents the follow up of the pilot program financed through the Instrument for Pre-Accession Assistance (IPA 2011) funds for Serbia, supported by the World Bank, under the Serbian Innovation Support Project in 2011. In 2018, through the Mini Grants Program, the Innovation Fund in cooperation with the World Bank finances up to 85% of the total project costs for Start Up and Spin Off companies, i.e. up to a maximum of 80,000 Euro per project.

The goal of the program is to help young companies in the critical phase of research and development, so that they can develop effective business capacities through which they will place their innovations on the market. In this way, it will encourage the creation of innovative companies, the development of innovative technologies, products and services that have great potential for commercialization.

4. ANALYSIS OF PROJECTS IN SERBIAN STARTUPS

Thanks to the Mini Grants Program, which was conducted through the Innovation Serbia Project in the period 2011-2016 by the Innovation Fund, the development of technological Start Ups in Serbia has practically started. Under this program, young companies could apply projects in any field of science and technology and any industry sector. In this way, the links between science and the economy have been strengthened, and a positive environment for the establishment of a knowledge-based economy in Serbia has been created.

Table 2 shows the survival rate that relates to the percentage of startups that continued to

function (run as active companies) after the completion of this program. Also, this table shows the number of projects that resulted in

the creation of a new product or service, as well as the number of successful commercialized project results.

Table 2 – Success of realized projects in startups

Mini Grants Program	Survival rate		New products/services created		Generating revenue from new products/services	
<i>First call, 2011</i>	9/10	90.00%	7/10	70.00%	6/10	60.00%
<i>Second call, 2012</i>	7/8	87.50%	6/8	75.00%	4/8	50.00%
<i>Third call, 2012</i>	13/13	100.00%	12/13	92.31%	4/13	30.77%
<i>Fourth call, 2013</i>	8/10	80.00%	8/10	80.00%	4/10	40.00%

With the continuation of the Mini Grants Program, through the Competitiveness and Jobs Project, the Fund continued to provide financial assistance to startup and spinoff companies in 2017, supporting innovation activities and encouraging research and development in private companies in Serbia.

The fact that in 2017 the Fund received 137 proposals of innovative projects from all parts of Serbia (Table 3) indicates that there is a great interest for the Mini Grants Program. The largest number of applications came from Belgrade, Novi Sad and Nis, and grants in 2017 were approved for 20 innovative projects in the total amount of 1.45 million euros.

Table 3 – Evaluation of submitted projects, 2017 [7]

Mini Grants Program, 2017	Number
<i>Submitted projects</i>	137
<i>Projects that have fulfilled eligibility requirements</i>	126
<i>Projects that have been narrowly selected</i>	23
<i>Projects that have been approved for financing</i>	20

Through the five public calls for funding published since 2011 under this Program, the Fund has approved a significant number of innovative project proposals from various fields. As shown in Table 4, these projects were

mainly from high-tech areas, such as Information and Communication Technologies, Software and Application Development, as well as from traditional industries such as Agriculture and Machine Industry.

Table 4 – Number of approved projects, by fields

Mini Grants Program	First call, 2011	Second call, 2012	Third call, 2012	Fourth call, 2013	Fifth call, 2017
<i>Construction and civil engineering</i>	1			1	1
<i>Electrical engineering</i>				1	
<i>Energy and energy efficiency</i>	3		1	1	
<i>Environmental and climate protection</i>			1		1
<i>Food and agriculture</i>	1	1	2	1	
<i>ICT (Information and Communication Technologies)</i>	3	2	7	3	7
<i>Life sciences</i>		1			2
<i>Machines and mechanical engineering</i>	2	2	2	1	2
<i>Medical and therapeutically devices</i>		1			1
<i>Software and application development</i>		1		2	6
<i>Total</i>	10	8	13	10	20

Figure 1 shows that the largest number of projects has been realized in the field of Information and Communication Technologies, as well as Software and Application Development. Given the current trends in the

world, the development of new companies in these areas and the realization of projects in them is a significant development opportunity for Serbia.

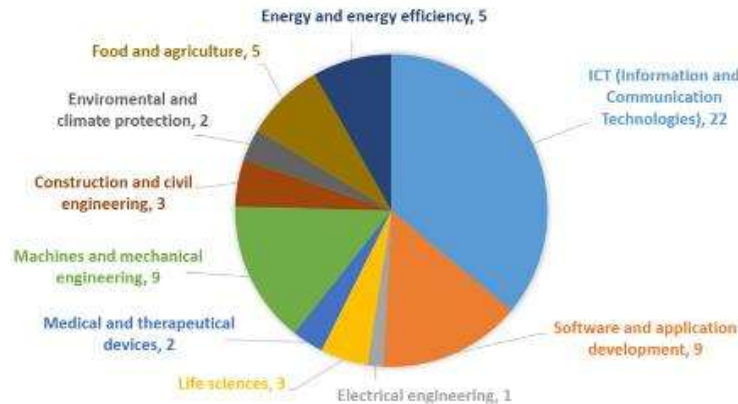


Figure 1 - Number of approved projects by area, from 2011 to 2017

On the other hand, during the 5 cycles of the program, only 1 recycling project was realized, through which a young company developed a mobile recycling machine for public use.

Namely, employees in Solagro Company from Belgrade designed the so-called. "Smart press" for recycling of cans. The system consists of a smart press and a mobile application, through which users or citizens communicate with smart press. The application gives instructions on the recycling of cans, but also explains for what purposes recycled waste is used. Each cans can carry a certain number of points that the user receives after each recycling, by the code that is read from the snippet in the application after the recycling is done. When a certain number of points are accumulated, citizens can substitute their points for a certain prize, provided by sponsors of this project. This raises public awareness of the importance of recycling, but also motivates them to recycle [8].

These examples of the using of ICT technology in the recycling process can be an incentive to create a smart End-of-Life Vehicle (ELV) system. Certainly startup projects in this area have a good opportunity to be successful and profitable, as there are more and more new cars on the world market, which suppress those that are obsolete and useless.

5. CONCLUSION

The development of ICT technology and the growth of market demand for products based on this technology or supported by ICT resulted in the emergence of a large number of startups in this field. A similar situation exists in Serbia and the EU when it comes to representation of startups in the field of ICT, software development and mobile and web applications. Although it is not possible to compare the number of startups, as well as the network of stakeholders and the amount of investments in Serbia and the EU, it is clear that activities such as ICT and related industries, as well as mechanical engineering and industrial production are the most prevalent in both cases. Medical and medical equipment startups are also popular in both Serbia and the EU, while projects in the field of environmental protection, recycling and energy have rarely been successful. This fact leaves space for startups and further development of startups in these areas, because the areas that will be increasingly popular and the will be an interesting topic both in industry and in science.

The future directions of the research will be oriented towards these areas, with the hope that investors and stakeholders will recognize the importance of energy and recycling for the entire society.

REFERENCES:

- [1] Fair IFAT 2018, <https://www.ifat.de/press/newsroom/press-releases/20-top-startups-at-ifat-2018.pdf>, accessed date 23rd August 2018.
- [2] Kollmann, T., Stöckmann, C., Linstaedt, J. and Kensbock, J., 2015. European startup monitor. *German start-up association, Berlin*.
- [3] Kollmann, T., Stöckmann, C., 2016. European startup monitor. *German start-up association, Berlin*.
- [4] Development Agency of Serbia, 2017. Public Invitation to Provide Support Package in the Beginner Beginner Startup Program - Startup. Retrieved from <http://ras.gov.rs/uploads/2017/03/avni-poziv-start-up.pdf>, accessed date 1st September 2018.
- [5] Development Fund of the Republic of Serbia, 2018. Start-up loans under the Program to Encourage Entrepreneurship Development through Financial Support for Beginners in Business in 2018. Retrieved from <https://fondzarazvoj.gov.rs/cir/proizvodi/start-up-kredit>, accessed date 3rd September 2018.
- [6] Innovation Fund, 2018a. Early Development Program-About the Program. Retrieved from <http://www.novacionifond.rs/program-ranog-razvoja-o-programu/>, accessed date 3rd September 2018.
- [7] Innovation Fund, 2018b. Report on the implementation of the work program of the Innovation Fund for 2017. Retrieved from http://www.novacionifond.rs/dokumenta/Izvestaj_o_radu_za_2017.pdf, accessed date 3rd September 2018.
- [8] Solagro company, <http://solagroteam.com>, accessed date 1st September 2018.

Acknowledgment: Research presented in this paper was supported by Ministry of Science and Technological Development of Republic of Serbia: Grant III-44010, Title: Intelligent Systems for Software Product Development and Business Support based on Models; Grant TR-35033, Title: Sustainable development of motor vehicles recycling technology and equipment.