Business in Małopolska

Startups and creative industry in Małopolska

European Funds
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Business in Małopolska

Małopolska Agencja Rozwoju Regionalnego S.A., Krakowski Park Technologiczny sp. z o.o. and Kraków Nowa Huta Przyszłości S.A. jointly implement a project titled: **"POWER UP YOUR BUSINESS IN MAŁOPOLSKA"**, co-financed by the Regional Operational Programme for the Małopolska Region for 2014–2020 (RPO WM) under Priority Axis 3: "Entrepreneurial Małopolska", measure: "The Internationalisation of Małopolska Economy", sub-measure "The Economic Promotion of Małopolska".

The objective of the project is to directly promote the economic potential of Małopolska on the international scene, improve the competitiveness of regional companies on foreign markets and support foreign investments in Małopolska.

The measures of the "Power up..." project include participating in foreign fairs, organising trade missions and regional workshops, issuing publications and creating a modern information system for the entrepreneurs of Małopolska.

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Preface

This study contains the characteristics of four branches of the metal, machine, automotive and electrotechnical industries in Małopolska (the Małopolskie province). Its purpose is to analyze the state of those types of economic activities in the Małopolskie province, to indicate the dynamics of changes occurring in them, and to identify strengths, opportunities and challenges.

The study contains information on the size of the mentioned markets in Małopolska and their dynamics. The main industries that belong to that markets are presented in the study. The size of the workforce involved in the functioning of each of the industries with information on the dynamics of changes in this area was indicated. The presented information on the number of enterprises in particular branches of industry was supplemented by their structure in terms of the number of employees, the origin of capital and the legal form. The study also contains information about the main centers of the metal, machinery, automotive and electrotechnical industries in Małopolska and a long list of their largest representatives was added.

The summary of the report includes information on the strengths of Małopolska in the listed industries. The most important of their trends and the basic challenges faced by the region in the context of the analyzed markets are listed. Opportunities are also presented that could dynamise the region's development in the area of metal, machine, automotive and electrotechnical industries.

The results of this analysis may serve the promotion of Małopolska, as a region worth investing in. The information contained herein can be a hint for investors, as to where they can find the best conditions for the development of operations and what are the strengths of the Małopolska industries.

Research method

The study was based on the desk research method.

It comes down to the analysis of data from available sources. The statistics are subjected to appropriate selection, verification and processing. This method uses a variety of data sets, which mostly include public statistics documents, industry analyzes and publications, reports, articles and press releases.

Data is processed - tables, charts and graphs are compiled, data from various sources is compiled, and its correctness is verified. The processed statistics are subject to interpretation - the state of a given phenomenon and its changes, their character and dynamics are determined. The prepared study is finalized with conclusions.

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Glossary

Business angels	affluent people who invest their own money in ideas appearing on the market (they support entrepreneurs who already have not enough money for business development, but are not yet of interest of more institutional financing entities, e.g. venture funds)[1]
LFS	*Labour Force Survey*
CEO	chief executive officer
CRM	client relations manager
Crowdfunding	a form of financing various types of projects by the community, which is or will be organized around those projects. The venture is, in this case, financed by a large number of small, one-off payments made by persons interested in the project[2]
CVC	Corporate Venture Capital, or a corporate high risk investment fund that invests directly on the market in startups, buying them and joining them to its corporate ecosystem or buying shares in them, to shorten the path of reaching innovation or human resources that are missing in a given corporation
Dragon Valley	this is what Krakow is called by foreign entrepreneurs (this is a reference to the famous startup mecca of Silicon Valley in the USA)
Gazela	according to OECD, those are companies that: have been employers for at the most five years, their annual growth rate of sales or employment revenues was, in the last three years, over 20%, and employ at least 10 people[3]
IoT	Internet of Things
IT	information technology
ITC	information and communications technology
NCF	The National Capital Fund is the first Polish fund of venture capital funds. The NCF's activity consists in investing in venture capital funds that provide capital support to small and medium-sized Polish enterprises, especially innovative enterprises with high development potential or conducting research and development activities. NCF was established on July 1, 2005 under the act on the National Capital Fund, by the Polish government to limit the phenomenon of capital gaps, consisting in low supply of VC capital in the SME segment[4]
Kickstarter	English-language crowdfunding website on which fundraisers are conducted to finance various projects from many areas of life[5]
KTP	Krakow Technology Park
SMEs	small and medium-sized enterprises
MVP	a product with the minimum necessary functionality that brings the customer the basic benefits, a minimum viable product

NCBiR	National Center for Research and Development - a Polish executive agency appointed to conduct tasks in the field of science, science and technology and innovation policies of the state
OECD	Organization for Economic Co-operation and Development
PARP	Polish Agency for Enterprise Development - a government agency - a central administration body subordinate to the Minister of Development - managing funds from the state and the European Union budgets, intended to support small and medium-sized enterprises and human resources development
GDP	gross domestic product
PKD	*Polish Classification of Economic Activities*
PLN/zł	Polish zloty
REGON	Polish National Official Business Register (a register kept by the President of the Statistics Poland)
SaaS	Software as a Service
SEZ	Special Economic Zone
Startup	a project that meets at least one of the following three conditions: • is included in the digital economy sector; • key elements of its business model include information processing or derivative technologies; • creates new technological solutions in the area of IT or ICT[6]
UNCTAD	United Nations Conference on Trade and Development *United Nations Conference on Trade and Development*)
Venture capital (VC)	medium and long-term investments in non-public enterprises in the early stages of development (burdened with high risk of investment failure), combined with managerial support (in terms of business processes optimization or improvement of management quality), conducted by specialized entities (venture capital funds)[7]

The study is based on the desk research method.

The study uses the PLN/EUR exchange rate of the National Bank of Poland of 25/09/2018, i.e. EUR 1 = PLN 4.2939 (https://www.nbp.pl/home.aspx?navid=archa&c=/ascx/tabarch.ascx-&n=a186z180925) [1] [2] [3] [4] [5] [6] [7]

[1] See Deloitte*, Diagnoza ekosystemu startupów w Polsce, 2016*, p. 19.
[2] See https://pl.wikipedia.org/wiki/Crowdfunding.
[3] See Deloitte*, Diagnoza ekosystemu startupów w Polsce, 2016*, p. 86.
[4] See http://www.nseeorg.pl/o-firmie/o-funduszu.
[5] See https://pl.wikipedia.org/wiki/Kickstarter.
[6] See Startup Poland*, Polskie Startupy. Report 2017, p. 94. The Polish startup for the needs of a survey conducted by Startup Poland is an entity operating in the country or registered abroad, if it has at least one partner who is a Polish citizen and, for the most part, conducts its activity in Poland.*
[7] See https://pl.wikipedia.org/wiki/Venture_capital.

Part I. Startups

1. Characteristics of the startup market

Although there are no hard definitions of a startup, it is usually considered a newly established business venture that aims to meet market needs by developing a viable business model for products, as well as effectively developing and validating a scalable business model. Startups have the potential of very fast growth due to the technological advantage or a discovered market niche, which has not yet been managed. Startups are companies designed to achieve a huge scale in a short time.[8]

Startups are often associated with emerging business ventures in the information and communication technologies and high-tech sectors. For example, in the Startup Poland survey on Polish startups, a definition was adopted according to which a startup is a venture that meets at least one of the following three conditions:[9]

- is included in the digital economy sector;
- key elements of its business model include information processing or derivative technologies;
- creates new technological solutions in the area of ICT.[10]

Although some startups (e.g. Amazon, Facebook or Google) have achieved global success, they also have quite high failure rates.[11]

1.1 Main industries in Małopolska

It is estimated that in Poland in 2016 there were approx. 2,700 startups (the number of startups in Poland increased by 16% compared to 2015), and the average period of startup's existence was 2 years.[12]

According to Deloitte, the industries in which Polish startups operate are:

- ICT solutions and solutions supporting digital transformation - 50.86%;
- creative industry and multimedia technologies - 30.86%;
- technologies concerning optimization of energy consumption and renewable energy sources - 12.57%;

[8] Startup Poland, Polskie Startupy. Report 2017, p. 9.
[9] Startup Poland, Polskie Startupy. Report 2018, p. 107.
[10] Ibidem. See also the report *Polskie startupy. Report 2017 p. 94,* where for the needs of a survey conducted it was assumed that a startup is an entity operating in the country or registered abroad, if it has at least one partner who is a Polish citizen and, for the most part, conducts its activity in Poland. The "Polish startups" survey focuses on the broadly understood digital industry.
[11] See, among others E. Griffith, *Why startups fail, according to their founders*, September 25, 2014, Fortune.com. See Also https://innpoland.pl/132839,to-nieprawda-ze-9-na-10-start-upow-upada-jesli-twoj-projekt-ma-rece-i-nogi-przezyjesz.
[12] Ministry of Economic Development, *There is a talent. There is capital. Start in Poland* (https://www.trade.gov.pl/pl/f/v/448224/PPE_PL_broszura%20start%20in%20Poland%2010%202017%20eng.pdf), p. 6 and https://www.pulshr.pl/start-upy/w-2016-r-w-polsce-jest-ponad-2-670-startupow,38584.html.

- biotechnologies and medical technologies - 9.14%;
- nanotechnologies and material technologies - 6.86%;
- robotics and other industrial technologies - 5.71%;
- others – 9.14%.[13]

A survey conducted by Startup Poland[14] on a group of 621 startups from across the country shows that:

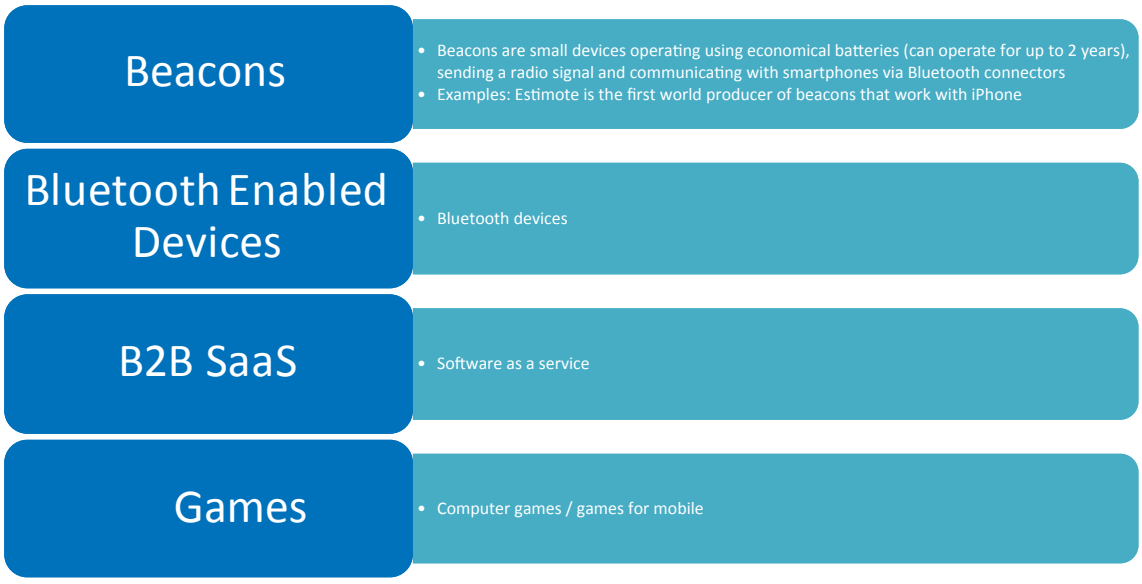
- approx. 7% of respondents are the startups from Krakow (Krakow is considered Beacon Valley)[15];
- most Polish startups build technologies in the areas of big data, analytics, Internet of things, development tools and natural sciences, and the industries in which they usually earn fixed revenues are design and fashion, development tools and technologies for marketing. The least regular revenues are achieved by the startups in the areas of natural sciences, health and biotechnology sectors, which results mainly from the need to incur significant financial expenditures (although those areas are in the top five, in terms of popularity);
- 82% of founders or CEOs of the startups have higher education, 7% have a university degree, while 8% have secondary education, and 3% are students;
- 76% of Polish startups sell their products to companies, the majority of which are micro-enterprises and SMEs;
- 25% of startups have one founder, 36% two, 22% three and 17% more than 4 founders;
- 58% of respondents building the startups today in Poland are thirty-year-olds, 26% of respondents are under 30 years old and 16% of respondents are over 40 years old;
- 62% of the startups surveyed in 2017 were financed by their own funds only (in 2016 it was 50%);

[13] Deloitte, *Diagnoza ekosystemy startupów w Polsce*, June 2016, p. 73.
[14] The survey is not representative, but the high sample size allows for generalizations. In 90% of cases, the survey was completed by the founders or co-founders, partners or managing directors (CEOs) of the startup, which makes Startup Poland recognize the obtained data and opinions as highly credible. Startup Poland, *Polskie Startupy.* Report 2017.
[15] The Startup Poland survey, *Polskie Startupy.* Raport 2018, p. 15, conducted on a group of 1101 startups, indicates that approx. 10% of respondents are the startups from Krakow.

- in 2017, 20% of the startups that gained external capital for development, used a foreign source of financing, i.e., from an accelerator, business angel or venture capital fund, and 44% planned to cooperate with a foreign investor within the next six months;
- 12% of the startups have a foreigner among the founders;
- 28% of the surveyed startups employed foreigners, in particular from Ukraine, the United States and the United Kingdom;
- in 2017, nearly 50% of the Polish startups sold products abroad, while exporters developed faster, earned better and easily gained investors (60% of exporters achieved regular revenues, and over 50% were in the group of the top earners);
- 46% of the surveyed startups declared cooperation with scientific institutions, which is increasingly being formalized;
- over 2/3 of respondents indicate mentors as the main source of knowledge and the motor of development.[16]

The main startup specializations in Małopolska, according to a survey conducted by Startup Poland[17], are small devices, operating on economical batteries (so-called Beacons), Bluetooth devices, software as a service (SaaS) and games.

Figure 1. Main startup specializations in Małopolska



* Nesweek.pl, *Beacon: przewodnik po muzeum i kupon rabatowy w jednym. Czy przyjmie się w Polsce?*, June 7, 2015.

Source: Startup Poland, *Polskie Startupy.* Report 2017, pp. 74-75.

According to the Startup Poland survey, the key startups in Małopolska include Base, Brainly, Estimote, Kontakt.io, Silvair, SALESmanago, Synerise, Elmodis, Ganymede, Bloober Team, and the

[16] Startup Poland, *Polskie Startupy.* Report 2017, pp. 6-7, 9 and 13-14, 19.
[17] Startup Poland, *Polskie Startupy.* Report 2017, pp. 74-75.

following startups are worth noting: Reality Games, Airly, Autenti, 2040.io, Contelio, DrOmnibus, CallPage, edrone, FlyTech UAV, Codewise.[18]

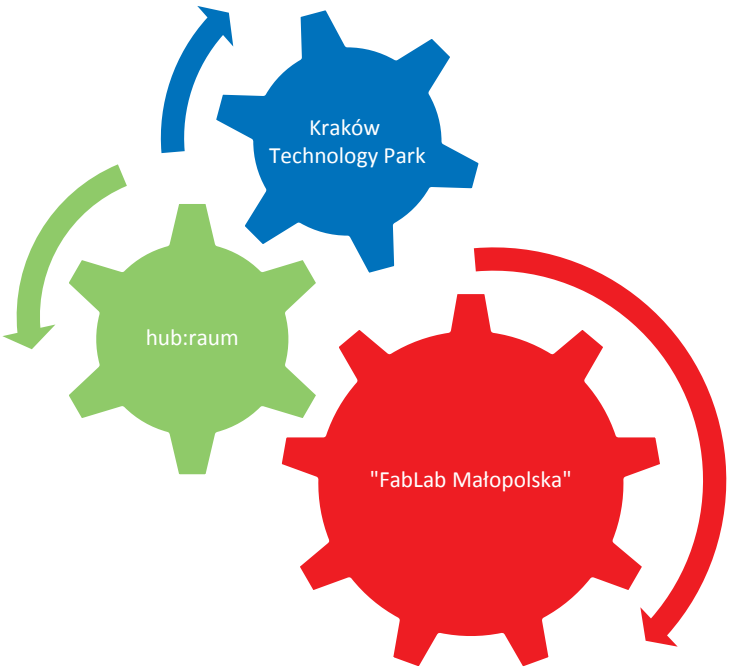
Kraków, as the capital of Małopolska, is, according to various sources, the headquarter for 100-200 startups, the most dynamically developing representatives of the modern technology industry, in particular beacons, Bluetooth enabled devices, B2B SaaS and games. Krakow is also an ideal location for modern hubs (places for creative meetings and enterprising people conducting a business) and many economic and technological events. A dynamic regional center supporting the development of startups, including those belonging to the gaming industry, is the Kraków Technology Park (KTP).

Małopolska has become the center of the Polish industry of 3D printer manufacturers. First, the first community connected with 3D printing in Poland was created around the Materialination portal. Later, the first cheap 3d printer based on rep-rap (or open source) solutions began to be produced by Pirx3D company. Another company that chose Kraków as the headquarters of its operations is 3DKreator. For the first 3 years of its activity, it produced and sold successfully business 3D printers in Poland and worldwide, to make a classic startup pivot (change of business direction) in 2018 and base its main activity on the production of 3D printer filters, when it discovered that vapors from 3D printing were as harmful to health as passive smoking.

1.2 Main centers in Małopolska

The technology startup centers in Małopolska primarily include: Krakow Technology Park, Hub:raum and FabLab Małopolska, and Krakow's district of Zabłocie are regarded as Polish Dragon Valley.

Figure 2. Main centers of technology startups in Małopolska



Source: Own study based on http://startuppoland.org/ecosystem/ and http://www.innowacyjnystart.pl/index.php/miejsca-i-spolecznosci?start=0..

[18] Startup Poland, *Polskie Startupy.* Report 2017, p. 74.

Kraków Technology Park (KTP) is the most complete one-stop-shop for business operating in Poland. The entity offers have a full toolbox to let its clients develop better and faster at its disposal. The system the KPT has developed consists of ca. 350 enterprises, whomthey help to build the best conditions for business development and sales increase in their daily practice.

KTP manages the special economic zone, authorising tax exemptions, and inspiring enterprises to new investments. In the office spaces of the Park, KTP develops technical potential and facilities for the development of SMEs.

KTP serves also as a space for startups development by usage of the technology incubator and accelerator to stabilise and reinforce the market position of the most promising start-ups, and by inspiring them to global development.

Within the KTP laboratories, the startups may have access to, among others, Cloud Computing, Data Center, Multi Lab and Living Lab.

As part of the accelerator, the following programs are held here: Scale Up (over twenty startups took part in it, and the first editions were held in cooperation with 13 partner companies); Baltic-SatApps (acceleration of startups using Copernicus satellite data, where the goal is to accelerate the involvement and use of satellite data in various areas of life, the duration of the program is until September 30, 2020); Baltic Game Industry (a pilot series of workshops designed for creative entrepreneurs in the gaming industry). KTP supports and promotes the video games industry and publishes a series of reports on the condition of that industry. KTP offers also an access to seed funds (i.e. smaller amounts granted for the start of a new business): INNOventure (established in December 2014 together with the National Center for Research and Development specializing in the commercialization of the effects of research and scientific works) and the KTP Seed Fund, which is a joint venture of the Krakow Technology Park and SATUS Venture company, which has over 20 companies in its portfolio.[19]

Hub:raum is an incubator belonging to Deutsche Telekom, which supports the startups financially in business development and conducts advisory programmes in many areas, such as communication, artificial intelligence, IoT and solutions for smart homes. Starting from 2012, the hub:raum incubator has already accumulated over 20 investments in its portfolio and created an ecosystem consisting of approx. 250 partner startups. The Krakow office is currently the 2nd, after the Berlin office, Deutsche Telekom project of this type, thanks to which the telephone company's clients have access to technological partners from all over the Europe.[20]

[19] Więcej informacji na http://www.kpt.krakow.pl.
[20] For more information see https://www.hubraum.com/.

However, **"FabLab Małopolska"** is a new project of Małopolska Regional Development Agency S.A., implemented in cooperation with the Marshal Office of the Małopolska Region. It is an open laboratory, accessible to individuals, as well as entrepreneurs who want to quickly or cheaply create or verify the adopted assumptions of the model or to make a prototype and implement their first project of the kind MVP. *Minimum Viable Product*). It is planned to create several well-equipped stationary workshops with devices for digital production, 3D printers, CNC machine tools, laser cutters and plotters that will allow creating prototypes of various products, as well as, to construct robots. Workshops and meetings initiating cooperation of creators will be organized here. The FabLab will also offer a mobile laboratory called the MobiLab - a vehicle able to reach educational institutions throughout Małopolska.

It should also be noted that there are numerous co-working offices in Małopolska. In Krakow, there can be found several dozen of them, and their list is constantly growing.[21]

As for the remaining part of the Małopolskie province, it is worth pointing out that the startups in Małopolska may find their potential in the ecosystems created within industrial districts[22], where the clusters of high-tech industry are often located.

2. Size of the market in Małopolska

2.1 Market value (share in GDP, a value in PLN, a value of main industries)

Estimation of the impact of the Polish startup ecosystem on the state economy in a few years perspective shows that the more mature the startup market in Poland is, the more its real possibilities of generating economic growth in the country increase. According to Deloitte's estimates, in 2023, the startups that achieve the gazelle status will generate in a direct, indirect and induced way over PLN 2.244 million of value added[23] (i.e. approx. EUR 523 m)[24]. In total, the household income generated by the startups in 2023 will amount to over PLN 757 million (i.e. approx. EUR 176 m). In 2023, the startups in Poland will create in a direct, indirect and induced way over 50.3 thous. of jobs.[25]

Here it is worth noting that in 2015 less than 13% of surveyed startups did not show any revenues, and 64% of them did not exceed the ceiling of PLN 100 thous. of revenues (i.e. approx. EUR 23 thousand). However, the percentage of startups exceeding that threshold increases (according to the estimates of startups alone in 2016 it will amount to 59%).[26]

2.2 Product structure

With regard to the startups market itself, the survey conducted by Startup Poland on a group of 621 startups from all over the country shows that the five most popular products include big data,

[21] A regularly updated list with places for creative co-working space is available on https://gist.github.com/mackuba/7271345.

[22] Usually, industrial centers are mining regions, and regions wih high-tech, machinery, automotive, food industries, etc., having a significant percentage of people employed in industry, consisting of many industrial plants having production links and concentrating significant production potential on a small area.

[23] In accounting terms, the value added means that part of the enterprise's output that remains after deducting the value of goods and services used as inputs in the production process, i.e. the intermediate consumption. On the other hand, the value added is the main and most important component of GDP. Deloitte, *Diagnoza ekosystemu startupów w Polsce, 2016*, p. 85.

[24] Conversions were used in the study) See. https://www.nbp.pl/home.aspx?navid=archa&c=/ascx/tabarch.ascx&n=a186z180925.

[25] Deloitte, *Diagnoza ekosystemu startupów w Polsce, 2016*, pp. 89-90.

[26] Deloitte, *Diagnoza ekosystemy startupów w Polsce,* June 2016, p. 75.

analytics, Internet of Things (IoT), tools for developers and programmers, and natural sciences/ health sector/biotechnology.[27]

Figure 3. The most popular products offered by Polish startups

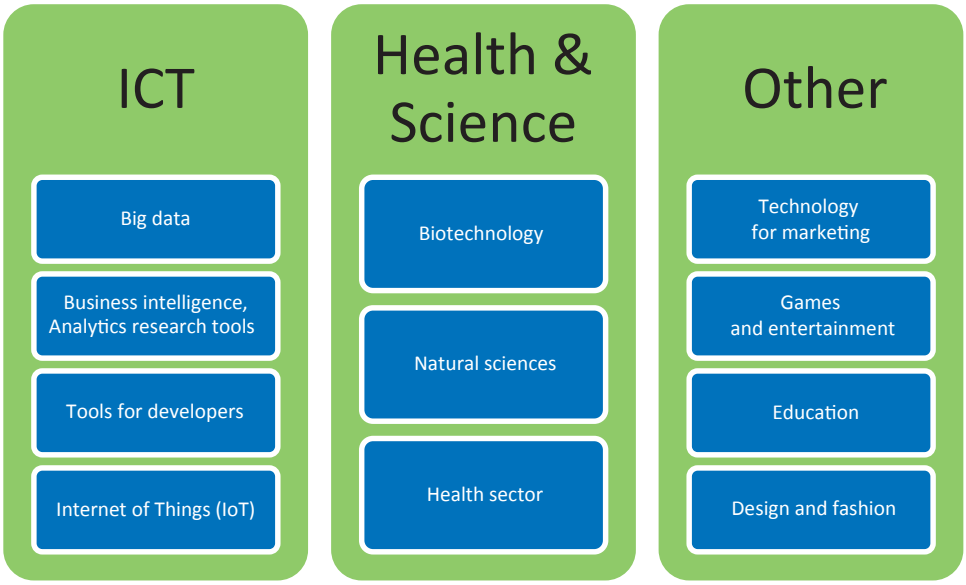
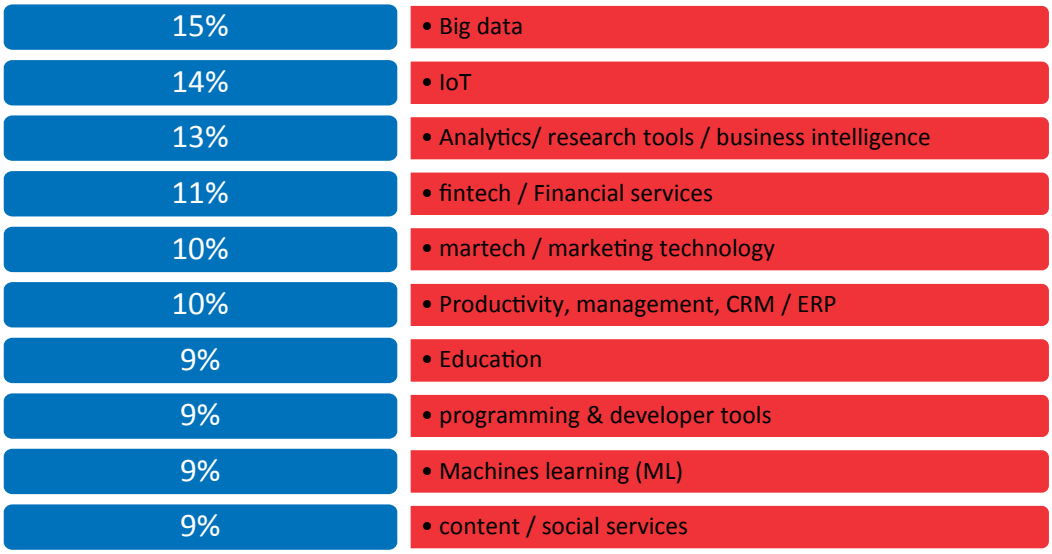


Figure 4 The percentage share of individual products is as follows:

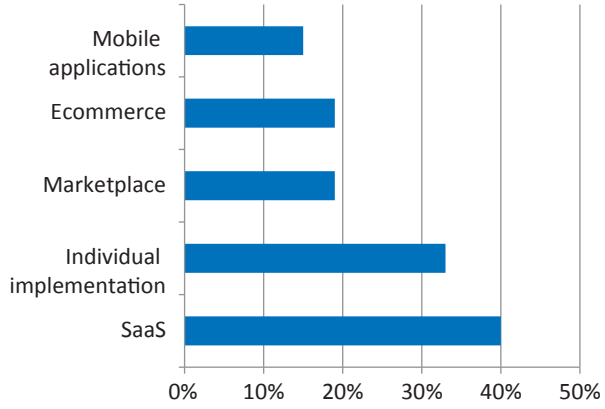


Source: Own study based on Startup Poland, *Polskie Startupy. Report 2018, p.* 24.

The startups selling products related to big data are doing well on the market - they receive regular and quite high revenues (over PLN 1 million, i.e. approx. EUR 233 thousand). Good results are also achieved by companies selling technologies for marketing (40% of them declare regular revenues) as well as, in the field of analytics, research tools and business intelligence (every third of them declares regular earnings). The hardest thing is to earn money by creating technologies for the power industry as well as an extended and virtual reality. [28]

[27] Startup Poland, *Polskie Startupy.* Report 2017, pp. 6-7, 9 and 13-14, 19.
[28] Startup Poland, *Polskie Startupy.* Raport 2017, p. 20-21 and *Polskie Startupy.* Report 2018, p. 31.

Chart 1. The most popular sales models



90% of companies selling according to the SaaS (Software as a Service) model report regular revenues. The other most common models are: e-commerce, marketplace, web services and mobile applications.

Source: Startup Poland, *Polskie Startupy.* Report 2017, p. 21 and Report 2018, p. 31.

2.3 Structure by entities

According to Deloitte, the Polish startups operated in the following legal forms:

- limited liability company - 58.29%;
- sole proprietorship – 14.86%;
- no legal form – 8%;
- business incubator without a separate legal form - 4.57%;

- limited partnership or limited joint-stock partnership– 4.57%;
- joint-stock company - 3.43%;
- others – 6.29%.[29]

Assuming that in 2016 there were approx. 2,700 startups[30] in Poland, and approx. 7% of the start-ups were located in Krakow[31], it can be initially estimated that in 2016 there were over 180 startups in Kraków, of which approx. 150 were active in the form of commercial companies or in the form of a sole proprietorship.

Moreover, assuming that the industries in which Polish startups operate include: ICT solutions and solutions supporting digital transformation (50.86%), creative industry and multimedia technologies (30.86%), technologies concerning optimization of energy consumption and renewable energy sources (12.57%), biotechnologies and medical technologies (9.14%), nanotechnologies and material technologies (6.86%), robotics and other industrial technologies (5.71%), other - 9.14%[32], one should assume that an appropriate percentage of the estimated 180 startups operating in 2016 in Krakow, could operate in the abovementioned industries (except that in the main special-

[29] Deloitte, "*Diagnoza ekosystemy startupów w Polsce"*, June 2016, p. 74.
[30] A survey conducted by Startup Poland on a group of 621 startups from all over the country shows that approx. 7% of respondents are startups from Krakow. As Startup Poland points out, the survey is not representative, but the high sample size allows for generalizations. In 90% of cases, the survey was completed by the founders or co-founders, partners or managing directors (CEOs) of the startup, which makes Startup Poland recognize the obtained data and opinions as highly credible. Startup Poland, *Polskie Startupy.* Report 2017. In the study Startup Poland, *Polskie Startupy.* Raport 2018, p. 15, conducted on a group of 1101 startups, indicates that approx. 10% of respondents are the startups from Krakow.
[31] Ministry of Economic Development, *There is a talent. There is capital. Start in Poland* (https://www.trade.gov.pl/pl/f/v/448224/PPE_PL_broszura%20start%20in%20Poland%2010%202017%20eng.pdf), p. 6 and https://www.pulshr.pl/start-upy/w-2016-r-w-polsce-jest-ponad-2-670-startupow,38584.html.
[32] Deloitte, Diagnoza ekosystemy startupów w Polsce, June 2016, p. 74.

izations of industry startups from Małopolska, such as Beacons, Bluetooth Enabled Devices, B2B SaaS and games, one should expect a higher percentage of startups than at national level)[33].

2.4 Investment expenditures

In the case of start-ups, investment expenditures are of great importance. According to the Deloitte survey, the sources of financing the startups in Poland include:

- own funds (including funds from friends and family) - 71.84%;
- current revenues - 44.25%;
- venture capital funds and other – 24.71%;
- grants – 20.11%;
- business partners - 15.52%;
- business angels - 11.49%;
- debt financing (e.g. a loan from a bank) - 9.2%;
- crowdfunding - 5.17%;
- share or similar support by large companies - 4.02%.[34]

According to the Startup Poland survey[35]:

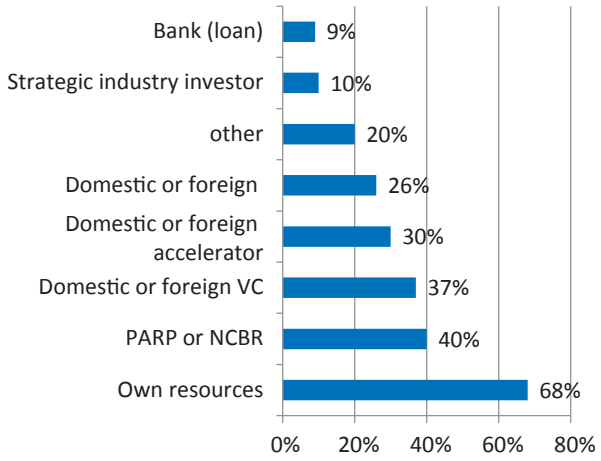
- Krakow is the undisputed leader in terms of effective fundraising (approx. 40% of those who have accumulated over PLN 10 million (i.e. approx. EUR 2.3 million)), comes from Małopolska; 30% from Wrocław, the rest from Warsaw or the Tri-City, while in other regions there are practically no technology companies that managed to collect more than PLN 10 million (EUR 2.3 million);
- a record 39 million dollars, was acquired by Brainly startup from Kraków in several rounds, from the international investment market;
- 2/3 of startups with external financing have passed one round of financing, every tenth passed 3 or more rounds, 2/5 of the invested startups collected at most PLN 500 thous. (i.e., approx. EUR 116.4 thousand) = (the median of the seed round in Germany in 2017 amounted to EUR 1.2 million).

Krakow's strong position is due to the fact that the most effective mentors, investors and organizations supporting the startup ecosystem, operate in it.

According to the Startup Poland survey[36], the financing of the start-up activity only with equity (so-called bootstrapping) and 3×F, i.e. friends, family & fools, fluctuates around 50/50. Almost 60% of the startups do not have any external capital.

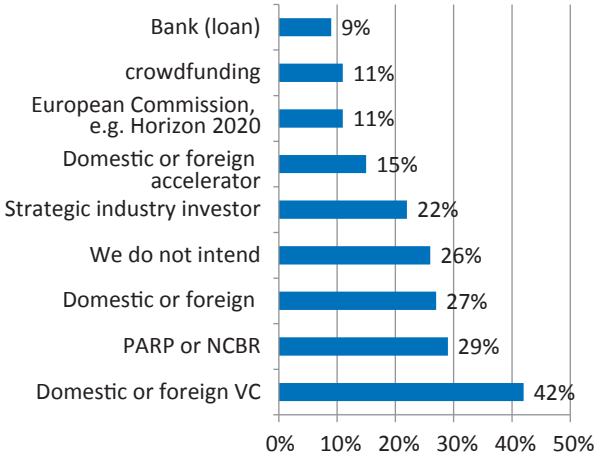
[33] Startup Poland, *Polskie Startupy.* Report 2017, pp. 74-75.
[34] Deloitte, *Diagnoza ekosystemy startupów w Polsce*, June 2016, p. 78.
[35] Startup Poland, *Polskie Startupy.* Report 2018, p. 33 *et seq.*
[36] Startup Poland, *Polskie Startupy.* Report 2018, p. 33 *et seq.*

Chart 2. Sources of startups' capital in Poland



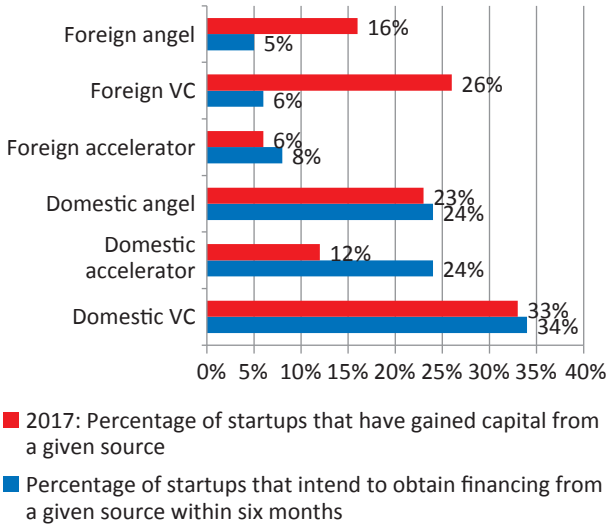
Source: Startup Poland, *Polskie Startupy*. Report 2018, p. 36.

Chart 3. External sources of capital, from which the startups intend to raise capital within the next 6 months



Source: Startup Poland, *Polskie Startupy.* Report 2018, p. 36.

Chart 4. Declarations of directions of raising capital versus the actual sources

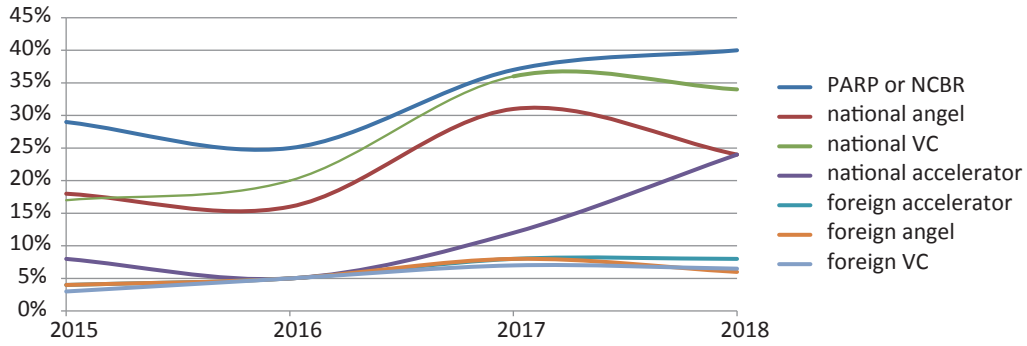


Source: Startup Poland, *Polskie Startupy*. Report 2018, p. 39.

In recent years, there can be observed an increase in the share of public programs in the startups financing from the Polish Agency for Enterprise Development, National Center for Research and Development, and from national accelerators created thanks to the Scale Up program launched by PARP in 2017, which bases the acceleration model on public-private partnership. The involvement of share crowdfunding and the European Commission also increases (e.g. within the Horizon 2020 program). On the other hand, the share of private capital in the portfolios of VC funds and business angels decreases.[37]

[37] Ibidem.

Chart 5. Trends in the sources of startups funding obtained



Source: Startup Poland, *Polskie Startupy*. Report 2018, p. 34.

Startups dealing with analytics and business intelligence, IoT and big data find capital in all sources. Fintechs are most often financed by business angels, and rarely by VC, accelerators and state institutions. Accelerators invest most often in solutions for industry (IoT, machine learning and big data).[38]The share of investments of venture capital funds in GDP in Poland is several times lower than in other European Union countries. In Europe, quarterly, 400-500 projects are financed, while Polish funds related to the National Capital Fund have invested in over 200 companies since 2008. Polish Venture Capital funds are known for tranching investments in the startups, which are suspended on the targets which companies are to perform at a given time. This is so-called fragmented tranching.

In other words, VC funds are not willing to grant startups a one-off sum of the amount of money promised in the investment agreement without prior implementation of the plan assumed and usually 100% performed by the company. This means that an investment fund, e.g. out of the promised PLN 1 million (i.e. approx. EUR 233 thousand) of the investment in the company, transfers it the first PLN 0.5 million (i.e. approx. EUR 116 thousand), and only when the company implements the assumed sales, production or marketing plans, the next tranche of money in the amount of another PLN 0.5 million (i.e. approx. EUR 116 thousand) is transferred. It happens more and more often in the Polish investment realities that the sum of PLN 0.5 million (i.e. approx. EUR 116 thousand) is divided into 2 or 3 parts and transfered to the company in smaller tranches, each time only when it fulfills certain objectives previously included in the investment agreement what is herein defined as the fragmented tranching, mentioned above.

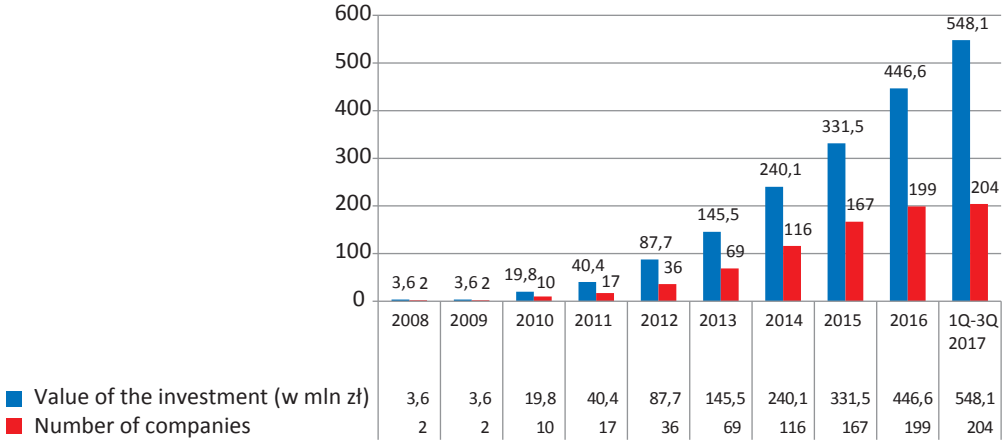
An exemplary scheme for tranching the investments in startups is provided below:

- < PLN 50 thousand (approx. EUR 11.6 thousand) is transferred in 1 tranche, 100%;
- PLN 50-100 thousand (approx. EUR 11.6-23 thousand) is usually tranched as 67% of one-off payment (fragmentation), and another 33% of the amount as the 2nd part of the payment;
- PLN 101-500 thousand (approx. EUR 23-116 thousand) respectively 46% of one-off payment, and 54% as a tranche;

[38] Ibidem.

- PLN 501 thousand - 1 million (approx. EUR 116- 232 thousand) - respectively 41% of one-off payment, and 59% as a tranche;
- PLN 1-3 million (approx. EUR 232–698 thousand) respectively 33% of one-off payment, and 67% as a tranche;
- PLN 3-5 million (approx. EUR 698–1,16 million) respectively 50% of one-off payment, and 50% as a tranche;
- PLN 5 million (approx. EUR 1.16 million) respectively 75% of one-off payment, and 25% as a tranche;[39] [40]

Chart 6. Portfolio investments of the National Capital Fund funds (NCF)



Source: KFK http://www.kfk.org.pl/fundusze/statystyki/inwestycje-funduszy-portfelowych.

The average Polish VC has 9 startups in its portfolio. Most of the financing on the market is leveraged using public funds from NCF (approx. 70%), which means that domestic young startups are in fact mostly financed with private investors funds, which remarkably distinguishes us from mature markets such as the UK, Germany or the US where the fragmented tranching as in Poland is practically non-existent, and the amount of the first tranche is usually 4-5 times greater. The value of an average investment in a startup in Poland is an amount of between PLN 101 thous. and PLN 3 million (i.e. approx. EUR 23.5 thousand - EUR 698.7 thousand).

The fundraising for the start of a business project through social crowdfunding platforms, as discussed in more detail in the rest of the study, is still not very popular among the Polish startups.

In 2017, the corporate investment funds participated in almost 25% of transactions worldwide, while in 2010 only 12% of investments were implemented by corporations. Approx. 48% of the funds invested by the funds were transferred to companies producing software, and biotechnology has become a new noticeable direction for supporting the startups. It is associated with an increase in expenditure on health care, and corporations realize that with the current pace of technological development they need to acquire innovations from the outside. Looking at the Eu-

[39] *Złota księga venture capital w Polsce 2018"; Editor: Fundacja Startup Poland*
[40] The average exchange rate of the National Bank of Poland of September 25, 2018, of EUR 1 = PLN 4.2939 was assumed.

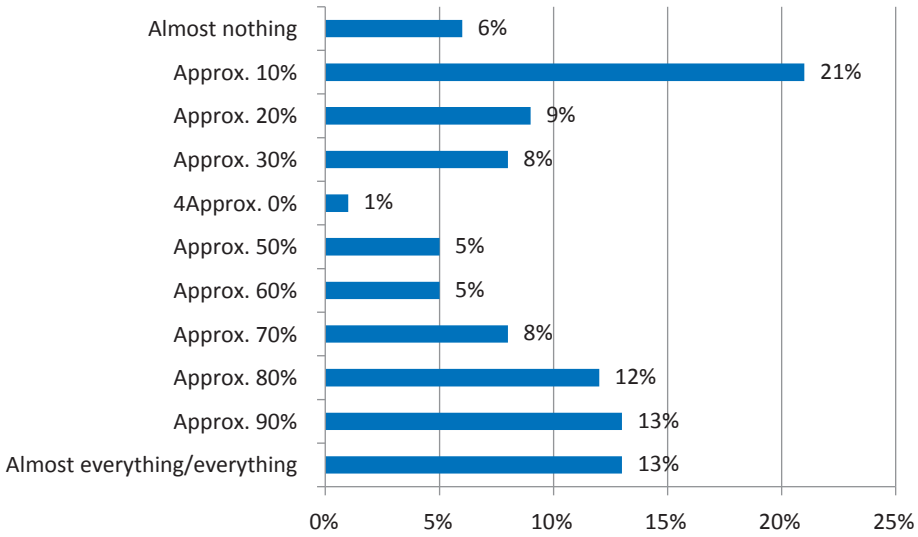
ropean market, the UK is still the most important venture capital market in Europe, where in 2017 almost 35% of the value of all European investments were invested in the British market, and the second one is Germany with the result of 16%. New plans for supporting the startup environment, such as the plan of the German government for establishing a special fund that will spend approx. EUR 500 million for investments in the startups for four years, or the French idea of establishing a fund of EUR 11 billion to finance innovative companies, are being created.

2.5 Import and export

A survey conducted by Startup Poland[41] on a group of 621 startups from across the country shows that: in 2017, nearly 50% of the Polish startups sold products abroad, while exporters developed faster, earned better and easily gained investors (60% of exporters achieved regular revenues, and over 50% were in the group of the top earners);[42]

The chart below shows the export trend of the Polish startup companies.

Chart 7. Share of exports in the startups' revenues (part of sales conducted outside Poland)



Source: StartupPoland, *Polskie Startupy. Report 2017,* p. 44.

According to this chart, the companies of Małopolska can boast of good statistical results.

Most experienced startups, with regular revenues and higher employment, of deep tech, mobile applications and social media industries, deal with export. Exporters rarely need money, but more often they need employees (mostly programmers), 85% of them employ people, 1/3 of them have foreign employees, and 2/5 of them have a foreign office.[43]

[41] The survey is not representative, but the high sample size allows for generalizations. In 90% of cases, the survey was completed by the founders or co-founders, partners or managing directors (CEOs) of the startup, which makes the obtained data and opinions recognized as highly credible. Startup Poland, *Polskie Startupy.* Report 2017.
[42] Startup Poland, *Polskie Startupy.* Report 2017, pp. 6-7, 9 and 13-14, 19.
[43] Startup Poland, *Polskie Startupy.* Report 2018, p. 67 *et seq.*

Selected representatives of Małopolska startups, direct their export efforts, mainly at the beginning, towards English-speaking markets, including the American market:

- **3DKreator** (a representative of the hardware industry) generates 75% of its revenues thanks to export activity through successively expanding the network of distributors and resellers;
- **Base** (a representative of the software industry) has over 7 thous. clients from all over the world, and its CRM solution is mainly used by foreign clients;
- **Brainly** (a representative of the software industry) is active in nearly 40 countries, and its expansion to the US market has also resulted in the acquisition of its largest competitor;
- **Estimote** (representative of the software/hardware industry) has over 60 thous. clients from around the world in its portfolio, including the largest companies from the prestigious Fortune Top 100 list;
- **Lovely** (a representative of the software/hardware industry) from the beginning of its activity was focused primarily on its presence on foreign markets (approx. 90% of revenues in the company comes from export), and its first headquarter was established in the USA;
- **SalesManago** (a representative of the software industry) a team of over 170 people sells corporate services worldwide, thanks to which over 50% of the company's revenue comes from export

- **DuckieDeck**- (a representative of the software industry) mainly directs its services and users abroad. Since the end of 2013, the company's services have been available in the US as an entertainment platform in dozens of restaurants in Poland, e.g., in the McDonald's network;
- **Alvernia Studios** (a representative of the film industry) recognized by the prestigious magazine The Hollywood Reporter as one of the most promising new film studios, it sells its production and post-production services worldwide, including to India, the Czech Republic, Norway, Hungary, Romania;
- **Sinterit** (a representative of the hardware industry) the Krakow manufacturer of 3D printers in the SLS technology after winning the investment round of EUR 1.1 million mainly focuses on the sale of its devices outside the country and focuses on the internationalization of its business.

Import data is less legible in the startup environment as companies are mainly interested in foreign expansion. Import efforts of companies from the hardware segment are mainly focused on the optimization of expenses incurred on the import of parts and subassemblies for the production of machinery or final products.

Referring to nationwide data on international trade, it is worth pointing out that according to the National Bank of Poland, in 2017 export of goods amounted to EUR 201 890 million, and import of goods amounted to EUR 200 464 million. In contrast, revenues from exports of services amounted to EUR 51 866 million, while imports amounted to EUR 33 910 million.[44] The largest trade exchange was conducted with the Member States of the European Union.

Trade in selected services related to the creation of new technologies was in 2016 as follows:

2.6 Characteristics of the market's close environment

The startups market environment, and in particular the quality of the startup ecosystem, is important for the development and success of the Startups. The activities of various types of entities and organizations in a given location are of particular importance for the results of the assessment of the size and quality of the said ecosystem, and above all:

- various types of entrepreneurs[45];
- entities specialized in research (e.g. universities, scientific institutes of the Polish Academy of Sciences, research institutes, universities, etc.) - Małopolska is the second academic center in Poland[46];
- financing institutions such as those providing support from EU funds, venture capital funds, business angels, share crowdfunding platform, etc.;
- supporting organizations, such as incubators, accelerators, co-working spaces.[47]

[44] Narodowy Bank Polski, https://www.nbp.pl/home.aspx?f=/statystyka/bilans_platniczy/bilansplatniczy_r.html.
[45] Statistical Office in Krakow, *Zmiany strukturalne grup podmiotów gospodarki narodowej w rejestrze REGON w województwie małopolskim, 2017,* p. 9.
[46] Statistical Office in Krakow, *Szkoły wyższe w województwie małopolskim w roku akademickim 2016/2017.*
[47] Cf. https://en.wikipedia.org/wiki/Startup_ecosystem.

Table 1. The startup market environment in Małopolska

Accelerators/Incubators	Hub:raum Kraków (Hub:raum is a technology incubator of Deutsche Telekom). Hub:raum supports start-ups from Central and Eastern European countries by accelerating, incubating and accessing the global resources of the telecommunications/IT group. Hub:raum also operates in Berlin and Tel Aviv.	ul. Przemysłowa 12 30-701 Krakow hello@hubraum.com
	Creative Labs - incubator of innovative startups	ul. Dworska 1, 30-314 Krakow office@wearecreativelabs.com http://wearecreativelabs.com/
	Tarnowski Klaster Przemysłowy S.A. – an institution of the business environment, important for the city and sub-region of Tarnów. It has been operating since 1999 for the development of entrepreneurship. The main task is to create conditions and a climate conducive to the development of entrepreneurship, including enabling the development of new and mature businesses. It incubates entrepreneurship.	ul. Słowackiego 12 33-100 Tarnów sekretariat@tkp.com.pl http://www.tkp.com.pl
Coworking	WorkMeUp - a free co-working space. Thanks to the involvement of the District Governor Office and the District Labor Office in Oświęcim, the use of this place is free of charge.	Oświęcim marcin@workmeup.pl http://www.workmeup.pl/
Co-working community	Stowarzyszenie Ambasada Krakowian	ul. Stolarska 6/9 31-043 Krakow http://www.ambasadakrakowian.pl/
Startup community	#OMGKRK	ul. Podole 60, Kraków www.omgkrk.com/
	Innovation Forum Krakow The Innovation Forum is a global grassroots network of over 10,000 innovators who strive to build bridges among industry, academic environment and government.	https://krakow.inno-forum.org/
Hacker community	Hacktory - a community of hackers and enthusiasts of the Internet of Things and the latest technologies: robots, quadrocopters, Oculus, Beacons, Google Glass, Tango. Meetings are organized in the form of workshops.	http://www.hacktorykrakow.com/ https://twitter.com/hacktorykrakow
Community of IT industry	**WebMuses is a community fascinated by the IT industry (**from programming to design**)**	http://www.webmus.es/
Other Funds or Accelerators	**Funds: Innovation Nest, Satus Venture, Innoventure, Leonardo Fund, Fundusz Zalążkowy KPT, Hub:raum; Accelerators: Hub:raum WARP, KPT ScaleUp, Bitspiration Booster**	

Source: Developed on the basis of Startuppoland.org oraz http://www.tkp.com.pl.

Also numerous foreign startups open their branches in the region, which emphasize the importance of many technical universities whose graduates are engineers or programmers.

One of the largest European startup stars in the fin-tech segment is the English company Revolut which employs approx. 100 people in its office in Krakow. By its application the startup offers the possibility to exchange currencies to most of the world's means of payment, "you pay when you

leave" travel insurance and offers the opportunity to buy and keep cryptocurrency in a virtual portfolio.

Uber company has opened in Małopolska its European operations center, employing approx. 150 people.

The next foreign representative in the region is AirHelp, with the headquarter in New York, which assists passengers with cancelled or delayed flights. Azimo, a London-based company dealing in micropayments, has located its R&D department in Małopolska, and Warsaw's game manufacturer and creator of the widely popular Wiedźmin game, CD Projekt RED opened a branch in Kraków to have access to technical university graduates.[48]

Compared to Europe Krakow, just after London and Berlin, is an attractive place to invest in start-ups, attracting entrepreneurs and investors who recommend this city to run businesses.

3. Characteristics of enterprises

3.1 Employment (structure, human capital)

According to Deloitte's estimates, in 2023, startups will create in Poland directly, indirectly and in induced way over 50.3 thousand jobs.[49]

The vast majority of startups employs up to 4 people with full-time equivalents (63.79% employed 1-4 people, 19.54% employed 5-9 people, and 16.67% employed at least 10 people), and almost 90% startup employees had at least undergraduate education (10.4% - higher undergraduate, 15.61% - higher engineering, 57.23% higher master's degree, 5.78% - doctoral degree).[50]

Assuming that in 2016 there were over 180 startups operating in Krakow, it can be assumed that approx. 63.79% of startups in Małopolska employed 1-4 people, 19.54% employed 5-9 people, and 16.67% employed at least 10 people. Moreover, it should be assumed that almost 90% of Małopolska startups employees had at least undergraduate education (10.4% - higher undergraduate, 15.61% - higher engineering, 57.23% higher master's degree, 5.78% - doctoral degree).

Therefore, from the point of view of startups, the origin of human capital is significant. The above is also confirmed by the fact that industries in which Polish startups conduct business require intensive knowledge engagement[51].

It is worth pointing out that the quality of human capital in Małopolska is strongly influenced by the activity of specialized research entities (e.g. universities, scientific institutes of the Polish Academy of Sciences, research institutes, universities, etc.). Małopolska is the second academic center in Poland[52]. In 2017, there were 11 institutes of the Polish Academy of Sciences, 5 research institutes, 21 higher education institutions and 58 other specialized research entities in Małopolska, thanks to which thousands of people with higher education come to the Małopolska labour market every year.

[48] Data source - own study based on the analysis of data found with the desk research method.
[49] Deloitte, *Diagnoza ekosystemu startupów w Polsce, 2016*, pp. 89-90.
[50] Deloitte, Diagnoza ekosystemy startupów w Polsce, June 2016, p. 80.
[51] Deloitte, *Diagnoza ekosystemu startupów w Polsce, 2016*,, pp. 74-75.
[52] Statistical Office in Krakow, *Szkoły wyższe w województwie małopolskim w roku akademickim 2016/2017.*

According to Startup Poland, almost 30% of startups do not employ anyone, 53% employ from 1 to 10 people, and 18% employ more than 10 people.[53] Half of the startups surveyed by Startup Poland, which reaches at least PLN 1 million (i.e. approx. EUR 233 thousand) of monthly income, employs from 1 to 50 people. Half of startups with revenues from PLN 50-100 thousand (approx. EUR 11.6-23.3 thousand) employ between 4 and 10 people (annual revenue per employee in this group is approx. PLN 60-300 thousand per year, i.e. approx. EUR 14-70 thousand).[54]

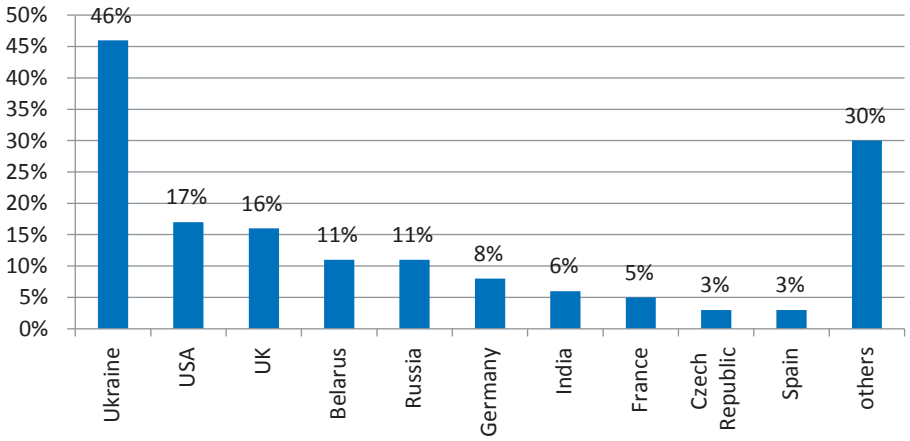
Nearly half of startups in the initial phase employ 1-10 people, where the average is around 4-5 people, and 22% of startups employ more than 10 employees. The visible trend indicates that the largest companies in terms of employment are created among startups offering solutions in the area of technology for marketing and sales (as many as 16% of them employ over 50 people).

The best-developed innovative markets, such as the American, Israeli or Canadian markets, earn on the migration of talents. From a wider national perspective of the startup scene, 26% of companies employ foreign employees. In the environment of Małopolska startups, the trend of employing employees from Ukraine and India is noticed. This is mainly due to the lower costs of employing such an employee, and this is mainly the case for the startups who are in the early stages of internationalization, usually consisting in acquiring foreign clients by email and telephone. When startups grow in strength and raise capital resources for development and move from the phase of raising capital resources (seed stage) to business partnerships with VC funds, then they increase

[53] Startup Poland, *Polskie Startupy.* Report 2018, p. 76.
[54] Startup Poland, *Polskie Startupy.* Report 2018, p. 75.

employment and increase expenditures on acquiring qualified managers with experience derived from the market. international work environments, mainly corporate ones.

Chart 8. Origin of foreign employees employed by Polish startups



Source: Startup Poland, *Polskie Startupy.* Report 2018, p. 82.

It is estimated that 62% of startups employing over 50 people are already enterprises implementing the foreign expansion.

Importantly, startups employing the high number of employees are in the group generating the highest revenues: 72% of startups, which reported revenues exceeding one million zlotys for the previous six months (i.e. approx. EUR 233,000), employ over 50 people in the team.[55]

Małopolska, compared to Poland and the European Union, has a competitive position in the share of human resources in science and technology, in a professionally active population, as well as in the share of research and development scientists in the total number of people employed.

The share of human resources in science and technology, as well as the share of research and development scientists and the share of people employed in research and development in the total number of employees has a significant impact on the development of the startup market.

In 2015, the share of human resources in science and technology in the economically active population in the European Union amounted to 43.3%, and in Małopolska it fluctuated in the range of 40-45% (similar to the Śląskie, Dolnośląskie and Pomorskie provinces). In other provinces this share fluctuated in the range of 30-40%, with the exception of the Mazowieckie province, for which this share fluctuated in the range of 45-50%. The share of research and development scientists in the total number of people employed in 2014 in the European Union on average amounted to 0.83%, and in the Małopolskie province it fluctuated in the range of 0.75-1.25% (comparatively to the Mazowieckie province).[56]

[55] Data source - own study based on the analysis of data found with the desk research method.
[56] Eurostat (online data code: rd_p_persreg).

In the above-mentioned areas, Małopolska presents itself in a competitive way, not only in comparison to the country level, but also to many regions of the European Union. It should also be expected that Małopolska's competitiveness should grow in this respect.

In 2015, the share of people employed in research and development in the total number of employees in Małopolska varied between 1.18 and 1.69%.

3.2 Wages and salaries

In most cases, the median of earnings in startups covered by the Spider's Web probe oscillates between PLN 4-5 thousand net amount (approx. EUR 0.9-1.2 thousand net). The average is already more diverse - it usually ranges from PLN 3.5 to 6 thousands net amount (approx. EUR 0.8-1.4 thousand)[57]. Large startups can offer a level of earnings above the average market earnings, which is approx. PLN 4-6 thousand net (approx. EUR 0.9-1.4 thousand), although it should be remembered that those values depend on a specific job position (e.g. programmer, seller or marketer).[58] [59]

Thus, remunerations in startups are varied and depend on, among others the industry in which they operate. In this regard, it is worth indicating the remunerations of particular industries in Małopolska.

The group most often employed in startups are IT programmers - their employment is reported by 62% of entities. Every third startup also hires employees in sales positions, and the most common form of cooperation are, contracts with self-employed specialists (selected by more than half of the companies).

According to Startup Poland data, in 4% of startups surveyed, the monthly remuneration of a management board member exceeded PLN 20 thous. net (approx. EUR 4.7 thousand), sales managers earn approx. PLN 15,000 net monthly (EUR approx. 3.5 thousand), developers in 80% of startups earn over PLN 5 thousand net (i.e. approx. EUR 1.2 thousand), and in 20% of startups ap-

[57] Spider Web, Ile zarobisz pracując w polskim startupie? – raport Spider's Web, 03.03.2016, https://www.spidersweb.pl/2016/03/startup-zarobki-pieniadze-polska.html.
[58] Forsal.pl, Złoto dla zuchwałych. Jak zarabiają polskie start-upy? http://forsal.pl/artykuly/1099249,ile-zarabia-sie-w-polskich-startupach-wynagrodzenia-w-startupach.html.
[59] The indicated values in PLN should be divided by the conversion rate (the average euro exchange rate announced by the NBP in Table No. 186/A/NBP/2018 of 25 September 2018 amounted to EUR 1 = PLN 4.2939.)

prox. PLN 10-15 thousand net (i.e. approx. EUR 2.3-3.5 thousand). In the smallest startups without the division of functions in the team, the remuneration usually does not exceed PLN 5 thous. net (i.e. approx. EUR 1.2 thousand). Interestingly, 30% of respondents reward employees with shares in the company.[60]

3.3 Market value of enterprises

As previously mentioned, in 2023, the startups that achieve the gazelle status will generate in a direct, indirect and induced way over PLN 2.244 million of value added[61] (approx. EUR 523 m)[62]. In total, the household income generated by the startups in 2023 will amount to over PLN 757 million (i.e. approx. EUR 176 m).[63] Assuming that Małopolska's gross domestic product will account for approx. 8% of Poland's GDP, and approx. 8% of startups will operate in Małopolska[64], (with the gazelle status), it can be initially estimated that in Małopolska in 2023 they will generate approx. PLN 180 million of value added (approx. EUR 42 million). Every fifth company of all Polish startups that have found external capital for the development, uses a foreign source of financing: an accelerator, business angel or venture capital fund. Nearly 44% of startups plan to cooperate with a foreign investor during the next six months, omitting their home VC.

[60] Startup Poland, *Polskie Startupy.* Report 2018, p. 77 *et seq.*

[61] In accounting terms, the value added means that part of the enterprise's output that remains after deducting the value of goods and services used as inputs in the production process, i.e. the intermediate consumption. On the other hand, the value added is the main and most important component of GDP. Deloitte, *Diagnoza ekosystemu startupów w Polsce, 2016*, p. 85.

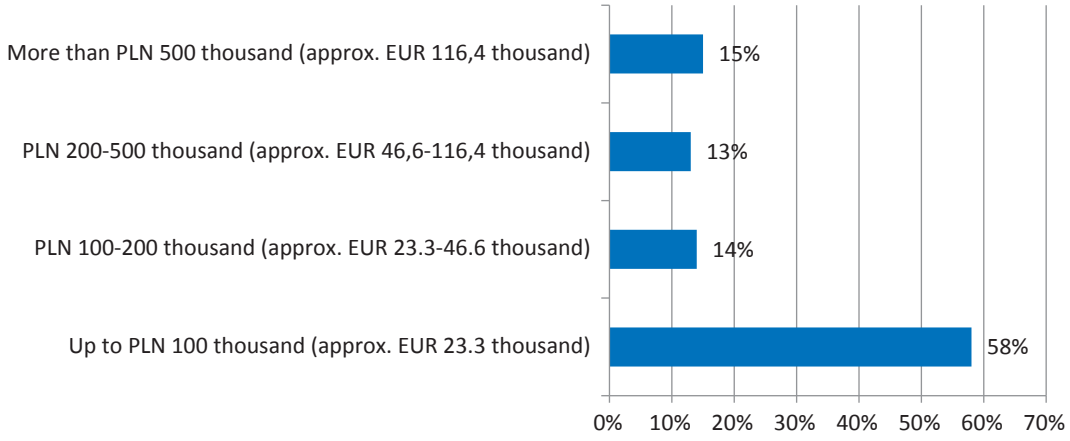
[62] Cf. https://www.nbp.pl/home.aspx?navid=archa&c=/ascx/tabarch.ascx&n=a186z180925.

[63] Deloitte, *Diagnoza ekosystemu startupów w Polsce, 2016*, pp. 89-90.

[64] A survey conducted by Startup Poland on a group of 621 startups from all over the country shows that approx. 7% of respondents are startups from Krakow. As Startup Poland points out, the survey is not representative, but the high sample size allows for generalizations. In 90% of cases, the survey was completed by the founders or co-founders, partners or managing directors (CEOs) of the startup, which makes Startup Poland recognize the obtained data and opinions as highly credible. Startup Poland, *Polskie Startupy.* Report 2017. In the study Startup Poland, *Polskie Startupy.* Raport 2018, p. 15, conducted on a group of 1101 startups, indicates that approx. 10% of respondents are the startups from Krakow.

Nearly PLN 160 million (approx. EUR 37.3 million) is the estimated value of acquired investment sources by Małopolska startups employing 40+ employees on average and operating in foreign markets.

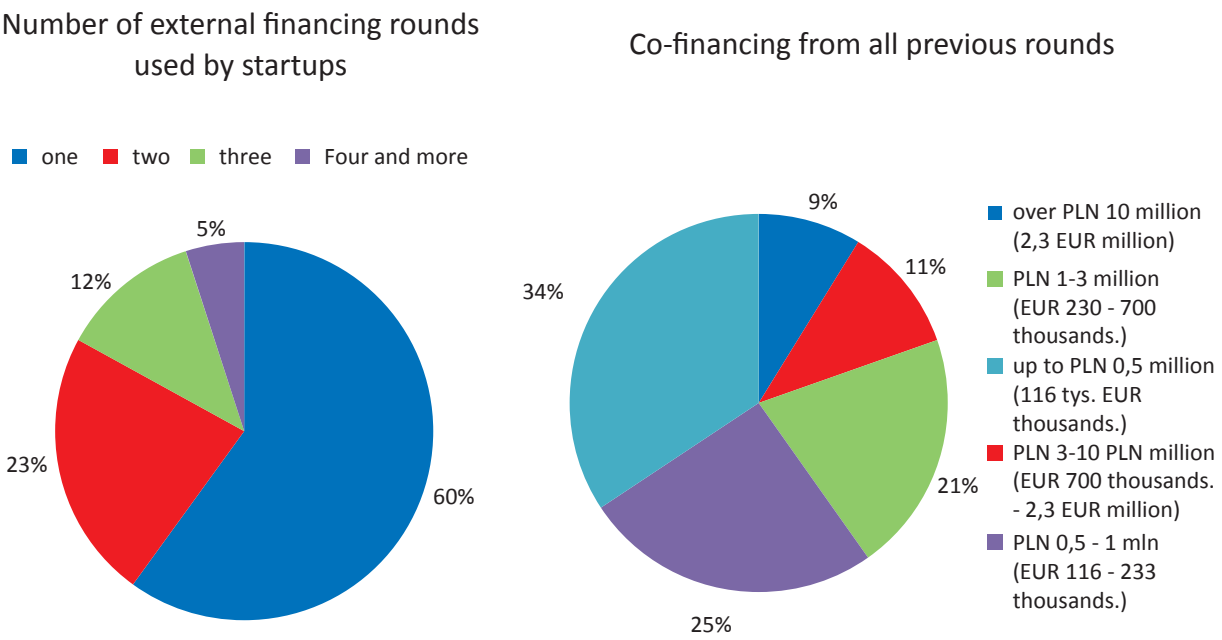
Chart 9. Average monthly income of a startup in one half of 2017.



Source: Startup Poland, *Polskie Startupy. Report 2017*, p. 26.

The largest number of startups pass one funding round (60%). 60% of the total entities financed externally received up to PLN 1 million (approx. EUR 233 thousand), collected in all hitherto rounds acquired from investors.

Chart 10. Experience in the area of external financing rounds passed by startups



Conversion rate: the average euro exchange rate announced by the NBP in Table No. 186/A/NBP/2018 of 25 September 2018 amounted to EUR 1 = PLN 4.2939. Source: Startup Poland, *Polskie Startupy. Report 2017, p.* 28.

There are currently over 1.9 million companies operating in Poland, the vast majority of which are micro, small and medium-sized enterprises (99.8%). 20% of enterprises belong to Małopolska, currently less than 1% of this number are startups.

To estimate the value of the startups market in Małopolska, we assumed earlier in this study that approx. 200 startups found their location in the region, of which 60%, i.e. about 120 companies can boast an investment round of PLN 1 million (approx. EUR 0.23 million). The value of the company when it invests PLN 1 million (approx. EUR 0.23 million) gives us an entity valuation of 10 times more, that is PLN 10 million (approx.2.3 million EUR). With this assumption, this means that the startup market in Małopolska is worth no less than PLN 1.2 billion (approx. EUR 280.5 million).

According to market experts, by 2020 we have a chance to build or start in Poland a startup based on Estonian Skype, which can be supported by EU funds available for the creative industry, especially in the field of Research and Development. However, given the much smaller investment rounds in Polish startups than the general European average - only companies in the software area have the chance to achieve the status desired by unicorn investors - that is, companies valued at over USD 1 billion /EUR 860 million.[65]

[65] See. PARP *"Raport o stanie sektora small and medium-sized enterprises w Polsce 2017 roku".*

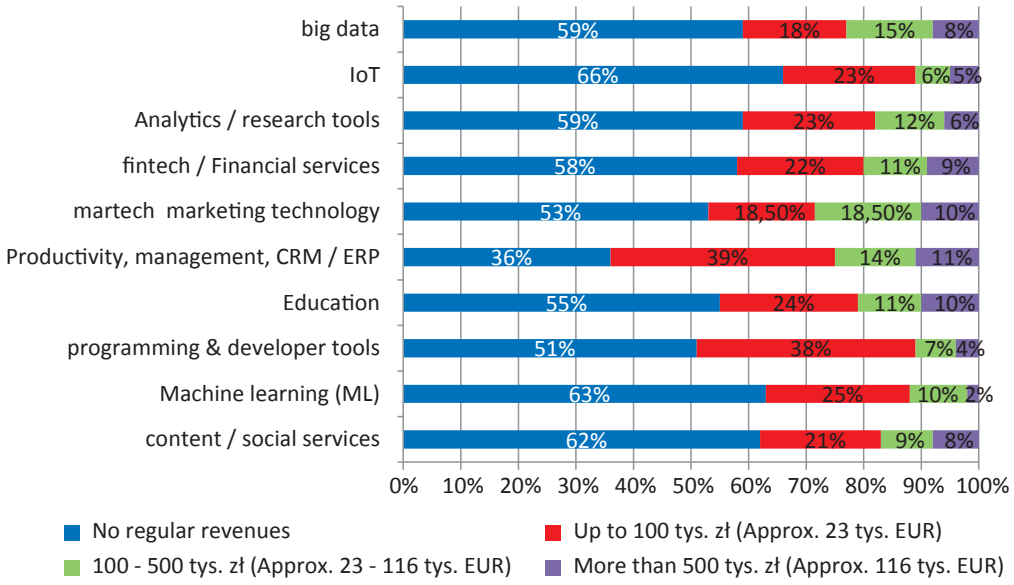
3.4. Financial flows

The level of revenues, the volume of purchased fixed assets and external services.

In 2015, less than 13% of startups did not report any revenues, and 64% of them did not exceed the ceiling of PLN 100 thous. (approx. EUR 23.3 thousand) of revenues. However, the percentage of startups exceeding this threshold is increasing, which can be seen in the comparative data where in 2014 it was 27% of entities, in 2015 already 36% of them, while 2016 showed increases to approx. 60%.

The level of revenues in startups between provinces is similar and shaped according to the chart below.

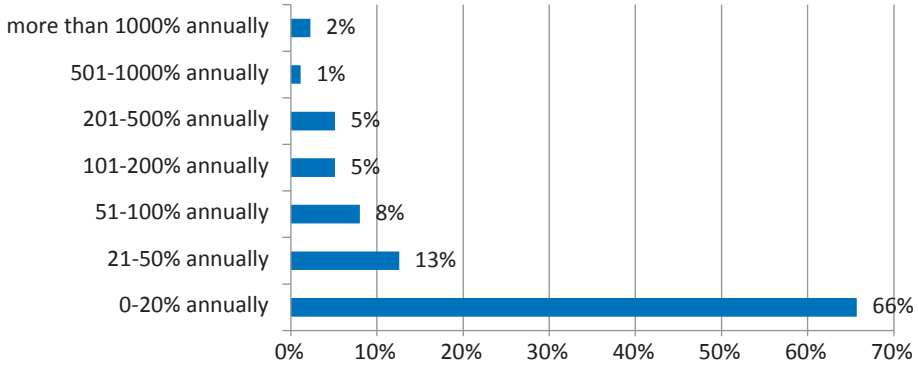
Chart 11. The average level of monthly income of the startups surveyed in particular industries for the last six months



Conversion rate: the average euro exchange rate announced by the NBP in Table No. 186/A/NBP/2018 of 25 September 2018 amounted to EUR 1 = PLN 4.2939. Source: "Startup Poland, *Polskie Startupy.* Report 2018, p. 25.

The following data indicate that every third of the surveyed startups could have boasted an average yearly increase in revenues exceeding 20% over the last three years. Approx. 11% of all domestic startups are allocated to Małopolska (location of startups according to the report Polskie Startupy 2016, Startup Poland) where the major part of the creative segment belongs to software developers and it should be noted that those startups can boast good results and continuous increments.

Chart 12. Average annual increase in revenue of the Polish startups surveyed in 2013-2015

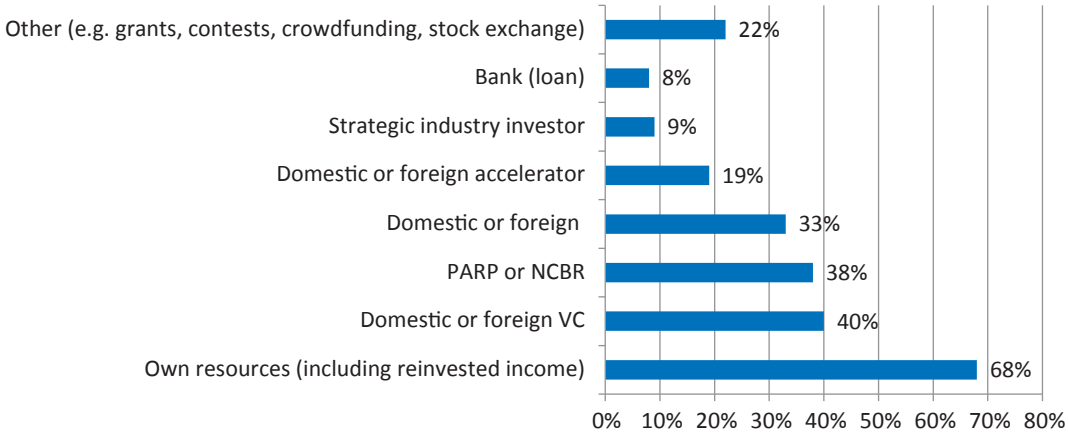


Source: Deloitte Polska *„Diagnoza ekosystemu startupów w Polsce 2016"*, p. 75.

3.5 Division of enterprises by origin of capital

The most common source of funding for startups in Poland is private funding of founders or 3xF (so-called bootstrapping and *friends, family & fools*) what in 2018 refers to 59% of companies[66]. Another source of financing may be financial support provided by the so-called business angel. Nevertheless, the activity of those entities in Poland, including Małopolska, is basically limited only to mentoring, and its price for mediating in finding a suitable investor fluctuates at the level of 1-5% of the value of financing granted to the company. Next, are the funds from strategic Venture Capital (VC) partners, support from or and support from the accelerator. A bank loan is rarely chosen source of financing for startups.

Chart 13. Sources of capital of the startups surveyed



Source: Startup Poland, *Polskie Startupy*. Report 2017, p. 267.

[66] Startup Poland, *Raport Polskie Startupy 2018.*

A survey conducted by Startup Poland[67] on a group of 621 startups from across the country shows that 12% of the startups have a foreigner among the founders.[68]

Assuming that in 2016 there were approx. 2,700 startups[69] in Poland, and approx. 7% of the start-ups were located in Krakow[70], it can be initially estimated that in 2016 there were over 180 startups in Kraków, of which approx. 20 had a foreigner among the founders.

The most popular source of external capital for startups is (domestic or foreign) venture capital, followed by public money from EU funds (PARP or NCBiR). Equally popular as the EU capital is private capital collected from domestic or foreign business angels. Slightly less startups will use capital gained through acceleration programs.[71]

According to the Deloitte survey, the sources of financing the startups in Poland include:

- own funds (including funds from friends and family) - 71.84%;
- current revenues - 44.25%;
- venture capital funds and others - 24.71%;
- grants – 20.11%;
- business partners - 15.52%;
- business angels - 11.49%;
- debt financing (e.g. a loan from a bank) - 9.2%;
- crowdfunding – 5.17%;
- share or similar support by large companies - 4.02%.[72]

4. Domestic and foreign markets

Very often, a startup, focusing on innovative products and services, already at the level of a business plan, takes into account the expansion into foreign markets.

Half of the non-exporting enterprises indicates the too early development stage and the unfinished product as the main reasons for not going abroad and starting a fight for a more demanding

[67] The survey is not representative, but the high sample size allows for generalizations. In 90% of cases, the survey was completed by the founders or co-founders, partners or managing directors (CEOs) of the startup, which makes the obtained data and opinions be all the more recognized as highly credible. Startup Poland, *Polskie Startupy.* Report 2017.
[68] Startup Poland, *Polskie Startupy.* Report 2017, pp. 6-7, 9 and 13-14, 19.
[69] A survey conducted by Startup Poland on a group of 621 startups from all over the country shows that approx. 7% of respondents are startups from Krakow. As Startup Poland points out, the survey is not representative, but the high sample size allows for generalizations. In 90% of cases, the survey was completed by the founders or co-founders, partners or managing directors (CEOs) of the startup, which makes the obtained data and opinions be all the more recognized as highly credible. Startup Poland, *Polskie Startupy.* Report 2017. In the study Startup Poland, *Polskie Startupy.* Raport 2018, p. 15, conducted on a group of 1101 startups, indicates that approx. 10% of respondents are the startups from Krakow.
[70] Ministry of Economic Development, *There is a talent. There is capital. Start in Poland* (https://www.trade.gov.pl/pl/f/v/448224/PPE_PL_broszura%20start%20in%20Poland%2010%202017%20eng.pdf), p. 6 and https://www.pulshr.pl/start-upy/w-2016-r-w-polsce-jest-ponad-2-670-startupow,38584.html.
[71] Startup Poland, *Polskie Startupy.* Report 2017, p. 26.
[72] Deloitte, Diagnoza ekosystemy startupów w Polsce, czerwiec 2016 r., p. 78.

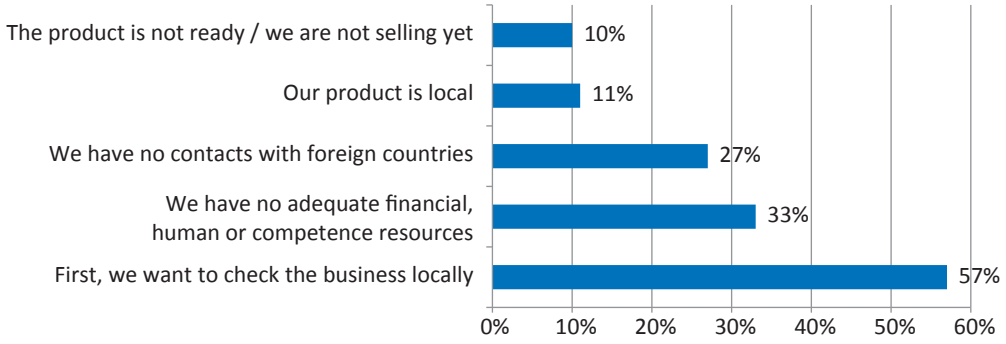
customer. However, as many as 60% of exporters believe that they are at an advanced stage of development, while 75% of non-exporters are in the initial stages.[73]

Over 80% of the surveyed exporters achieve the highest revenues on the markets of the United States or the European Union. On the other hand, the proportion between those two directions has changed: there are more startups selling to EU countries, and the number of those who export to the USA is decreasing. Importantly, as many as 40% of European exporters indicate Germany or the UK as their largest sales markets.[74]

The first version of the product, most often after a period of about 1.5-2 years, is replaced by version 2.0 and this is usually considered by the founders of the startup as an attempt to internationalize the company. This step is associated with large financial expenditures, because the characteristics of foreign markets are completely different and the entrepreneur is repeatedly forced to spend budget expenses for the purchase of licenses, certificates and permits. When we deal with a unique solution on a global scale, the best way to internationalize a product is to patent it (patent pending is the first trademark for a protected solution), which definitely raises value in the eyes of a foreign customer, but is one of the most costly financial operations in the company's life.

The following graphs answer the following questions: why not all companies are ready to conquer foreign markets and what volume of sales generates sales outside Poland and which foreign countries are most often chosen for foreign expansion.

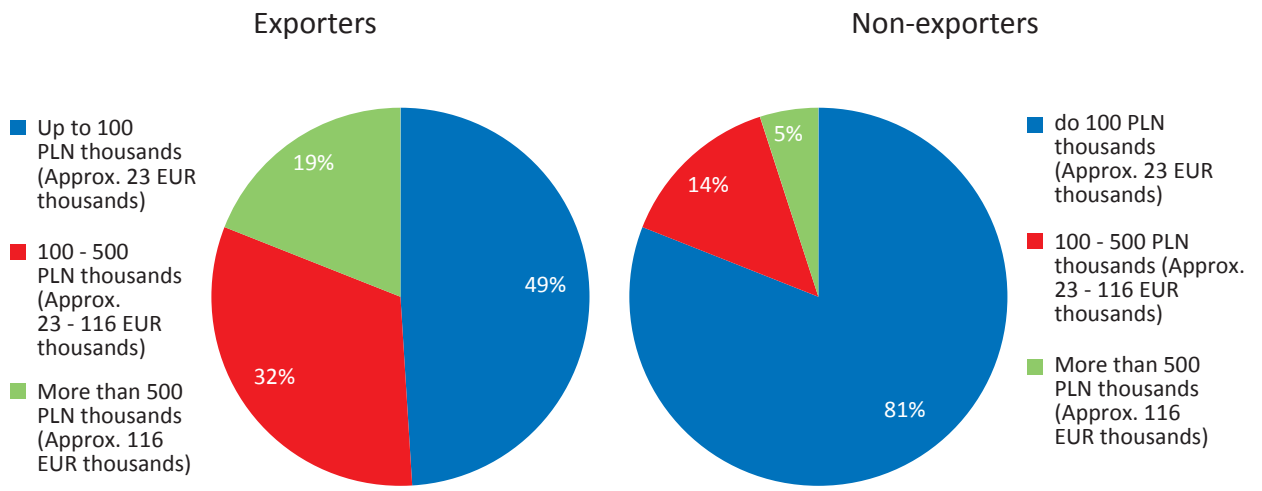
Chart 14. Reasons for not selling abroad



Source: Startup Poland, *Polskie Startupy.* Raport 2017, p. 43, see: the Central Statistical Office data from 2014, see: Report on the condition of the SME sector, PARP, 2016.

[73] Startup Poland, *Polskie Startupy.* Raport 2018. Eksport.
[74] Startup Poland, *Polskie Startupy.* Report 2018, p. 71.

Chart 15. The average level of monthly income from the first half of 2017 (startups earning on regular basis: exporters and non-exporters)



Source: Startup Poland, *Polskie Startupy.* Report 2017, p. 45.

5. The largest representatives of the sector

Over 380 thousand business entities operate in the region and, as statistics show, the number of companies in Małopolska has been growing steadily for several years. For comparison - in 2009, there were 314 thousand registered companies in the Małopolskie province, and in April 2018 those companies accounted for 383 thousand.

The leaders of local startups from Małopolska employ nearly 1000 people.

Table 2. The leaders of Małopolska startups

Logo	Startup	Contact details:	Description
Base	Base	ul. Wyczółkowskiego 7 30-118 Krakow www.getbase.com	• creates CRM software (client relations manager) allowing to manage the sales process in the company comprehensively; • employs approx. 200 people; • gained investment in the amount of USD 53 million/PLN 226 million;
BRAINLY	Brainly	ul. Krowoderska 31-158 Krakow www.brainly.com	• an online portal that allows students to support each other with their homework; • employs approx. 75 people; • gained investment in the amount of USD 38 million/EUR 32.6 million /PLN 139.6 million;
estimote	Estimote	ul. Krakusa 11 30-535 Krakow www.estimote.com	• produces software and devices that allow building mobile applications aware of the real context in which they are used; • the main product is beacons that enable building navigation inside buildings; • employs approx. 70 people; • gained investment in the amount of USD 14 million/EUR 12 million /PLN 51.25 million;

SYNERISE	Synerise	ul. Podole 60 30-394 Krakow www.synerise.com	• creates a marketing tool that processes big data, omnichanel marketing, automation tool; • employs approx. 70 people; • gained investment in the amount of USD 12 million /EUR 10.3 million /PLN 44.1 million;
kontakt.io	Kontaktio	ul. Stoczniowców 3 30-709 Krakow www.kontakt.io	• creates software and productions of beacons; • employs approx. 70 people; • gained investment in the amount of USD 10 million /EUR 8.6 million /PLN 36.7 million;
SALES MANAGO marketing automation	SalesManago	ul. Grzegórzecka 21 31-532 Krakow www.salesmanago.com	• creates software that allows to automate marketing and sales activities in the company; • employs approx. 170 people; • gained investment in the amount of USD 7.5 million /EUR 6.45 million /PLN 27.5 million /;
SILVAIR	Silvair	ul. Jasnogórska 44 31-358 Krakow www.silvair.com	• creates IoT for lighting systems; • employs approx. 60 people; • gained investment in the amount of USD 16 million /EUR 13.7 million /PLN 58.8 million;
ELMODIS	Elmodis	ul. Jana Dekerta 24 30-703 Krakow www.elmodis.com	• creates a system that collects and analyzes information about the operation of machines, e.g. on production lines, and detects anomalies to reduce the costs of servicing and operating them; • employs approx. 50 people; • gained investment in the amount of USD 5 million /EUR 43 million /PLN 18 million/;
SINTERIT	Sinterit	ul. Rzemieślnicza 20G 30-363 Krakow www.sinterit.com	• manufactures desktop 3d printers in industrial SLS technology; • employs over 40 people, and its clients include such brands as BMW, Toyota, Bosch; • German business partner has invested in the company EUR 1.1 million / USD1.28 million /PLN 4.4 million, but the company is already looking for another round of investment also abroad and despite the small first investment round is already known by the world industry of 3D printing and by great corporations;

Source: Own study.

6. Trends, challenges, directions of development

New legal regulations imposed by the EU on the financing of startups through share crowdfunding and an increase in the ceiling for collected funds from PLN 0.4-4 million, i.e. approx. EUR 0.09-0.93 million (without the need for complicated procedures of the Polish Financial Supervision Authority) will definitely increase the popularity of attracting investors ready to support financially a new business project. Perhaps this will also cause greater activity of Polish business angels who are practically invisible.

Corporate investment funds, or CVC, is a new trend to activate the innovation of large corporations that are aware of the lack of ideas or specialists with modern solutions and start verifying Polish and global markets in search of revolutionary solutions. An additional advantage for startups looking for cooperation with CVC is that such funds invest a lot more than typical VCs at the start and mainly finance the tested solutions.

Trends, challenges and directions of startup development are inseparably connected with general trends, challenges and directions of development in the economy and individual sectors. As for Małopolska, the general business climate is assessed favorably, and the best assessment in this respect is reported by companies from the information and communication, as well as from industrial processing sections. Also the general climate for startups seems to be beneficial, including startups operating in Małopolska.

7. Industry events

In Małopolska, over 500 events related to startup and technology take place during the year. A dozen or so hackathons, hundreds of technological meetups, a lot of industry-related meetings, and several initiatives dedicated to women in IT. The key annual events in Krakow are Bitspiration, Digital Dragons (every year in May, the largest B2B event in the gaming industry in this part of Europe), Smogathon (technology in the fight against smog), Startup Week. Open Coffee KRK, Startup Stage, Hive53, and Startup Weekend are held regularly. It's also worth taking part in Impact CEE, Open Eyes Economy Summit, TEDxKraków and TEDxKazimierz.[75]

The most important industry events are:

- **Bitspiration** – the cyclical event for young Polish companies organized since 2012 alternately in Warsaw and Krakow, in 2017 it has changed the formula "We are opening a conference for entrepreneurs ... and we are closing it for investors". Practical knowledge of strategic areas of building a company. Sales and marketing strategy, building and motivating the team and preparing the company for rapid development;
- **Digital Dragons** – held every year in May, the largest B2B event in the gaming industry in this part of Europe, during which the most important prizes of the Polish gaming industry - the Digital Dragons Awards -are awarded.

[75] Startup Poland, *Polskie Startupy.* Report 2017, pp. 74-75.

- **Smogathon** – technology in the fight against smog where the organizers every year are looking for a solution that will fight with air pollution through innovation and modern technologies; started in 2015 as the 24h competition passed through the stage of bootcamp in 2016 to go beyond Poland in 2017 and organize the semi-finals for the best projects in 5 foreign cities with the finale in Krakow;
- **Tydzień Startupów** – startup events accumulated in one week throughout the city of Krakow consisting of open workshops, panels, trainings and networking meetings that aim to show the best existing businesses and support people with an interesting idea in developing their own business initiatives;
- **Impact CEE-** 2-day conference on 4 stages with 8 thematic blocks dealing with new technologies, with speakers from around the world who present their vision of the future and talk about the implementation of modern technologies, which is also an opportunity to meet with innovation leaders from a number of sectors;
- **Open Eyes Economy Summit (OEES)** – international economic summit held in Krakow since 2016, gathering outstanding personalities from the world of science, economics, culture and politics. The congress is devoted to economics based on social values, where intangible assets (e.g. design, social commitment, ecological responsibility), which were usually of secondary importance, become more and more important for brands;
- **#StartUP Małopolska** - a new initiative of the Office of the Marshal of the Małopolska Region addressed to startups and SMEs that are on the market no longer than 24 months and have their registered office in the province; 2 editions of the program took place, in which 15 companies pertecipated, and in autumn 2018 there are 3 ones planned in which during several intense weeks the entrepreneurs will gain practical knowledge of running a startup such as pitching or business globalization;
- **TEDxKraków -** is the local version of the TED conference and part of the TEDx program, i.e. events organized by TED conference fans around the world. The aim of the conference is to spread ideas that change the world, and speakers are outstanding personalities associated with various areas of life.
- **TEDxKazimierz-** a smaller version of the TEDxKraków conference, whose subject matter is mainly IT, startups, motivation, project management and an opportunity for networking;
- **European Startup Days** - as an accompanying event for the European Economic Congress. Presentations of the most innovative products of the Polish economy with a zone that contacting start-ups with corporate managers.

Startups can also benefit from industry-specific national promotion programmes, including:

- biotechnology and pharmaceuticals (see https://biotech.trade.gov.pl/pl/);
- construction and finishing of buildings (see https://construction.trade.gov.pl/pl/);
- car and air parts (see https://parts.trade.gov.pl/pl/);
- IT/ICT (see https://ict.trade.gov.pl/pl/);

- yachts and boats (see https://yachts.trade.gov.pl/pl/);
- cosmetics (see https://cosmetics.trade.gov.pl/pl/);
- machinery and equipment (see https://machine.trade.gov.pl/pl/);
- furniture (see https://furniture.trade.gov.pl/pl/);
- fashion (see https://fashion.trade.gov.pl/pl/);
- Polish food specialties (see https://food.trade.gov.pl/pl/);
- medical equipment (see https://medical.trade.gov.pl/pl/);
- pro-health services (see https://health.trade.gov.pl/pl/).[76]

8. Investment incentives

In 2016, in the Małopolskie province, the government sector spent PLN 768.6 million on research and development activities (approx. EUR 179 million), enterprises allocated PLN 2,232.6 million (approx. EUR 520 million), and universities allocated PLN 43.8 million (approx. EUR 10.2 million), private non-profit institutions allocated PLN 1.2 million (approx. EUR 0.28 million). At the same time, the share of foreign funds amounted to PLN 150.7 million (approx. EUR 35.1 million).[77]

There are various types of investment incentives that may also be taken into account by startup investors. The investors can benefit, among others, from:

- governmental subsidies, which are granted on the basis of the Investment Support Programme of significant importance for the Polish economy 2011-2023 (adopted by the Council of Ministers on July 5, 2011);[78]
- from investment incentives in special economic zones (https://www.paih.gov.pl/strefa_inwestora/sse, if the entrepreneur decides to invest in one of the SEZ, the income that he receives from business activities conducted on its premises will be exempt from income tax);[79]
- the possibility to locate operations in the Krakow Technology Park, thanks to which the gathering of companies from one industry and the R&D facilities will enable entrepreneurs to develop quickly;[80]
- from the property tax exemption (the municipal council may, by way of a resolution, establish an exemption from property tax for entrepreneurs as one of the forms of state aid);[81]
- from exemptions from agricultural and forest tax due to the company's status as a research and development center.[82]

[76] https://www.paih.gov.pl/nasze_uslugi/ekspansja_zagraniczna/branzowe_programy_promocji.
[77] Urząd Statystyczny w Krakowie, *Rocznik statystyczny województwa małopolskiego*, Kraków 2017, p. 266.
[78] https://www.paih.gov.pl/strefa_inwestora/grant_rzadowy.
[79] https://www.paih.gov.pl/strefa_inwestora/zachety_inwestycyjne_w_sse.
[80] https://www.paih.gov.pl/strefa_inwestora/parki_przemyslowe_i_technologiczne/krakow_pt, http://www.ktp.krakow.pl/.
[81] https://www.paih.gov.pl/strefa_inwestora/zwolnienie_z_podatku_od_nieruchomosci.
[82] https://www.paih.gov.pl/strefa_inwestora/zachety_inwestycyjne/centra_badawczo-rozwojowe.

Krakow Technology Park manages a Kraków Special Economic Zone and implements also the new instrument for investors' support – Polish Investments Zone. When an entrepreneur wants to receive public aid in the Małopolska Region, the administrative decision ('Support Decision') in that matter is issued by the Kraków Technology Park on behalf of the Ministry of entrepreneurship and technology. According to the New Investment Support Act, the tax breaks can be granted to businesses that carry out investment projects that include: setting-up of a new facility, production capacity increase, introduction of new products, fundamental change in the overall production process.

At the beginning of July 2018, the City Council of Krakow adopted a new real estate tax exemption that small entrepreneurs, micro-entrepreneurs and startup entrepreneurs who want to develop their business in this city will be able to obtain.

Creating friendly conditions for young startup entrepreneurs is one of the priorities marked in the Krakow Programme for Supporting Entrepreneurship and Economic Development of the City adopted by the resolution of the councilors in January 2017, where comprehensive activities aimed at supporting business in this city were defined.

Moreover, the Polish Development Fund launches several investment instruments in 2018, including the type of fund most dedicated to startups: "Starter", the National Center for Research and Development releases another round of "Bridge Alfa" funds, which should definitely reached by startups.

The Alwernia municipality, known on the Polish map thanks to Alvernia Studios, is preparing new initiatives for entrepreneurs. A resolution is in preparation, which will allow granting tax reliefs to entrepreneurs. One kilometer from the motorway exit, the municipality has approx. 20 ha of land provided for in the spatial development plan for investments located in the Alvernia Studios area, but because plots are smaller and scattered there, which may be difficult for investors, the municipality plans to buy them and their further consolidation for the negotiations with future investors interested in those plots.

Part II. Creative industry

1. Characteristics of the creative industry market

There are many ideas regarding the definition of “creative industry”. The sectors of the creative industry include in particular the following industries:

- advertising and marketing;
- architecture;
- handicraft;
- product, graphic and fashion designing;
- film, television, video, radio and photography;
- IT, software and computer services;
- publishing sector;
- museums, galleries and libraries;
- music, performances and visual arts.[83]

UNCTAD, making statistics on creative industries for creative goods:

- art crafts (e.g. carpets, stationery software, wickerwork);
- audiovisual goods (film, DVD, CD, cassettes);
- design (e.g. architecture, fashion, glassware, jewelry, toys);
- new media (recorded media and video games);
- performing arts (musical instruments and printed music),
- publishing goods (books, newspapers, other printed matter),
- visual arts (antiques, painting, photography, sculpture),

while to creative services, UNCTAD classifies the following industries:

- advertising, market research and public opinion polls;
- research and development;
- architectural, engineering and other technical services

[83] Department for Culture, Media & Sport - Creative Industries Economic Estimates January 2015 „(PDF). Gov.uk. See: https://en.wikipedia.org/wiki/Creative_industries#CITEREFDCMS2001.

- personal, cultural and recreational services (audiovisual and related services and other personal, cultural and recreational services);
- computers and information (including computer services and information services);
- royalties and license fees (franchises and similar rights as well as other royalties and license fees).[84]

From the point of view of the Małopolskie province, the most important industries of the creative industry seem to be video games, film and software, while those industries may include, in particular, entities involved in film-, video recordings- and television programs-related activities, publishing activities in the field of computer games, publishing activities in the field of other software and activities related to software.

2. Selected industries in Małopolska (video games, film, software) and main creative centers

Video games, films and software are some of the areas indicated in the smart specializations of Małopolska, which were presented in the Regional Innovation Strategy of the Małopolskie Province 2020. The representatives of those segments are the most widely described in the below report, because they stand out from the other specialties of creative industries not only in terms of the implementation of their innovative products and services, but also most often they are already companies and brands recognizable on the supra-regional level. Most of them already serve foreign clients and are already at the stage of internationalization of their business activities, applying for this purpose for subsidies from the EU to develop and increase the recognition of their brand in the world. Strictly speaking - those are already mature enterprises with recorded successes.

The capital of Małopolska is an ideal place for modern hubs (places of creative and entrepreneurial meetings for people running a business) and many economic and technological events.

One of the areas of the creative economy is the gaming market - video games. According to the European Games Developer Federation, the revenues of Polish game producers for 2016 amounted to approx. EUR 300 million (about PLN 1,288 billion), a significant part of this industry located its offices in Małopolska. A dynamic regional center supporting the development of the gaming video and film production industry, is the Kraków Technology Park (KTP).

In Małopolska there is also a Film Cluster - a KTP enterprise associating companies from the film industry and experienced individual artists who work in the Małopolska region. The cluster also helps in direct access to film production, filming and post-production processes. To this end, an online platform was also created for the cooperation of creative artists, exchange of information and experience as well as educational and promotional goals which is part of a Creative Małopolska project implemented by the KTP and the Małopolskie province, co-financed by the EU. The aim of the project is to promote the region and companies from the area of small and medium-sized enterprises and the creative industry environment in the international arena, mainly focused on promoting companies from the film industry and video game production. So far, 19 companies from the Małopolska film industry have participated in prestigious film festivals (Berlin, Cannes, etc.). As part of the project, 2 international conferences on co-production cooperation were organized - in

[84] http://unctadstat.unctad.org/wds/ReportFolders/reportFolders.aspx.

2017 within the Krakow Film Festival and in 2018 within the OFF Camera Festival.

There are several film production companies in Małopolska, dealing with post-production and editing activities, especially in making commercials and special effects. One of the examples is the modern film studio in the region Alvernia Studios, which has the largest shadow-free screen in the world, thanks to which it can produce any kind of special effects on the order of a Polish or foreign client from the film, television or gaming industry. Alvernia Studios is a complex of over a dozen recording, film and photo studios used for production, which became the first non-state film production company in post-war Poland.

Film production is often supported by the Polish Film Institute (a national cultural institution responsible for the development of Polish cinematography and for the promotion of Polish film art abroad.

3. Size of the market in Małopolska

3.1 Market value (share in GDP, value in PLN, value of main industries)

The economic context is particularly important in the case of the creative industry - an industry indirectly connected with many other branches of the economy. For example, the market segment associated with the production of software finds its final application in most other industries also thanks to the development of IoT. The more mature the creative industries sector in Poland is, the more its real possibilities of generating economic growth in the country will increase.

In this context, it is worth pointing out that the gross domestic product of Małopolska in 2017 amounted to PLN 142.1 billion (about EUR 33.1 billion), which accounted for 7.9% of Poland's GDP.[85] The value of annual gross domestic product increased (fixed prices; 5% y/y). Gross value added increased (fixed prices; 6.1% y/y). Gross domestic product (current prices) per capita in 2015 in PLN in Małopolska amounted to PLN 42,160 (approx. EUR 9.8 thousand), and for the country it amounted to PLN 46792, respectively (about 10.9 thousand EUR).[86] The sold production of industry in 2017 amounted to PLN 93,590.3 million (in current prices), i.e. approx. EUR 21,796 million. The share of sold production of manufacturing in industrial output (current prices) amounted to 87.2% (similarly as in the country, while in Krakow it was at the level of 68.3%). In 2017 average employment in industry in thous. amounted to 193.2 thousand (in the country of 2649.9 thousand, and in Kraków alone 52.6 thousand).[87]

Assuming that Małopolska's GDP constitutes almost 8% of Poland's GDP, compared to the average concentration in the whole country, there is a high concentration of companies from creative industries and one of the largest dynamics of concentration in Małopolska.[88] It is safe to assume that at least 10% of the total value of production in those industries can be generated in Małopolska.

3.2 Characteristics of the closer environment

Market environment is important for the development and success of creative industries. Of particular significance for the results of the assessment of the size and quality of the said ecosystem are primarily:

- various types of entrepreneurs [89];
- entities specialized in research (e.g. universities, scientific institutes of the Polish Academy of Sciences, research institutes, universities, etc.) - Małopolska is the second academic center in Poland[90];
- financing institutions such as those providing support from EU funds, venture capital funds, business angels, share crowdfunding platform, etc.;
- supporting organizations, such as incubators, accelerators, co-working spaces.[91]

According to the report "Polskie Startupy 2016" prepared by Startup Poland, Krakow is the second most preferred location for entrepreneurs to register a company, after Warsaw. The creative industry is a dynamically developing industry, which to a large extent is based on startups.

Numerous foreign companies are also opening their branches in the region, underlining the importance of technical universities whose graduates are engineers or programmers.

[85] Bankier.pl, PKB województw jak PKB państw, 10-11-2017.
[86] Urząd Statystyczny w Krakowie, *Raport o sytuacji społeczno-gospodarczej województwa małopolskiego w 2017 r., p. 10.*
[87] Ibidem
[88] S. Szultka, *„Klastry w sektorach kreatywnych – motory rozwoju miast i regionów",* 2012, p. 26.
[89] Statistical Office in Krakow, *Zmiany strukturalne grup podmiotów gospodarki narodowej w rejestrze REGON w województwie małopolskim, 2017,* p. 9.
[90] Statistical Office in Krakow, *Szkoły wyższe w województwie małopolskim w roku akademickim 2016/2017*.
[91] Cf. https://en.wikipedia.org/wiki/Startup_ecosystem.

4. Characteristics of enterprises

4.1 Employment

Krakow is a recognizable city among companies that are looking for employees here (e.g. Motorola Solutions). By developing software for public safety systems and through financial center services, the company provides finance and accounting services to Motorola's branches around the world. Similarly, IBM, which employs highly qualified programmers in Małopolska.

The following tables indicate selected annual national and provincial employment ratios.

Table No. 4. Selected annual indicators of companies operating in selected subsectors of creative industries in 2016 (data for Poland)

	Publishing activities in the field of computer games	Publishing activities in the field of other software	Activities related to films, video recordings and television programs	Software related activities
Personnel costs - EUR million	12.3	165.0	129.8	1,896.1
Remunerations - EUR million	10.4	137.6	113.9	1,610.8
Social security costs - EUR million	1.8	27.4	15.9	285.3
Employed persons - number	1,502	8,038	14,012	118,319
Unpaid employees - number	380	1,232	7,785	41,604
Employees - number	1,122	6,806	6,227	76,715
Full time Employees - number	1 020	6,153	5,355	70,796
Turnover per employed person - EUR thous.	90.5	57.8	139.8	59.1
Visible labor productivity (gross value added per person employed) - EUR thous.	34.3	29.5	46.2	27.6
Remuneration adjusted to the work efficiency (visible work efficiency by average personnel costs) - percentage	313.1	121.5	221.6	111.7
Gross value added per employee - EUR thous.	45.9	34.8	103.9	42.6
Share of personnel costs in production - percentage	11.2	38.5	6.2	29.6
Average personnel costs (personnel costs per employee) - EUR thous.	10.9	24.2	20.8	24.7
Employee share in total employees - percentage	74.7	84.7	44.4	64.8
Employment growth rate - percentage	21.6	10.7	3.5	21.1

Employer social charges as a percentage of personnel costs - percent	:	:	:	:
Persons employed in the enterprise - number	3.8	6.3	2.0	3.1
Share of personnel costs in total purchases of goods and services - percentage	19.8	67.7	11.0	64.1
Investments per employed person - EUR thous.	1.9	1.7	4.4	1.4

Source: Own study based on Eurostat.

Referring to province data, in 2017 the average employment in Małopolska in the enterprise sector reached the level of PLN 483.6 thousand persons, an increase of 5.1% compared to 2016 (in Poland the average employment increased by 4.5%, while in Krakow the employment increased by 3.7% and reached the level of 215,3 thousand people).[92]

4.2 Remunerations

In 2017, in Małopolska, the average monthly gross remunerations in the enterprise sector amounted to PLN 4,375.40 (about EUR 1 thousand) and were by 7.6% higher than in 2016 (in Poland the average remuneration amounted to 4 PLN 530.47, i.e. EUR 1 055.10 and increased by 5.9% on an annual basis). The highest average monthly gross remuneration was recorded in the information and communication section, in which there are, among others activities related to films, video recordings and television programmes, publishing activities in the field of computer games, publishing activities in the field of other software and activities related to software. It exceeded by 85.7% the average remuneration in the sector of Małopolska enterprises (amounted to PLN 8123.91, i.e. approx. EUR 1.9 thousand). Remuneration in professional, scientific and technical activity was also quite high - higher by 65.1%.[93] [94]

4.3 Market value of enterprises

The value of the video games market in Poland was most accurately estimated in the "Condition of the Polish game industry 2017" report, quoting the analytical market of the gaming market Newzoo, states that the Polish video game market is worth over EUR 415 million (i.e. about 1, PLN 78 billion), representing 0.10% of our GDP.[95]

According to the "Polish GameDev 2017" survey in Krakow, representatives of the game producers' segment representing the creative industry occupy 31% of new, and 21.3% of all studios in the gaming industry in Poland. Also in this city one of the most important conferences dedicated to the Polish gaming industry is Digital Dragons is held. [96]

[92] Urząd Statystyczny w Krakowie, *Raport o sytuacji społeczno-gospodarczej województwa małopolskiego w 2017 r., p. 24.*
[93] Ibidem.
[94] The indicated values in PLN should be divided by the conversion rate (the average euro exchange rate announced by the NBP in Table No. 186/A/NBP/2018 of 25 September 2018 amounted to EUR 1 = PLN 4.2939.)
[95] Data source - own study based on the analysis of data found with the desk research method.
[96] Data source - own study based on the analysis of data found with the desk research method.

4.4 Financial flows

The following tables indicate selected annual national and provincial financial ratios.

Table No. 5. Selected annual indicators of companies operating in selected subsectors of creative industries in 2016 (data for Poland)

	Publishing activities in the field of computer games	Publishing activities in the field of other software	Activities related to films, video recordings and television programs	Software related activities
Enterprises - number	400	1,286	7,061	38,639
Gross assigned turnover or premiums - EUR million	135.9	465.0	1,958.6	6,992.4
Value of production - EUR million	109.2	428.0	2,092.2	6,403.8
Value added at the actual cost - EUR million	51.5	236.8	647.1	3,267.9
Gross operating surplus - EUR million	39.2	71.8	517.3	1,371.8
Total purchases of goods and services - EUR million	61.9	243.6	1,175.4	2,959.5
Purchases of goods and services purchased for resale as received - EUR million	29.5	44.2	32.3	701.4
Operating gross surplus /turnover (gross operating rate) - percentage	28.9	15.4	26.4	19.6
Value added according to the actual cost in the value of production - percentage	47.1	55.3	30.9	51.0
Share of personnel costs in total purchases of goods and services - percentage	19.8	67.7	11.0	64.1
Share of gross operating surplus in value added - percentage	76.1	30.3	79.9	42.0

Source: Own study based on Eurostat.

The basic economic and financial indicators of the Małopolska companies from all industries were more favorable than in 2016 (the cost level indicator from total activity decreased by 0.3 percentage points (pp), gross profit and net turnover profitability improved - by 0.3 pp, respectively. and 0.2 pp, the financial ratios of the first and second degree increased - by 3.2 pp, respectively. and 1.2 pp., the return on sales of products, goods and materials slightly decreased by 0.1 pp). [97]

[97] Urząd Statystyczny w Krakowie, *Raport o sytuacji społeczno-gospodarczej województwa małopolskiego w 2017 r., p. 81-82.*

5. Directions of expansion and forms of support

When we talk about companies from the video game, film and software industries, the most common model implemented is to first introduce the solution to the Polish market, check it with the eyes of customers and draw all possible conclusions whether the product or service is ready for international expansion.

Participation in promotional events (e.g. fairs) in the country and abroad allows to expand the local market and sometimes gain clients from industries/countries that were not taken into account by companies operating in the creative industries. Additional advantages of being present at this type of events are fair trade prizes that always build a good PR image of the company and allow you to gain better and better commercial contracts.

A Małopolska entrepreneur considering foreign expansion can use two the most popular financial support programmes for promotional activities during fairs or foreign missions: Go To Brand organized by PARP with the support of European Funds or Horizon 2020 Programmme for financing research and innovation in the European Union.

At the same time, the Foreign Trade Offices of the Polish Investment and Trade Agency may be an important support for the Małopolska companies in the foreign expansion.

The list of the Foreign Trade Offices of the Polish Investment and Trade Agency you can find on the website https://www.paih.gov.pl/en

6. The largest representatives of the sector

Over 380 thousand business entities operate in the region and, as statistics show, the number of companies in Małopolska has been growing steadily for several years. For comparison - in 2009, there were 314 thousand registered companies in the Małopolskie province, and in April 2018 those companies accounted for 383 thousand.

The leaders of local startups from Małopolska employ a total of nearly 1000 people.

Table No. 6. Examples of Małopolska companies operating in the film and video game industries

Company	Contact details	Description
Alvernia Studios	ul. Ferdynanda Wspaniałego 1, 32-566 Alwernia www.alvernia.com	• this is the best-known private film studio in Poland (also involved in post-production of video games), which in 2018 for EUR 50 million/ PLN 213 million was taken over by the publisher of the Rzeczpospolita Gremi Group daily and which has plans to invest the second as much in the development of start-up film production technologies using AR technologies (connection of the real and virtual world) and VR (virtual reality);
DuckyDeck	ul. Ślusarska 9 30-710 Kraków http://duckiedeck.com/	• an online gaming platform for children in the form of an application for mobile devices employing over 20 people and having in its clients portfolio, among others McDonald restaurant chain; • toy manufacturer Hasbro; • their gaming applications have been downloaded over 8 million times.
Gamedesire	ul. Promienistych 1 31-481 Krakow http://company.gamedesire.com/	• creates multiplayer games for players from around the world; • applications are available on many platforms;
Reality Pump Studios - branch TopWare Interactive AG	28 Lipca 1943 – 17a 30-233 Krakow http://www.realitypump.com	• creator of world-famous video games for platforms such as Xbox 360/One, PlayStation 3 and 4, PC, Mac, Android, iPhone and iPad
Bloober Team S.A.	Cystersów 9 31-553 Krakow https://www.blooberteam.com/	• video game producer;
BulbWare	Krakow http://www.bulbboygame.com/	• video game producer.
7Levels	al. Beliny-Prażmowskiego 69/1A, 31-514 Krakow 48 660-730-293 www.7lvls.com	•
Badly Interrogated	ul. Czerwone Maki 45/6 30-392 Krakow www.badlyinterrogated.com	•
FGI Studio	ul. Podole 60 30-394 Krakow office@fgi-studio.com www.fgi-studio.com	•
Home Net Games	homenetgames@gmail.com www.homenetgames.com	•
Red Limb Studio	Tymbark 310 34-650 Tymbark homenetgames@gmail.com www.redlimbstudio.com	•

Moonlit	ul Łobzowska 16/9 31-140 Krakow +48 511 459 001 www.moonlit.pl	•
Redi Games	ul. Zamkowa 2a/2 30-301 Krakow www.fb.me/RediGames	•
One More Level	Os. Złotego Wieku 89 31-618 Krakow info@omlgames.com www.omlgames.com	•
Teyon	ul. Bociana 6 31-231 Krakow mateusz@teyon.com www.teyon.com	•
Polyslash	ul. Podole 60/1.13 30-394 Krakow contact@polyslash.com www.polyslash.com	•
Two Mammoths	info@twomammoths.com www.twomammoths.com	•
Reality Games	ul. Podole 60 30-394 Krakow https://wearerealitygames.com/#contact www.wearerealitygames.com	•
GameDesire	31-481 Krakow ul. Promienistych 1 www.gamedesire.com/pl/help/contact-form www.gamedesire.com	•

Source: Own study

7. Industry events

In Małopolska, many events related to creative industries take place throughout the year, e. g. hackathons, technological meetups, industry-related meetings, and several initiatives dedicated to women in IT. The key annual events in Krakow are Bitspiration, Digital Dragons, Smogathon (technology in the fight for clean air) and Startup Week. Open Coffee KRK, Startup Stage, Hive53, and Startup Weekend are also held regularly. It's also worth taking part in Impact CEE, Open Eyes Economy Summit, TEDxKraków and TEDxKazimierz.[98]

The most important events related to the video game, film and software industries include:

- **Digital Dragons** – held every year in May, the largest B2B event in the gaming industry in this part of Europe, during which the most important prizes of the Polish gaming industry - the Digital Dragons Awards are awarded.
- **Kraków Film Festival** - one of the oldest events in Europe (from 1961) devoted to documentary, animated films and short feature films during which the following 4 equivalent contests take place: documentary, short, Polish films and DocFilmMusic music documents; festival; the festival lasts 8 days and viewers have the opportunity to see approx. 250 films;

[98] Startup Poland, *Polskie Startupy.* Report 2017, pp. 74-75.

- **Off Camera Festival -** a festival of Polish and foreign independent cinema that has been held in Krakow for 10 years. The festival's repertoire includes both reviews of film productions from various parts of the world as well as retrospectives of the most outstanding creators of world independent cinema. In 2018, the festival funded the highest monetary prize in history of PLN 300,000. (i.e. approx. EUR 69.87 thousand)
- KTP regularly organizes KrakJam, a 48-hour marathon for creating computer games, being part of the Global Game Jam global initiative. Another project is Creative Małopolska, which promotes the Małopolska film industry and the gaming industry abroad. Thanks to the participation in the project, the companies present their offer and establish business contacts with foreign partners during industry meetings. As part of a separate project called "Game Academy", GameDesire Company together with Digital Dragons and the Krakow Technology Park organize regular computer game development courses conducted by the best industry experts.

8. Investment incentives

There are various types of investment incentives that can also be taken into account by investors investing in the creative industries market, in particular in the video game, film and software industries. As in the case of the startups, those investors can use, among others, government grants, which are awarded on the basis of the *Programme for Supporting Investments of Major Importance to the Polish Economy for the Years 2011–2023*, investment incentives in special economic zones, opportunities to locate their acitivities in the Krakow Technology Park, exemption from

property tax or exemptions from property tax, agricultural and forest taxes due to the company's status of a research and development center.[99]

Creating friendly conditions for companies operating on the creative industry market is one of the priorities of Małopolska. Moreover, the Polish Development Fund introduces investment instruments, and the National Center for Research and Development awards grants available for the creative industry as well.

On July 24, 2018, the Polish Government adopted a new bill on supporting audiovisual production, thanks to which the Polish Film Institute (PISF) will financially support the production of audiovisual works created in Poland.

According to the bill, audiovisual producers, co-producers and entrepreneurs performing services for the production of audiovisual works may be reimbursed for some of the costs incurred for the production in Poland. The reimbursement will be paid only after completion of the production, or part thereof, and incurring all costs related to it by the producer. Before receiving support, the producer is, in principle, to pay tax liabilities related to audiovisual production performed in Poland. The annual co-financing budget was set at PLN 200 million (approx. EUR 46.58 million), and at least 10% of the amount dedicated to financial support will be granted to the production of animated films and series, which will boost the situation of Małopolska film companies.

The Regional Film Fund created by the Krakow Festival Office on behalf of the Mayor of the City of Krakow selects the most interesting projects by way of a competition and makes a financial contribution to their production. The basic criterion for the selection of supported film productions is their connection with Krakow and Małopolska, which may contribute to the tourist and economic promotion of the region.

9. Trends, challenges and development directions

Also the general climate for entities operating in the creative industries seems to be beneficial for Małopolska, and the biggest challenges result from the shortage of qualified employees and rising employment costs (see the above chapters).

The coming years will bring positive changes to the gaming and film industry thanks to new solutions for AR (augmented reality) and VR (virtual reality) technologies. Mainly, the lower price of special goggles to recreate artificial reality, which is gradually dropping, is starting to drive producers to create new generation content.

The challenge for the Małopolska and domestic film industry is the requirements of digitization of the films produced. This is now a key market trend, which is necessary to anticipate in the next few years to increase interest among software companies developing specialized software for all industries, including the public sector.

[99] https://www.paih.gov.pl/strefa_inwestora/.

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