Professional MBA
Entrepreneurship & Innovation

The Austrian startup ecosystem: an analysis of its competitive position among EU countries and its attractiveness to entrepreneurs from selected CIS countries

A Master's Thesis submitted for the degree of
“Master of Business Administration”

supervised by
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Vienna, 30.06.2019

Affidavit

I, **LEONID MERZLYAKOV**, hereby declare

1. that I am the sole author of the present Master's Thesis, "THE AUSTRIAN STARTUP ECOSYSTEM: AN ANALYSIS OF ITS COMPETITIVE POSITION AMONG EU COUNTRIES AND ITS ATTRACTIVENESS TO ENTREPRENEURS FROM SELECTED CIS COUNTRIES", 117 pages, bound, and that I have not used any source or tool other than those referenced or any other illicit aid or tool, and
2. that I have not prior to this date submitted the topic of this Master's Thesis or parts of it in any form for assessment as an examination paper, either in Austria or abroad.

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Abstract

The main objective of this thesis is an assessment of the Austrian startup ecosystem competitive position. The assessment was performed through triple-layer analysis. The first layer contains a quick examination of the entrepreneurial and innovation ecosystems as fundamental structures of the startup ecosystem. The examination was performed for Austria and other selected EU countries. The second layer examined selected startup ecosystem domains of Isenberg model and analysed the attractiveness of the highlighted countries for EU startup founders. The third layer included a measure of the Austrian startup ecosystem attractiveness for entrepreneurs from the selected CIS countries through the discussion of survey outcome. The attractiveness of the ecosystem to foreign high-tech entrepreneurs is particularly important because of their significant impact on the host country entrepreneurial landscape and country's wealth. Summary of this research helps to understand competitive position, strengths and weaknesses of the Austrian startup ecosystem as well as highlight factors, which affect the country's attractiveness to foreign entrepreneurs when they choose new jurisdiction to relocate their venture abroad. Survey outcomes can be potentially utilised to improve Austrian startup ecosystem's competitive offer by private and public institutions as well as by entrepreneurship development institutions in CIS countries to deeper understand ongoing processes and interaction between local and foreign startup ecosystems.

Keywords: startup, ecosystem, competitiveness, attractiveness, immigrant, entrepreneur, Austria, EU.

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"By enabling innovative companies to launch and scale their business ideas, we aim to stimulate economic growth and job creation, and identify and scale effective solutions to critical development issues, like access to clean energy and water, health services, and education".[1]

Anabel Gonzalez
World Bank Group
Senior Director for Trade & Competitiveness

Introduction

1.1 Problem formulation

One of the major goals of every state is the increase of national wealth through the support of economic growth, creation of new jobs and development of industries with high added value. Increase of Gross Domestic Product (GDP) is the most direct and clear metric of such growth. Economic development and prosperity bring numerous benefits to the society, including the growth of income for individuals and corporations, reduction of unemployment, a decrease of government borrowings, growth of investments in real and financial sectors, increase of spending on fundamental research and development etc. Economists determine four main factors contributing to such growth.

The first factor is **human resources**, i.e. the number of workers/employees, their qualification and skills, the general level of society development.

The second factor is the **availability of natural resources**, though it seemed like an important factor into the past decade, nowadays it is a supplementary factor, while extraction and selling of such resources have a moderate added value versus the use of such resources in the creation of high technological products. A typical example of moderate importance of natural resources in economic growth is Russia. This resources-reach country had current GDP of 1,578 Trillion US Dollars as of the year 2017, at the same time, Japan with almost no resources and

[1] http://www.worldbank.org/en/news/feature/2016/06/20/entrepreneurs-and-small-businesses-spur-economic-growth-and-create-jobs

about 45 times smaller territory had a GPD of 4,872 Trillion of US Dollars, what is more than three times higher.

The third factor is **capital formation** – this factor represents a change in inventories and fixed assets. The latter mainly represented by new plants, machinery, the building of infrastructure, construction of roads, etc. While this factor is still an important contributor to GDP, the importance of it slowly declines. According to World Bank data, Gross capital as a percentage of GDP decreased from 28,224% in the year 1974 to 24,202% in the year 2017. Such a 14% drop represents a redistribution of growing factors importance within GDP.

The fourth factor is **technology development and entrepreneurship**. Latest studies pay significant attention to the entrepreneurship as a growth driver of the national economy. Impact of entrepreneurship was described by J. Schumpeter in "Theory of Economic Development". Schumpeter determined economic development as "Spontaneous and discontinuous change in the channels of flow, disturbance of equilibrium, which forever alters and displaces the equilibrium state previously existing" (Schumpeter, 2017).[2] Schumpeter's economic activity is the concept of circular flow, where supply, demand and competitiveness seek equilibrium. This state of the economy is static and characterised by a lack of economic growth and routinisation of business processes. A major role in the disturbance of this static state belongs to entrepreneur, who initiates the disruption by exploiting opportunities, non-routine solutions (innovations) and willing to receive adequate profit. Entrepreneurial behaviour disrupts the static flow and irretrievably improves the basics of business processes. Later, essential categories of dealing with uncertainty and risk were further elaborated and firmly connected with the phenomenon of entrepreneurship by (Knight, 1921) in the book "Risk, uncertainty, and profit".

Globally, entrepreneurship is mostly represented by small and medium enterprises (SME). SMEs can be determined by the number of assets, number of employees, but such classification may vary significantly, depending on the region. All present corporations started once as SMEs in some garages and basements (Edit, 2005). Therefore, SME is a classification of the venture, created by entrepreneur and therefore entrepreneurship is the underlying and most important structure. Globally, SME comprises from 81 to 99% of all the companies, but SMEs group is heterogeneous and consists of many sub-groups from individual farmers and family-owned enterprises in rural areas to small high-tech firms developing sophisticated technologies (WorldBank). But not all kinds of entrepreneurship drive economic development, some developing countries have the highest number of entrepreneurs and the highest self-employment rate.

[2] Schumpeter, J. cited by F. E. Langroodi

Zambia and Nigeria are good examples of low-income economies, where insufficient infrastructure and lack of human capital create numerous low assets entrepreneurs, that are neither innovative nor high growth (Ács, et al., 2018, p. 25). Such kind of entrepreneurship is so-called necessity-driven, where the main motivation is lack of alternative sources of income, survival and search of means of substance.

Study of (Hilson, et al., 2018) exemplifies that in sub-Saharan Africa most members of Artisan Small scale mining communities are "more of the 'necessity entrepreneur' variety and only a select few can flourish as 'true' entrepreneurs in the small 'space' available to innovate". This thesis is supported by (Edit, 2005, p. 6) findings: "a significant section of SMEs in developing countries remain in traditional activities generally with low levels of productivity, poor quality products, serving small, localized markets. There is little or no technological dynamism in this group, and few "graduate" into the large size or modern technologies. In many poor countries, there is also a large underclass of (formal and informal) microenterprises that ekes out a bare survival".

Scientific findings demonstrate that economic development is strongly connected with opportunity-based, innovative entrepreneurship and developed countries benefit a lot form such kind of entrepreneurial activity and recognize the necessity of its development and support. Apparently "The European Commission considers SMEs and entrepreneurship as key to ensuring economic growth, innovation, job creation, and social integration in the EU" (Papadopoulos, et al., 2018). In the United States "annually 50% of gross job creation is accounted for by only 15% of firms, most of which are young startups" (Decker, et al., 2014).

Countries are searching for special receipts to boost economic growth through opportunity-based innovative entrepreneurship an improve national entrepreneurial systems. Nevertheless, such special "kind" of entrepreneurs demand non-conventional conditions to flourish and grow; this is where the startup ecosystem appears. Many attempts to copy "Silicon Valley model" as a most successful ecosystem failed, despite the fact, that main ingredients of ecosystem remain well-known. Often, numerous efforts of private institutions and public bodies in the development of startup ecosystem have a little effect and search of proper "recipe" and identification of country's unique traits and propositions are still on the agenda.

As an ecosystem develops, it passes through many stages, and transition from local to the global ecosystem is associated not only with access to the global resources but also with global recognition of such ecosystem and openness for foreign talents and immigrant entrepreneurs. Numerous studies show that immigrant entrepreneurs and talents overall more successful in entrepreneurship than natives and more involved in innovation activity. Measurement of startup

ecosystem openness to innovative immigrant entrepreneurs and ecosystem attractiveness is highly important in the assessment of ecosystem overall competitiveness. Within the European Union environment, where freedom of movement and common market allow the high-tech business to free float in search of best possible conditions, stakes are especially high. Therefore, open and attractive startup ecosystem could become a strong competitive advantage.

The present master thesis explores strengths, weaknesses and unique traits of the Austrian startup ecosystem and highlights its attractiveness for foreign entrepreneurs from selected CIS countries, particularly from Russia. Russia was taken as a significant CIS country (Commonwealth of Independent States - the union of former Soviet Union republics) with the weakly developed startup ecosystem, overall insufficient entrepreneurial environment and at the same time, high level of human capital. Research pays special attention to the most evident characteristics of the Austrian startup ecosystem, which may affect the decision of entrepreneurs from developing countries, while they consider moving their startup abroad.

The success of startup ecosystems in the United States is so significant that they attract thousands of foreign entrepreneurs (startup founders) from all over the world. Researcher in this study hypothesizes that Austria as a well-developed economy may be a regional startup hub for entrepreneurs and startup founders from neighbouring developing countries, i.e. countries from Central and Eastern Europe, including some CIS countries (Russia, Ukraine, Belorussia, etc.). While CEE countries – members of the European Union have fewer barriers and are in a common economic environment, CIS countries like Russia suffer from lack of infrastructure, insufficient governmental policies and unsatisfactory economic environment. Those unfavourable conditions inhibit startup growth. Therefore, many local entrepreneurs are looking for foreign startup ecosystems to relocate their ventures and get access to essential resources, like markets, financing, infrastructure, legal protection, etc.

It is important to underline, that available studies incompletely cover the link between attractiveness of the startup ecosystem to foreign entrepreneurs and ecosystem performance. What characteristics of the ecosystem are most important to foreign entrepreneurs, while they relocate their startup venture abroad and can these characteristics be revealed in the competitive analysis? Implications of this research are particularly important to close the potential gaps in Austrian startup ecosystem development and improvement of competitive position.

1.2 Statement of the problem

For this study, the researcher formulated two main problems related to the success of the Austrian startup ecosystem in the EU area.

Problem 1: What is the current competitive position of Austrian startup ecosystem versus EU leaders? What is the level of the Austrian startup ecosystem development?

Problem 2: How entrepreneurs (startup founders) from the selected CIS country perceive Austria and other EU leading countries as a potential destination for their startup?

Development of the efficient startup ecosystem is a sophisticated and long-lasting process for every state, and as practice reveals, there is no one size fits all solution. Up-to-date analysis of ecosystem competitive position is an essential step to understand further necessary actions for further development of a startup ecosystem.

Quick outlook shows that Austria is not among leaders of the EU startup scene despite well-developed infrastructure and continuous efforts of the public institutions. Startup founders within the EU as well as outside the EU are moving abroad for many reasons and choose of the proper country and ecosystem is one of the key success factors for a new venture. If the startup ecosystem is attractive for foreign founders, it is highly likely to be attractive for the majority of local founders as well.

In this study, the researcher reveals and estimates these factors and make recommendations for ecosystem improvement. Those recommendations can be utilised by private and public institutions to understand the status quo of the Austrian startup ecosystem and determine potential steps to improve its competitiveness and attractiveness.

1.3 The objective of the Master Thesis

Based on the problems stated in the description above, three main purposes of the present Master Thesis are formulated as follows:

The first objective is the research of the available theoretical studies to understand the place of startup ecosystem within the general business environment of the country and factors, influencing startup ecosystem competitiveness as well as the impact of immigrant entrepreneurs.

The second objective is the selection of several most advanced startup ecosystems in the European Union and the comparison of those ecosystems to the Austrian one in order to assess the Austrian startup ecosystem competitive position, strengths and weaknesses.

The third objective is the measurement of the Austrian startup ecosystem attractiveness and perception through the field research among CIS entrepreneurs and the interpretation of its results cumulatively with implications from the first and second objective.

1.4 Ethical considerations

There are two main ethical issues related to this research.

The first ethical issue is the brain drain problem, associated with the migration of tech entrepreneurs and talents. The researcher perceives the situation in Russia and other CIS countries as unsupportive and to some extent hostile to entrepreneurs. Therefore, through the measurement of potential attractiveness and development level of the selected EU and Austrian ecosystems, the researcher tries to understand available possibilities and the current attitude of those entrepreneurs to potential business migration. Relocation to the safer and more developed ecosystem may provide more opportunities to high-tech entrepreneurs and is overall beneficial on a global scale. Various studies reveal that entrepreneurs' migration is not a zero-sum game. As an example, in the U.S., immigrant entrepreneurs and tech talents, often keep connections with their home countries, facilitate common trade and reinforce connections in business and scientific environments.

Not all entrepreneurs and tech talents have a propensity to leave their home countries, thus the act of migration or intention to do so is a demonstration of individual's free will, and cannot be discussed within any political or national-interest contexts, rather discussion is to be organized in respect of ecosystem's existing status quo and available possibilities for self-realization for high potential individuals.

The second ethical issue is linked to the privacy of the respondents' personal data. Thus, any collected personal data is to be kept within one month after the submission of the present master thesis and will be permanently destroyed afterwards. The researcher takes all the necessary and reasonable steps to prevent any data leakage and assumes responsibility to act honestly and in full respect to the disclosed personal information.

The researcher did not receive any grant or specific funding from any private or public agency, institution or corporation to perform present study.

Theoretical background of the startup ecosystem

1.5 Chapter overview

To determine how immigrant entrepreneurs and foreign startup founders could affect the competitiveness of Austrian startup ecosystem, it is important to start from definition and evolution of such underlying terms like entrepreneur, ecosystem and answer the question: why the phenomenon of entrepreneurship is so important to society welfare and how it impacts the economic growth of the country? What distincts entrepreneurship in developing and developed countries? How such distinctions stimulate private and public institutions to create special conditions for innovative and potentially high-growth ventures? Answers to these questions bring us to the understanding of the startup ecosystem phenomenon. Analysis of startup ecosystem development phases links us to the understanding of the importance of immigrant entrepreneurs' factor and its connection with overall ecosystem competitiveness.

1.6 Definition of entrepreneurship

There are many definitions of entrepreneur and entrepreneurship up to date, defining entrepreneurship and entrepreneur and get exact definition is important to further elaboration of topic. Definition of entrepreneurship gradually evolved from the early definition of R.Cantillon (1755) *"Entrepreneur an "undertaker, a person that does not retreat from engaging in risky business ventures. He buys and produces goods for a certain price to sell it later on at a yet unknown price. His disposition to face risks makes him an entrepreneur"*.[3] Jean-Baptiste Say (1834) "*The Entrepreneur shifts economic resources out of an area of lower and into an area of higher productivity and greater yield".*[4] Later, by François Quesnay (1888) category of capital was added as an entrepreneurial activator. Function of entrepreneur determined by (Schumpeter) is *"to reform or revolutionize the pattern of production by exploiting an invention or, more generally, an untried technological possibility for producing a new commodity or producing an old one in a new way, by opening up a new source of supply of materials or a new outlet for products, by reorganizing an industry and so on"*, entrepreneur acts *"with confidence beyond the range of familiar beacons"*.

[3] Cited by (Śledzik, 2013)
[4] Cited by (Drucker, 1985)

Merriam-Webster defines *"Entrepreneur as one who organizes, manages and assumes the risks of a business or enterprise"* (Merriam Webster Glossary). Global Entrepreneurship Index 2018 : *"Entrepreneur is a person with the vision to see innovation and the ability to bring it to market"* (Ács, et al., 2018, p. 17).

Based on these definitions, the **entrepreneur is an actor, characterised by special mindset and ability to determine and use opportunities; entrepreneur can act in a risky and uncertain environment, needs capital to boost its activity and bring a new product to the market and create value through innovation**.

1.7 Types of entrepreneurship and effect on a country's wealth

This aggregate definition of entrepreneurship brings us to the idea that not every kind of business activity considers as entrepreneurial, as many of them are not innovative, nor deal with uncertainty.

According to Global Entrepreneurship Monitor (Bosma & Kelley, 2019), some countries like Uganda, Nigeria and Angola have a very high indicator of total entrepreneurial activity, but high value doesn't mean that these countries are really in entrepreneurship according to the aggregate definition given above. Those high level of activity is mostly driven by necessity rather than opportunity and has a little or no innovative component. Necessity entrepreneurs don't have a better option in the local labour market than become an entrepreneur. Moreover, the country's infrastructure and low level of human capital don't allow entrepreneurs to grow and innovate. Such necessity choice doesn't create substantial additional value nor extra jobs and therefore doesn't contribute to economic development.

Global Entrepreneurship index (hereinafter – GEI) (Ács, et al., 2018) underlines that opportunity-driven entrepreneurship is on the opposite scale to necessity and is defined as qualitative entrepreneurship. Opportunity-driven is strongly associated with substantial impact on job creation and aimed to develop scalable, innovative products. Innovative doesn't always mean high-tech, sometimes new processes or recombination of available resources may add substantial competitive advantage to the existing or new product.

This kind of entrepreneurship matches with the aggregate definition elaborated above and should contribute economic growth based on the Schumpeterian model.

An empirical study performed by (Valliere & Peterson, 2009) demonstrates that entrepreneurship impacts a country's development, but the effect on developing and developed

countries is different. There is a strong positive impact in developed countries, where *"..high-expectation entrepreneurs exploit the elevated levels of national knowledge development and freedom from government interference to generate economic output and growth…"*. Those implications were supported in another research (Ivanovic-Djukic, et al., 2018) where opportunity entrepreneurship strongly correlates with economic growth.

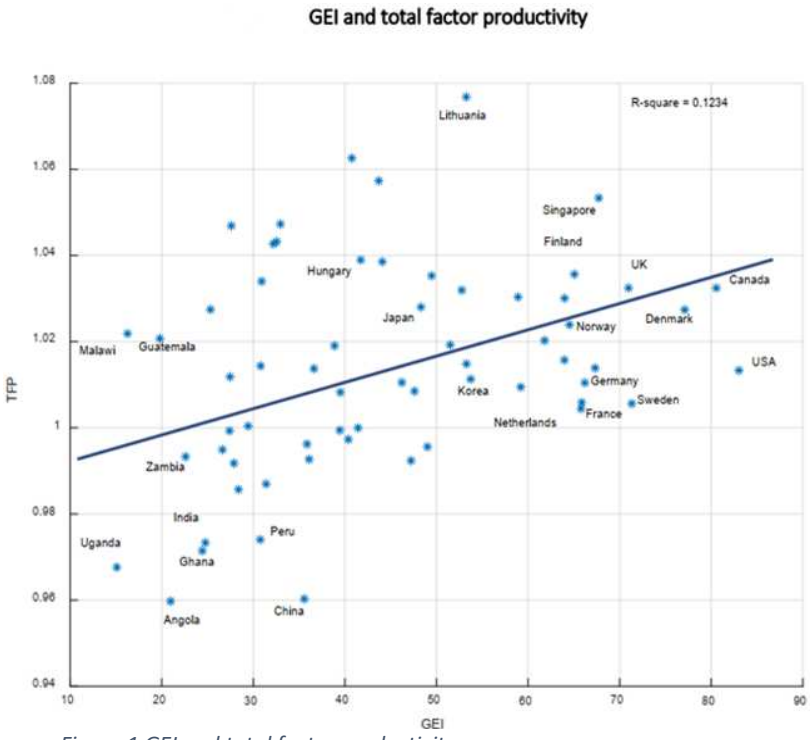


Figure 1 GEI and total factor productivity
Source: (Ács, et al., 2018, p. 26)

Global Entrepreneurship Monitor (hereinafter – GEM) (Bosma & Kelley, 2019, p. 24) underlines that European and North American regions are distinct due to the low level of necessity entrepreneurs and a dominant share of improvement-driven opportunity innovative entrepreneurs who contribute substantially to the society and represents around two-thirds of entrepreneurs in startup activity.

GEI data demonstrate the effect of entrepreneurship through the decomposition of **Total Factor Productivity (TFP)** on two components: **Productivity Effect (P)** and **Innovation Effect (I)**. Productivity effect demonstrates the capacity of the country's entrepreneurs to allocate and utilize limited resources effectively. On the other side, Innovation Effect represents the ability of entrepreneurs to absorb innovations (inventions, improvements, new processes, new operations, etc.) and produce and sell a marketable product. This innovative function is strongly associated with the main role of the entrepreneur in the Schumpeterian theory of economic development. Inventions don't contribute to economic growth without commercialization, and this is the point where the entrepreneur fills an important gap through "finding and creating new things". Generally, TFP has a positive correlation with Global Entrepreneurship Index score (GEI vs total factor productivity 0.3513) Meantime, GEI demonstrates the unequal contribution of both TFP components (Ács, et al., 2018, p. 26).

While Productivity Effect has a smaller correlation on the whole range of measured countries (0,0930), it has a higher impact on economies of developing countries and in some cases, the negative correlation for developed countries. Innovation Effect is, on the other hand, has inverse correlation and dramatically increases along the GEI score scale from -0,41 in developing to +0,33 in developed countries. Such distribution demonstrates that developing economies mostly benefit from improving overall efficiency, while developed countries are mostly innovation driven.

Variables	Correlation
GEI vs productivity effect	0.0930
GEI vs innovation effect	0.3882

Table 1 GEI vs productivity and innovation effects
Source: (Ács, et al., 2018, p. 26)

Such significant dependency of developed countries from innovation effect rises question on necessary conditions to support and strength those effect. In other words, what kind of environment or ecosystem should be in place to successfully support innovation-driven, high-growth entrepreneurship?

Many countries try to boost entrepreneurial activity to achieve a positive impact on economic growth. As an example, the European Union adopted in the year 2013 “The Entrepreneurship Action Plan 2020”. Such plan includes spreading of entrepreneurial education, reducing administrative barriers and reshaping entrepreneurial culture. Such changes, inter alia, includes change of existing policies and optimizing governance mechanisms (European Commission, 2013).

As we observe the example of Action Plan 2020, public institutions try to impact the environment of entrepreneurs to achieve the desired goal. As entrepreneurs don’t act into vacuum and constantly interact with other entrepreneurs, individuals, private and public institutions and surrounding socio-economic environment, all actors affect each other and mode and efficiency of their interaction in aggregate with conditions of the environment impact entrepreneurial success and overall system performance, and at the end country’s economic growth.

1.8 Ecosystem's definition

Based on the definition of the term ecosystem given by Merriam-Webster: "*the complex of a community of organisms and its environment functioning as an ecological unit*" (Merriam Webster Glossary). We may conclude, that definition of ecosystem reflects described complex relations of entrepreneurs with the surrounding environment.

The similarity between biological and economic definitions of the ecosystem was described by (Rothschild, 2004, pp. 15-27) in "Bionomics: Economy As Ecosystem". The author established parallels between the interaction of organizational business units and cells inside the organism. Both use resources and apply different processes and methods to ensure survival and growth. At the same time, evolutionary mechanisms in C. Darvin's theory of evolution have a similar purpose as the innovation process within the organization. Both sustain an organism'/ organization' survival and growth. In the study "The use of analogy in biology and economics: From biology to economics, and back" (Hannon, 1997) systematized historical, scientific findings related to the link between biology and economics and confirmed them through the classification of analogical connections in both fields.

To operate precisely with the definition of a startup ecosystem, it is important to distinguish it from terms entrepreneurial ecosystem and innovation ecosystem. While all three definitions are interconnected, they all cover differing sectors.

1.9 Entrepreneurial ecosystem's definition

The entrepreneurial ecosystem is a complex and interdependent system which enables individuals, enterprises, society and government to cooperate effectively to generate economic wealth and prosperity. Those and other actors are driven by various motives, objectives and expectations. The ecosystem includes behaviour or actors, national cultural background and patterns, social norms and beliefs, the political and legal system, educational system, industrial infrastructure and capital. Ecosystems may exist on a global, national and local scale.[5] Thirteen ecosystem factors of Daniel Isenberg was used by (Suresh & Ramraj, 2012) to determine entrepreneurial ecosystem, namely Leadership, Government, Culture, Success stories, Human Capital, Financial Capital, Entrepreneurship Organizations, Education, Infrastructure, Economic Clusters, Media & Networks, Support Services, early Customers.

[5] Own elaborated definition, based on (Suresh & Ramraj, 2012)

Global Entrepreneurship Index, which main purpose is an assessment of entrepreneurial ecosystems around the globe elaborated three important premises to analyze ecosystem (Ács, et al., 2018). First is initiative-based action of agents inside the ecosystem. Second is the performance of agents is affected by conditions of the institutional framework. The third is multifaceted structures comprise an entrepreneurial ecosystem, where performance is produced by numerous elements. It was emphasized that each ecosystem is unique due to the different composition and interaction of elements. The entrepreneurial ecosystem in GEI approach has living and non-living components and outcome or ecosystem services and ecosystem management. The entrepreneurial ecosystem is not just a composition of factors, agents and resources, and it is more a manner in which all elements are organized and interact within a particular geographic space (Ács, et al., 2018).

As was already noted in the discussion of entrepreneurship, it has a maximal impact on economic development only if the main actor - entrepreneur innovates. To perform sustainable growth, innovation should occur not sporadically, but as a constant flow. To achieve such a significant rate of innovation, entrepreneurs should be able to interact with other innovation-related actors, get access to knowledge spill-overs and sources of information, securely transact and protect valuable inventions. All the described interactions are covered by the aggregate term innovation ecosystem.

1.10 Innovation ecosystem's definition

According to (Jackson, 2011), an innovation ecosystem is *"the complex relationships that are formed between actors or entities whose functional goal is to enable technology development and innovation"*.

Innovation ecosystem like entrepreneurial ecosystem includes living and non-living components. Living components are actors (individuals, corporations, institutions and all of those, who comprise human capital). Non-living are material resources, equipment, facilities, knowledge, etc.

It is underlined by (Jackson, 2011) that the innovation ecosystem comprises two different and relatively separated economies: the knowledge economy, which is driven by fundamental research and commercial economy, which is driven by markets. Those economies are linked through funding as a knowledge-based economy receives financing from government and corporations through taxation. At the same time, only some of the outputs from the knowledge-based economy can be successfully commercialized (i.e. successfully transferred

into the commercial economy). The innovation ecosystem is important, while it is the source of substantial wealth generation for the economy, but successful commercialization of innovation is not easy and most probably fail. The way from fundamental research to commercial product is extensive and demands many implementation resources and unrestricted interaction among actors and resources. Many actors can innovate and contribute to economic growth. Many actors deal with innovations. Large corporations with established R&D departments pipeline innovation process, spin-offs from university labs, students and of course, entrepreneurs. As was noted by (Ács, et al., 2018), not all entrepreneurs innovate. Among those, who innovate just a few are high-tech, and others are concentrated on incremental improvements and processes optimization, what contributes economic growth at a lower rate.

As we see, the innovation ecosystem doesn't match entrepreneurial ecosystem in full but mostly cover those part of the entrepreneurial ecosystem, which facilitates innovative, high-tech entrepreneurs, while they commercialize their product and rapid growth. As entrepreneurial ecosystem aims to boost all kind of entrepreneurship, it should include various mechanisms for different entrepreneurial segments.

In the course of the present research, the author is particularly concentrated on the startup ecosystem, which includes special actors, resources and mechanisms to facilitate innovative entrepreneurs to develop their product and growth. Innovative entrepreneurs are important due to their potentially high input into the economic growth, but at the same time, those entrepreneurs should deal with the highest level of uncertainty due to the main role of innovation, in their venture. Many innovations fail not because underlying inventions were bad, but due to dozens of other reasons, related to the market, available resources, internal motives of entrepreneur or even problems within the team. Therefore, innovative entrepreneurs demand special mechanisms of support like venture capital financing, incubators, accelerators, etc.

1.11 Definition of startup and its position within discussed ecosystems

To further investigate what exactly the startup ecosystem is, it is important to specify the definition of a startup.

Definition of (Merriam Webster Glossary) start-up as "*the act or an instance of setting in operation or motion" or "a fledgling business enterprise*".

Definition provided by from Kauffman Index of Startup Activity (Morelix, et al., 2015) is "*Startup businesses here are defined as employer firms less than one-year-old employing at least one person besides the owner*".

European Startup Monitor (Kollmann, et al., 2016) identifies the following essential characteristics of a startup:

- Startups are younger than 10 years
- Startups feature (highly) innovative technologies and/or business models
- Startups have (strive for) significant employee and/or sales growth.

NESTA Organisation (Dee, et al., 2015) defines a startup as "*a young, innovative, growth-oriented business (employees/revenue/customers) in search of a sustainable and scalable business model*". This definition was elaborated by Nesta from (Blank, 2014) description of startups as temporary organisations formed to search for a repeatable and scalable business model.

Definition of startup given by (Ries, 2011) "*a human institution designed to deliver a new product or service under conditions of extreme uncertainty*".

Merriam-Webster and Kauffman definitions concentrate on time of enterprise existence and a small number of employees and founders. Those definitions are suitable for quantitative research of early business activity but do not reveal specific characteristics of a startup as a venture, commercializing innovation. ESM 2016, NESTA's, Steve Blank and Ries definitions are much more complete and characterize startup as:

- young, and temporary venture
- high growth-oriented
- acting in conditions of extreme uncertainty
- developing and testing innovative product or service
- searching sustainable and scalable business model.

Empirical observations of researcher show, that startup can't be characterized by legal form (which is determined mostly by liability, taxation, investment and profit allocation motives), duration on the market (startup can test product and search for scalable model for several years), number of founders or employees (Startup can be founded by one or more founders and on early stage can hire more than one person).

Those characteristics match the definition of entrepreneurship elaborated above and are in accord to entrepreneurship approach of J. Schumpeter. At the same time, is important to underline, that startup is distinct from SMEs, which comprise the majority of actors in the entrepreneurial ecosystem. A startup can grow into going concern and become an established business with clear product, business model and strategy or disappear in case of failure. The startup is a definition of the entrepreneurial venture with special traits and for that kind of venture are important not only conditions of the entrepreneurial ecosystem but also elements of the innovation ecosystem and other essential elements, which were developed especially for startups. These special elements, in combination with other elements of the entrepreneurial and innovation ecosystem, constitute a distinct environment - the startup ecosystem. Relations between all three ecosystems are shown in figure 2 below.

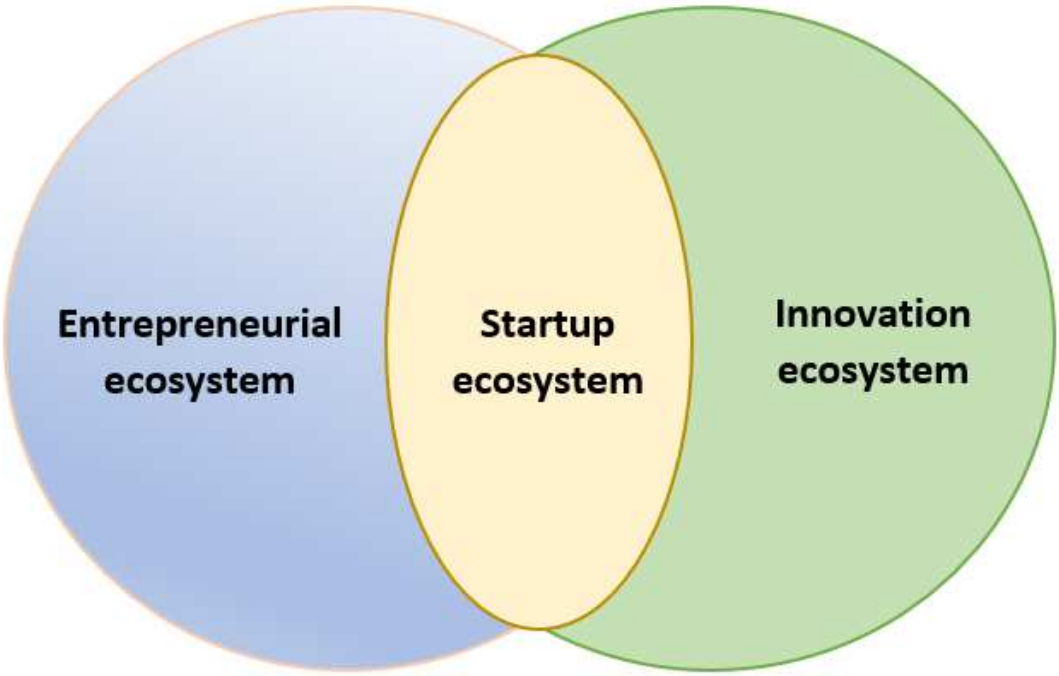


Figure 4 Illustration of relations between various ecosystems

Figure 5 Domains of the Entrepreneurship EcosystemFigure 6 Illustration of relations between various ecosystems

Source: own elaboration.

1.12 Startup ecosystem

1.12.1 Definition

There are numerous definitions of the startup ecosystem in literature.

Definition of D. Isenberg cited by (Fuerlinger, et al., 2015) is *"a set of networked institutions […] with the objective of aiding the entrepreneur to go through all the stages of the process of a new venture. It can be understood as a service network, where the entrepreneur is the focus of action and the measure of success"*.

Startup ecosystem definition given by (Mason & Brown, 2014, p. 5) is *"a set of interconnected entrepreneurial actors (both potential and existing), entrepreneurial organisations (e.g. firms, venture capitalists, business angels, banks), institutions (universities, public sector agencies, financial bodies) and entrepreneurial processes (e.g. the business birth rate, numbers of high growth firms, levels of 'blockbuster entrepreneurship', number of serial entrepreneurs, degree of sellout mentality within firms and levels of entrepreneurial ambition) which formally and informally coalesce to connect, mediate and govern the performance within the local entrepreneurial environment".*

Startup Ecosystem ranking (Startup Blink, 2019, p. 10) *highlight following ecosystem traits: "A robust startup ecosystem is not only comprised of startups, but must have supporting organizations (…coworking spaces, accelerators, global startup influencers…) that provide resources, networking, and access to capital."*

Startup Ecosystem report (Gauthie, et al., 2017, p. 25) *: "We defined ecosystems, with some exception, around the concept of a shared pool of resources generally located within a 60 mile (100 km) radius around a centre point."*

Summarizing all the definitions, the researcher conclude, that **startup ecosystem** is *a geographically bounded special environment, created with the purpose of assistance innovative entrepreneurs to go successfully through various venture stages in conditions of extreme uncertainty and to connect entrepreneur with the local entrepreneurial environment and key actors. Such assistance is performed through various entrepreneurial organizations, institutions, culture, network (connectedness), availability of resources, special processes and instruments.*

Elements, processes and output of the environment are objective and measurable, apart from tacit elements like culture, experience, etc., which can be only described.

1.12.2 Elements and stakeholders of the startup ecosystem

Following main domains of the ecosystem ware defined by (Isenberg, 2011). While Isenberg named this ecosystem entrepreneurial, he addressed innovative entrepreneurs, who mainly contribute to economic growth and constitute main actors of the startup ecosystem. Those domains are basic for ecosystem assessment methods and used in variations, e.g. in the study of (Drexler, et al., 2014).

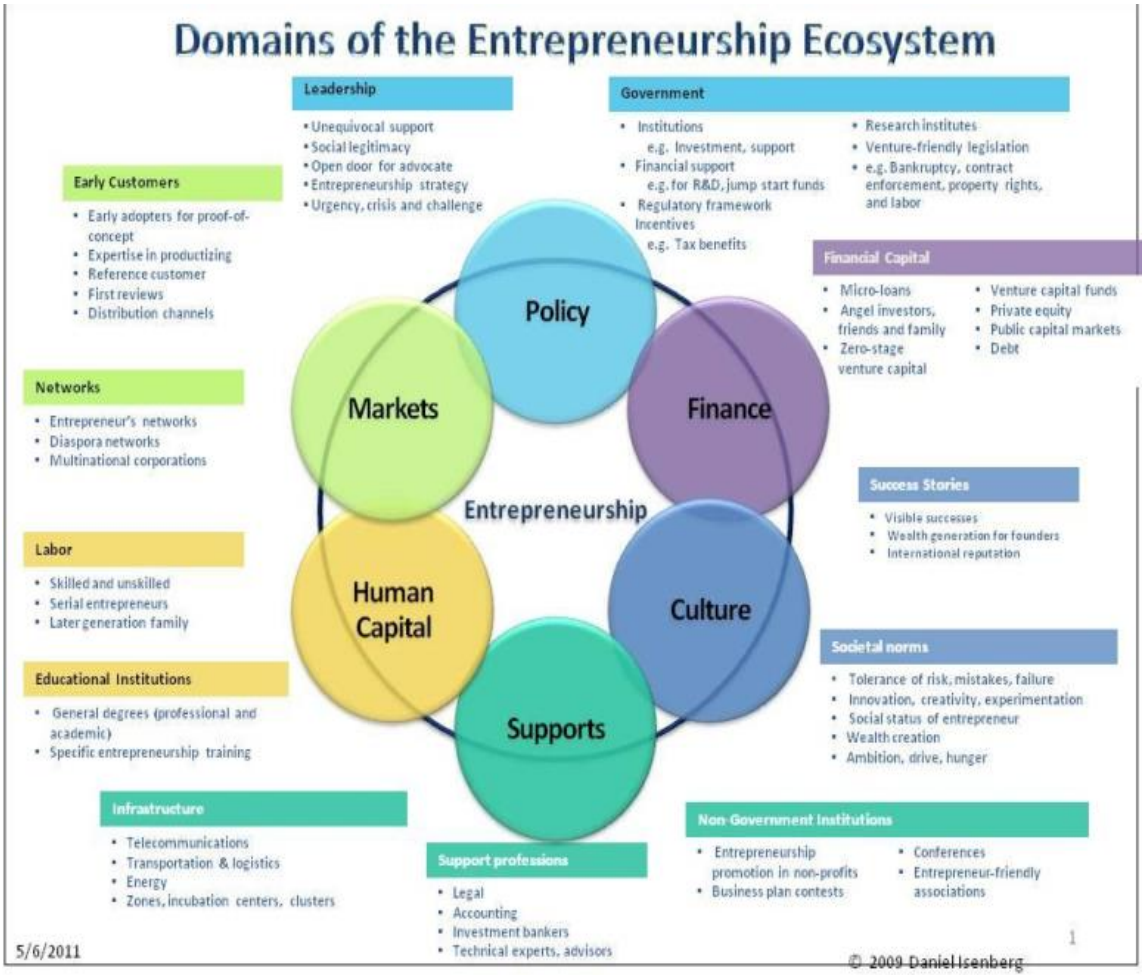


Figure 7 Domains of the Entrepreneurship Ecosystem

Source: (Isenberg, 2011, p. 7)

Figure 8 Startup ecosystem stakeholdersFigure 9 Domains of the Entrepreneurship Ecosystem

Startup Commons project (https://www.startupcommons.org) in the Startup Ecosystem White Paper selected the following **key stakeholders**, who are essential for startup ecosystem development as resources, quality and experience of those stakeholders directly affect measurable ecosystem output.

Figure 10 Startup ecosystem stakeholders

Figure 11 Ecosystem Lifecycle ModelFigure 12 Startup ecosystem stakeholders

Source: (Startup Commons Project, p. 1)

Ecosystem stakeholders and available resources also affect the specialization of the ecosystem. Historically, many innovation centres were created around industrial clusters and universities. Actors of those clusters gained experience and knowledge within specific industries and sub-sectors, and it became an important part of the ecosystem success factor.

1.12.3 Lifecycle model of the startup ecosystem

Global Startup Ecosystem Report 2017 (Gauthie, et al., 2017, p. 15) presented startup ecosystem lifecycle model, which consists of 4 stages and every stage is characterized by specific output metrics and specific objectives of the ecosystem.

First stage. **Activation** is characterized by a low number of startups and is aimed at building community by accessing local talents, investors, entrepreneurs.

Second stage: **Globalization** is recognized by a recording of a series of multimillion exists and ecosystem become a well-known place within the country. Startup output reaches 2000 startups. Such ecosystem fills the resources gap and builds connections with other global ecosystems to provide local startups with the opportunity to grow internationally and reach unicorn level.

Third stage: **Expansion** is characterized by existing of several billion dollars exits and the appearance of local unicorns. These significant events rise global recognition of ecosystem and world resources become available for local startups. Increase of global connectedness and ability to attract global resources, filling of gaps and stable high-quality (billion-dollars startups) output is still a primary objective.

Fourth stage: **Integration** is a balanced stage of the ecosystem, and the main attribute is a strong competitive position among other top ecosystems. The objective is the integration of national and global resources and knowledge inside and outside of the tech sector, optimization of laws and policies. Startup ecosystem becomes an influential part of the business ecosystem due to its special culture, wealth, innovation, etc.).

Transfer to globalization and expansion phases is i.a. characterized by the increase of global connectedness and attraction of global talents. Immigration is considered an important factor of ecosystem development and any constraints adversely affect ecosystem growth.

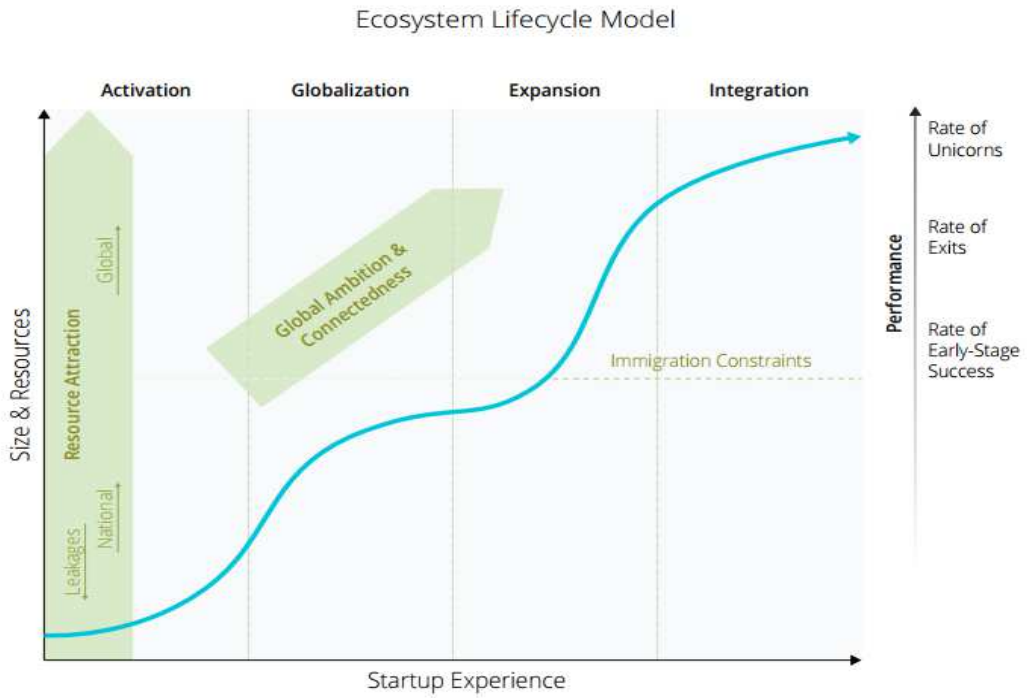


Figure 13 Ecosystem Lifecycle Model

Figure 14 Business sophistication comparison chartFigure 15 Ecosystem Lifecycle Model

Source: (Gauthie, et al., 2017, p. 28)

1.13 Role of immigrant entrepreneurs and talents on ecosystem development

1.13.1 Impact of immigrant entrepreneurs and highly skilled individuals

Talents are skilled and experienced specialists, entrepreneurs or startup founders from other regions and countries. Those human resources may bring substantial benefits to the economy through the successful integration of immigrants into the country's ecosystems. Globalization trend loose interstate borders and for many entrepreneurs start of the venture in the right ecosystem becomes a crucial factor for overall venture success. Famous Y Combinator program (www.ycombinator.com) attracts several thousand of application per each cycle of acceleration, and more than 30% of applicants are outside the US. Even in the case of venture

failure, foreign entrepreneurs get strong connections to the local business environment, gain experience and learn best practices. A failed entrepreneur may have a second attempt or return to his/her home country but keep business and personal connections and overall positive impact on trade and interstate communication. The attraction of entrepreneurs may also serve as a part of soft power governmental policy.

Example of Y Combinator clearly demonstrates how free movement of entrepreneurs may boost one ecosystem and cause a decline in other (as that 30 % decided to leave their home ecosystems).

Many indices and reports already include data, linked to the activity of foreign founders as an important metric of the ecosystem competitiveness within the region and globally. As an example, Waterloo Startup Ecosystem Report (Gauthier, et al., 2015) includes the number of entrepreneurs who move to the ecosystem before founding a startup. Global Startup Ecosystem report 2018 (Gauthie, et al., 2017, p. 45) points out that immigrant founders and entrepreneurs have a substantial impact on startup ecosystems, as they found a substantial share of tech companies and connect host with their home country. Immigrant founders are important actors in the global connectedness of the startup ecosystem. It is extremely important, especially in countries with a high number of foreign students, to adopt special policies and remove excessive barriers to facilitate immigrants to build startups or join as a co-founder or key-specialist.

Research of (Kerr, 2013) summarizes the impact of high-skilled immigration on innovation and entrepreneurship in the U.S., as an example of an advanced economy. Kerr used previous studies and created extensive research throughout various aspects, including qualitative and quantitative metrics. High-skilled immigrants, according to (Kerr, 2013) are essential for U.S. entrepreneurial and innovation ecosystem. Referred analysis of immigrant contribution as a founder in Silicon Walley performed by (Saxenian, 1999) shows that 24% of ventures were run by Chinese or Indian top-managers. Referred work of (Wadhwa, 2007) also represents similar figures, where around 25% of new high-tech companies have at least one immigrant founder, who played a key role. Companies were selected on the sales minimal threshold of one million US Dollars. Among venture-backed companies, immigrant founders were in 25% of the ventures (Anderson & Platzer, 2016). Data form WIPO (World International Patent Organization) shows, that non-U.S. citizens inventors are among 24% of international patent applications from the U.S.

1.13.2 Importance of STEM education

Further review various studies by (Kerr, 2013), related to the impact of highly skilled immigrants and shows, that most of those immigrants are engaged in STEM fields and better than natives or equally trained in this work. Immigrants accounted for 29% growth in STEM workforce from 1995 till the 2008 year. Significant STEM contribution of immigrants was validated through a disproportionally high number of authors of most-cited and very highly cited papers and among immigrants U.S. Nobel Prize winners.

Immigrants are successful in STEM because they invest in education more than natives, and that makes immigrants more immersed in selected areas. Almost 25% of immigrants with at least bachelor education are among occupations closely related to technology commercialization and innovation. Overall, highly skilled immigration is associated with higher levels of innovation for the United States.

Patenting contribution of Anglo-Saxon and European ethnics on the period 1975-2004 dropped from 90% to 76%, but mostly due to the rise of patent applications from Chinese and Indian ethnics (Kerr, 2013). It is important to underline, that the United States Patent and Trademark Office (USPTO) database doesn't collect information of inventors' citizenship and analysis was performed through ethnic name matching procedure and such approach doesn't reveal real status quo, but good enough for rough assessment.

1.13.3 Role of the immigration policy

High-skilled immigration in the U.S. is supported by friendly immigration policy like Start-Up visa, which allows immigrant entrepreneurs to create companies with the potential of high-growth. At the same time, the H1-B visa fills the necessity of talents and allows to enter skilled workers with "speciality occupations" (Kerr, 2013). Mostly H1-B visa is used for STEM-related occupations. Both programs are extremely successful and serve as an essential legal framework in the development of the startup ecosystem in Globalization and Expansion phases.

1.13.4 Connection of immigrants with home countries

The study also finds evidence, that immigrants interact with their home countries after arriving in the U.S. Around 50% of immigrants assisted in developing of contracts or business relations between the U.S. and their home countries and 18% invested in overseas business

partnerships. Evidence of technology transfer between the U.S. immigrants and their home countries highlighted by (Kerr, 2013) was built on (Saxenian, et al., 2002), where 82% of Chinese and Indian STEM-working immigrants reported exchanging technical information with their respective nations. Share of such technology-exchange may depend on existing ethnic patterns. Some immigrant inventors also facilitated U.S. companies in outsourcing of R&D-based work abroad (in immigrant's home country) without the support of local partners due to a better knowledge of such home country (Kerr, 2013).

1.13.5 Assessment of immigrants' entrepreneurial activity level

Access of the effects of immigrants on the entrepreneurship ecosystem and national welfare was made by (Vandor & Franke, 2016 a). It was discovered that immigrants and return immigrants overall demonstrate a higher rate of entrepreneurial activity compare to natives. Immigrants have higher motivation and cross-cultural experience. A growing part of the global migration part comprises highly skilled mobile talents (engineers, scientists, students, entrepreneurs). All those talents enormously enrich human capital of the host country through "cross-cultural experience and the associated knowledge of products, services, markets and customer problems" (Vandor & Franke, 2016 a). Particularly "Cross-cultural experiences may increase individuals' capabilities to identify promising business ideas. By living in different cultures, they encounter new products, services, customer preferences, and communication strategies, and this exposure may allow the transfer of knowledge about customer problems or solutions from one country to another (Vandor & Franke, 2016 b). By applying this kind of arbitrage, a temporary or permanent migrant can decide to replicate a profitable product or business model available in one country but not in another" (Vandor & Franke, 2016 a).

Not only highly skilled individuals but also larger group of immigrants and temporary immigrants may significantly contribute to the output of local entrepreneurial and ecosystem as many of them have knowledge about customer problems, products and services in other cultures. Support of those immigrants through entrepreneurial awareness-rising and startup incubation programs may increase their opportunity recognition capabilities and positively contribute economic growth and job creation, conclude (Vandor & Franke, 2016 a).

1.14 Summary of literature review

Present chapter summarized implications from the international literature review. It was demonstrated how national wealth, economic growth and job creation could be achieved through the development of innovative, opportunity-driven entrepreneurship. The key role of those entrepreneurs in economic growth pulled demand for a special supporting environment for startups acting in conditions of extreme uncertainty.

The startup ecosystem is a relatively new phenomenon, and it constitutes a semi-independent structure within the existing business environment. There are two major underlying blocs for startup ecosystem – entrepreneurial and innovation ecosystems. While, both ecosystems influence startup ecosystem, they can't predetermine its success. The startup ecosystem has its own domains and stakeholders as well as its own development lifecycle model offered by GSER. As a startup ecosystem evolves, globalization and internationalization become essential parts of a successful strategy.

Globalization provides access not only to distant resources but also brings the opportunity to attract foreign talents and entrepreneurs.

Importance of immigrant entrepreneurs and talents was demonstrated within the course of this review. Namely, immigrants became more entrepreneurial than natives and had an advantage of cross-cultural experience. They increase the value of the ecosystem's human capital and immigrants' input in the country's welfare can't be underestimated.

Following chapters provide a description of the methodological approach and results of empirical studies, related to the

Austrian startup ecosystem competitiveness among other top EU destinations as well as the attractiveness of the ecosystem for foreign entrepreneurs.

Research methods overview

1.15 Research questions

There are two main questions within the present study:

1. What is the current competitive position of the Austrian startup ecosystem?
2. How attractive is the Austrian startup ecosystem to entrepreneurs from CIS countries?

Theoretical findings provided a multi-layered assessment structure for the research as a startup ecosystem is not simply the sum of the entrepreneurial and the innovation ecosystems but rather a semi-independent ecosystem with special stakeholders and tacit environment. Therefore,

for comprehensive research, the analysis of all elements affecting the startup ecosystem is necessary.

1.16 Research design

Research to be conducted in three phases:

Phase 0: the selection of appropriate countries within the EU to compare with Austria. This phase is particularly important due to the high number of countries within the EU, which cannot be properly analysed within the scope of this study.

Phase 1: quantitative assessment of entrepreneurial and innovation ecosystems of the selected countries and Austria. As both ecosystems are underlying structures of the startup ecosystem, thus their condition would be be overall important for the performance of the startup ecosystem.

Phase 2: quantitative assessment of the most important metrics describing startup ecosystems of the selected countries.

Phase 3: conduct of field survey among CIS entrepreneurs (startup founders) in respect of Austrian and other selected startup ecosystems' attractiveness. Results of the survey will be analysed and compared to findings from the first and second phases of research.

Assessment of entrepreneurial and innovation ecosystems during phase 1 is an extensive task, which cannot be covered by this study in case of primary sources of data analysis. Therefore, it is more viable to use secondary sources of information, describing various sides of entrepreneurial and innovation activity within each country, namely well-known reports, like Global Entrepreneurship monitor, Global Entrepreneurship Index, Global Innovation Index, doing business, etc. Those reports contain synthetic metrics, describing the performance of various ecosystem parts and underlying methodology. Gradual quantitative analysis from high-level to mid and low-level metrics could bring clarity and consistency to the research and understanding how the performance of entrepreneurial and innovation ecosystems affects the startup ecosystem.

Nevertheless, different reports rely on different sources of information and use non-uniformed data processing methods, thus use of data from a single source to assess countries' performance within one ecosystem is an important element of consistency. To assess

entrepreneurial ecosystem, the Global Entrepreneurship Index 2018 is used, and Global Innovation Index 2018 for innovation ecosystem assessment.

Phase 2 of research measures performance of the selected domains from Isenberg model, namely policies, finance and human capital. These domains will be subsequently complemented by metrics, necessary to measure the Austrian startup ecosystem development phase as an important indicator of competitiveness. Those complementary metrics include ecosystem quantitative output or number of startups, qualitative output – number of unicorns and impact on the country's employment. A final assessment of the startup ecosystem is performed through the attractiveness of the selected ecosystems to the main internal stakeholders, namely, startup founders. This analysis links us to the third phase of research – a measure of the attractiveness of the ecosystem to CIS startup founders (entrepreneurs).

1.17 Description of the survey

Phase 3 measures the level of the Austrian startup ecosystem attractiveness for CIS startup founders (entrepreneurs) and conducted through the use of a primary source of information – assessment of answers given by startup founders in the online survey. The survey is of the quantitative nature and consists of 16 questions with a predefined range of answers, but some questions allowed to enter a free answer on respondent's discretion in order to cover any potential gaps and for the sake of the research enhancement.

The survey was conducted through Google Forms, the online platform, providing free tools to create and conduct a survey, and analyse the received data. For the better coverage in the potential target group survey was conducted in the Russian language and received results were further processed and translated in English by the researcher.

To reach the potential target group, the snowball strategy was used. To get initial responses, the selected people from the researcher's personal network were contacted. This preliminary selection was made on the basis of people's occupation within the startup industry. Among directly targeted individuals were founders, investors, software developers, engineers, mentors and advisors. Further distribution of survey requests was done through social media channels, and all the potential respondents were checked against their profile to avoid any responses from the irrelevant target group.

Within the survey, special target group filter was implemented. Respondents were asked about their role in a startup, their product, industry, etc. All those questions had a range of pre-defined variants as well the possibility to give a free response. If during the results processing any deviations within the control questions occurred, such results were removed as irrelevant.

To avoid any biases in answers, respondents were not asked directly about the Austrian startup ecosystem, and Austria was included within the range of countries pre-selected in phase 1 of the study.

The questionnaire was developed to perform the following measurements:

1. assessment of respondent's relevance
2. measure demographic data and level of education
3. access share of founders, who consider relocation of startup abroad.
4. access push factors
5. access factors for location choice
6. measure the level of attractiveness and awareness about selected European countries' startup ecosystems.

Potential maximal number of respondents was defined through the number of startups in Russia according to the data from https://www.startupblink.com/startups/russia

Calculation of sample size and the margin of error was based on the formula below:

$$\text{Sample size} = \frac{\frac{z^2 \times p\,(1-p)}{e^2}}{1 + \left(\frac{z^2 \times p\,(1-p)}{e^2 N}\right)}$$

Where:

N = population size = number of startups in Russia

E = The margin of error within the accessed population sample.

Z = Standard deviation from desired confidence level.

Variables value:

N = 1564.

Desired confidence level= 95% (as an industry standard).

Z = 1,96

Sample size =34 (maximal number of received responses as of the pre-defined end date).

The margin of error = 16,6% (calculated based on the number of the received responses).

1.18 Research process imitations and results processing

The first research limitation of the survey is linked to the margin of error, which can be significant for the questions with the approximately equal distribution of answers.

The second limitation relates to the measurement of the level of awareness and the level of attractiveness of a particular ecosystem. Both characteristics may be unconsciously interchanged by the respondents (I.e. “This ecosystem is attractive because I heard a lot about it”). To avoid this limitation, the survey measures both characteristics.

Results from the survey are used to:

- build a picture of CIS entrepreneur and measure its relevance to the theoretical findings on entrepreneurship
- compare with the findings from the previous research phases and measure the attractiveness of the Austrian startup ecosystem
- build recommendations for the Austrian startup ecosystem.

Research phases

1.19 Description of research phases

The main objective of this research is the double-sided assessment of Austrian startup ecosystem competitiveness through objective quantitative analysis of macroeconomic and statistical data and comparison of received outcome with the results of the survey that reflects the subjective perception of the Austrian ecosystem by CIS entrepreneurs. The present research is conducted in three phases and preliminary data selection process.

Data selection process. To narrow present research from 28 European Union member-states to a more reasonable number, data from Startup Blink Ecosystem Rankings 2019 is used. Further study is conducted on those ecosystems, which are at least in the top ten on a global level. Received data is further filtered and narrowed, based on the list of top 10 countries in Global Innovation Index 2018. Those short-listed participants will be further compared to Austria.

Phase 1. Measurement of entrepreneurial and innovation ecosystems' competitiveness of Austria compare to other selected EU countries and determination of Austrian strengths and weaknesses.

Phase 2. Measurement of the Austrian startup ecosystem competitiveness through specific metrics.

Phase 3. Discussion of survey results on selected startup ecosystems perception among CIS entrepreneurs(startup founders) in view of findings from phases 1 and 2.

1.20 Data selection

Startup Blink Ecosystem Rankings 2019 is a synthetic index, which represents the aggregated performance of startup ecosystems around the globe. Every country is assessed as a summary of all internal ecosystems within the country's geographical border. One country may be represented by one or more ecosystems and hubs located around big cities and industrial clusters. Startup Blink Ranking is based on data from crunchbase.com, similarweb.com, coworker.com and World Bank. Total country's ecosystem performance is expressed through three main metrics: quantity score, quality score and business score (Startup Blink, 2019, pp. 10-12).

Quantity score – metric includes several essential elements within the ecosystem, namely: incubators, accelerators, coworking spaces, startups, global startup influencers and startup events. Such metrics describe the general level of supporting organizations, networking capabilities, and access to capital.

Quality Score represents the summarized output of all the ecosystem elements. Networking is measured by a number of events and visitors. Supporting infrastructure i.a. includes the presence of global coworking networks. Start-ups' output is measured through various metrics, including monthly visits, authority and customer base. This metric also accounts presence and **unicorns** (startups valued above one Billion US Dollars). Those entities create not only vivid success stories but also reshape local culture and attract investments to the local startup ecosystem. Apart from unicorns, this metric includes existing companies (ex-startups, local and multinational corporations) with substantial financial and cultural impact on the ecosystem.

Business Score is the metric, based on the World Bank Doing Business Report. The received score is further adjusted by locations, which doesn't satisfy certain criteria of quality and quality. Authors also considered significant internet censorship in place as such limitation is an additional challenge for startups on their way to global markets.

Total Score - the sum of the quantity, quality, and business scores.

Rank	Country	Rank Change (from 2017)	Quantity Score	Quality Score	Business Score	Total Score
1	United States	–	12.29	22.02	9.78	**44.090**
2	United Kingdom	–	1.86	5.10	9.76	**16.719**
3	Canada	–	1.24	5.10	9.54	**15.867**
4	Israel	–	0.35	5.21	9.07	**14.626**
5	Australia	+6	0.64	2.71	9.61	**12.953**
6	The Netherlands	+9	0.34	3.27	9.29	**12.907**
7	Sweden	−1	0.19	2.87	9.71	**12.774**
8	Switzerland	–	0.21	3.06	9.26	**12.527**
9	Germany	−4	0.71	2.25	9.50	**12.461**
10	Spain	+4	0.58	2.42	9.40	**12.396**

Figure 16 TOP 10 countries with most performing startup ecosystems

Source: (Startup Blink, 2019, p. 16)

The United States is in first place with an enormous gap. Among other top performers, there are six countries from the European region. Switzerland, who is the third largest trade partner of EU and five European Union member-states: The United Kingdom, The Netherlands, Sweden, Germany and Spain.

To confirm the correctness of blink ecosystem rankings assessment and further narrow field of research, those results are compared with data from Global Innovation Index 2018. This index represents the innovation efficiency of nations based on the difference between technological input and output. This index also accounts *"…ranking of the world's largest clusters of science and technology activity. Like last year, this ranking relies on international patent filings to identify such clusters"* (Dutta, et al., 2018, p. 7) .

Global Innovation Index 2018 rankings

Country/Economy	Score (0–100)	Rank	Income	Rank	Region	Rank	Efficiency Ratio	Rank	Median: 0.61
Switzerland	68.40	1	HI	1	EUR	1	0.96	1	
Netherlands	63.32	2	HI	2	EUR	2	0.91	4	
Sweden	63.08	3	HI	3	EUR	3	0.82	10	
United Kingdom	60.13	4	HI	4	EUR	4	0.77	21	
Singapore	59.83	5	HI	5	SEAO	1	0.61	63	
United States of America	59.81	6	HI	6	NAC	1	0.76	22	
Finland	59.63	7	HI	7	EUR	5	0.76	24	
Denmark	58.39	8	HI	8	EUR	6	0.73	29	
Germany	58.03	9	HI	9	EUR	7	0.83	9	
Ireland	57.19	10	HI	10	EUR	8	0.81	13	

Figure 17 Global Innovation Index 2018 rankings

Source: (Dutta, et al., 2018, p. XX)

Presented index included eight countries from the European region in the top ten list. All are high-income countries. High innovation performance is strongly associated with a high level of human capital, education and investments in R&D and as was discussed in the second chapter of this study, strong innovation ecosystem positively affects the entrepreneurial activity and startup ecosystem.

There are four countries appear in both rankings: the Netherlands, Sweden, the United Kingdom and Germany.

1.21 Phase 1. Analysis of entrepreneurial and innovation ecosystems

1.21.1 Ecosystems overview

As the performance of the startup ecosystem is strongly affected by the performance of entrepreneurial and innovation ecosystems, thus initial assessment starts from the measurement of all countries' ecosystems performance and composition of aggregated rating.

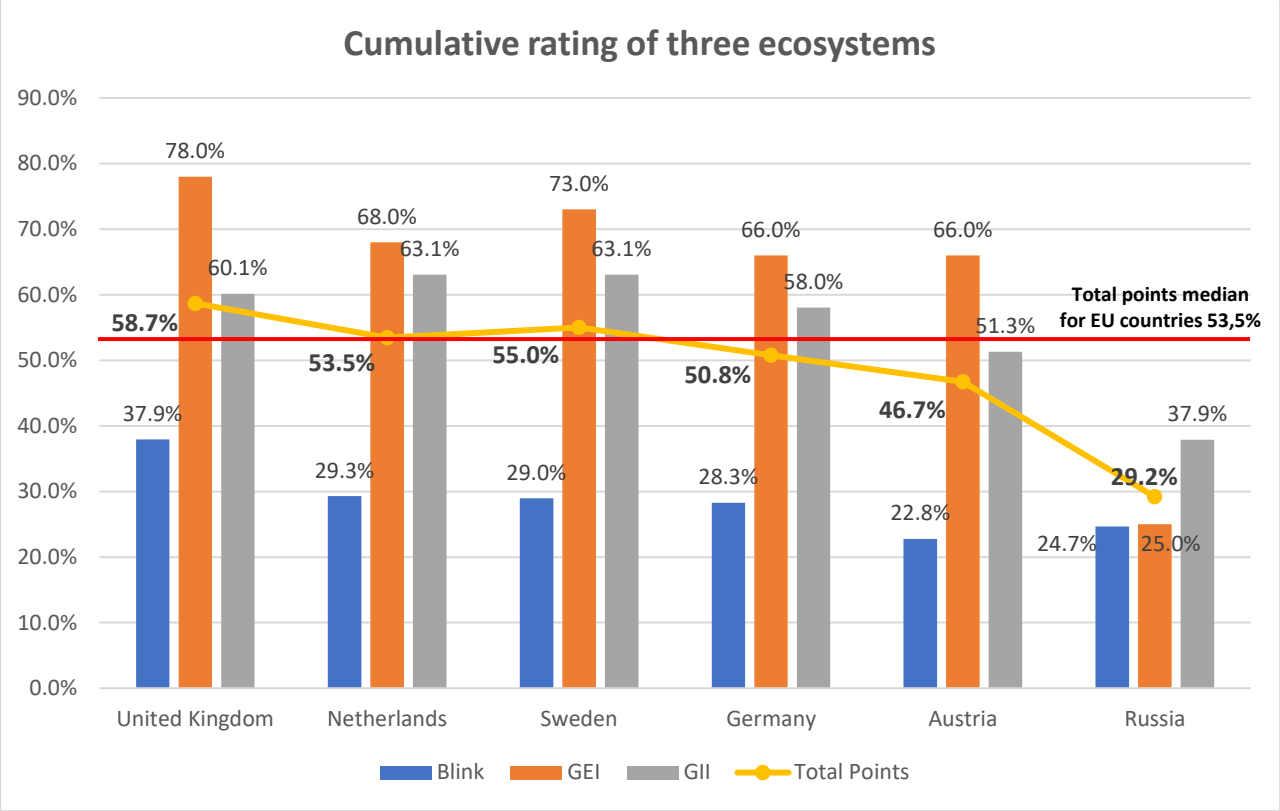


Figure 18 Cumulative rating of three ecosystems

Source: own development, based on (Startup Blink, 2019), (Ács, et al., 2018), (Dutta, et al., 2018). See Appendix 3 for underlying data.

Abbreviations:

- Blink - Startup Blink Ecosystem Rankings 2019.
- GEI (Global Entrepreneurship Index 2018) represents a multifaceted measurement of national-level entrepreneurial ecosystem's performance.
- GII (Global Innovation Index 2018) measure national innovation inputs and outputs.
- Total points – mean of BLINK, GEI, GII score for the selected country.

All selected EU-member countries have overall good performance as they are all in TOP10 rankings. The UK is the obvious leader with the strongest startup ecosystem (37,9%), highest entrepreneurship score (78%) and average innovation score (60,1%). The Netherlands, Sweden and Germany perform lower than the UK but fluctuates within standard deviation range for all five EU countries (St. dev = 4,032%). Sweden has a higher GEI score (73% vs 68% and 66%) than the Netherlands and Germany, but with no significant effect on startup ecosystem performance.

Austria has overall significantly underperforming startup and innovation ecosystems but has satisfactory entrepreneurship score (66%), which is comparable to the group of Netherlands,

Sweden and Germany and lays within standard deviation range. Overall, the chart does not provide any evidence that startup ecosystem performance is just a summary of entrepreneurial and innovation ecosystems performance, but a further examination of innovation and startup ecosystems is essential. For the sake of consistency, GEI index will be decomposed to its pillars and sub-pillars to get a deeper understanding of it's underluing components, but due to entrepreneurship ecosystem satisfactory performance, such decomposition will be of the introductory manner. At the same time, GII index decomposition will be performend on more thorough manner as this ecosystem demonstrated significant underperformance compared to other selected EU countries.

1.21.2 Global Entrepreneurship Index decomposition

GEI consists of three main components (sub-indices): entrepreneurial attitudes, entrepreneurial abilities and entrepreneurial aspiration. Each sub-index reflects different aspects of the entrepreneurial ecosystem. Every sub-index consists of several pillars and variables. For better understanding, definitions of sub-indices are cited below.

Entrepreneurial attitudes (ATT) are "…societies' attitudes toward entrepreneurship, which we define as a population's general feelings about recognizing opportunities, knowing entrepreneurs personally, endowing entrepreneurs with high status, accepting the risks associated with business startups, and having the skills to launch a business successfully" (Ács, et al., 2018, p. 37).

Entrepreneurial abilities (ABT) are characteristics and abilities of entrepreneurs to run "…startups in the medium- or high-technology sectors that are initiated by educated entrepreneurs and launched because of a person being motivated by an opportunity in an environment that is not overly competitive" (Ács, et al., 2018, p. 37).

Entrepreneurial aspiration (ASP) is "..the early-stage entrepreneur's effort to introduce new products and/or services, develop new production processes, penetrate foreign markets, substantially increase their company's staff, and finance their business with formal and/or informal venture capital" (Ács, et al., 2018, p. 37).

Details of sub-indices variables are shown as follows.

GLOBAL ENTREPRENEURSHIP INDEX	Sub-Indexes	Pillars	Variables (individual / institutional)
	ATTITUDES SUB-INDEX	OPPORTUNITY PERCEPTION	*OPPORTUNITY RECOGNITION*
			FREEDOM (ECONOMIC FREEDOM *PROPERTY RIGHTS)
		STARTUP SKILLS	*SKILL PERCEPTION*
			EDUCATION (TERTIARY EDUCATION*QUALITY OF EDUCATION)
		RISK ACCEPTANCE	*RISK PERCEPTION*
			COUNTRY RISK
		NETWORKING	*KNOW ENTREPRENEURS*
			AGGLOMERATION (URBANIZATION*INFRASTUCTURE)
		CULTURAL SUPPORT	*CAREER STATUS*
			CORRUPTION
	ABILITIES SUB-INDEX	OPPORTUNITY STARTUP	*OPPORTUNITY MOTIVATION*
			GOVERNANCE (TAXATION*GOOD GOVERNANCE)
		TECHNOLOGY ABSORPTION	*TECHNOLOGY LEVEL*
			TECHNOLOGY ABSORPTION
		HUMAN CAPITAL	*EDUCATIONAL LEVEL*
			LABOR MARKET (STAFF TRAINING*LABOUR FREEDOM)
		COMPETITION	*COMPETITORS*
			COMPETETIVNESS (MARKET DOMINANCE*REGULATION)
	ASPIRATION SUB-INDEX	PRODUCT INNOVATION	*NEW PRODUCT*
			TECH TRANSFER
		PROCESS INNOVATION	*NEW TECHLOLOGY*
			SCIENCE (GERD*(AVERAGEQUALITY OF SCIENTIFICAL INSTITUTIONS +AVAILABILITY OF SCIENTISTS AND ENGENEERS))
		HIGH GROWTH	*GAZELLE*
			FINANCE AND STRATEGY (VENTURE CAPITAL*BUSINESS SOPHISTICATION)
		INTERNATIONALIZATION	*EXPORT*
			ECONOMIC COMPLEXITY
		RISK CAPITAL	*INFORMAL INVESTMENT*
			DEPTH OF CAPITAL MARKET

Figure 19 Sub-indices and Pillars of GEI

Source: (Ács, et al., 2018, p. 32)

Sub-indices were grouped by type in the chart below. There are significant underperforming or outlying values. The UK is outperforming other EU-countries in entrepreneurial abilities and aspirations and have above average attitude index. Austria does not have any substantial deviations from the group of the Netherlands, Sweden and Germany.

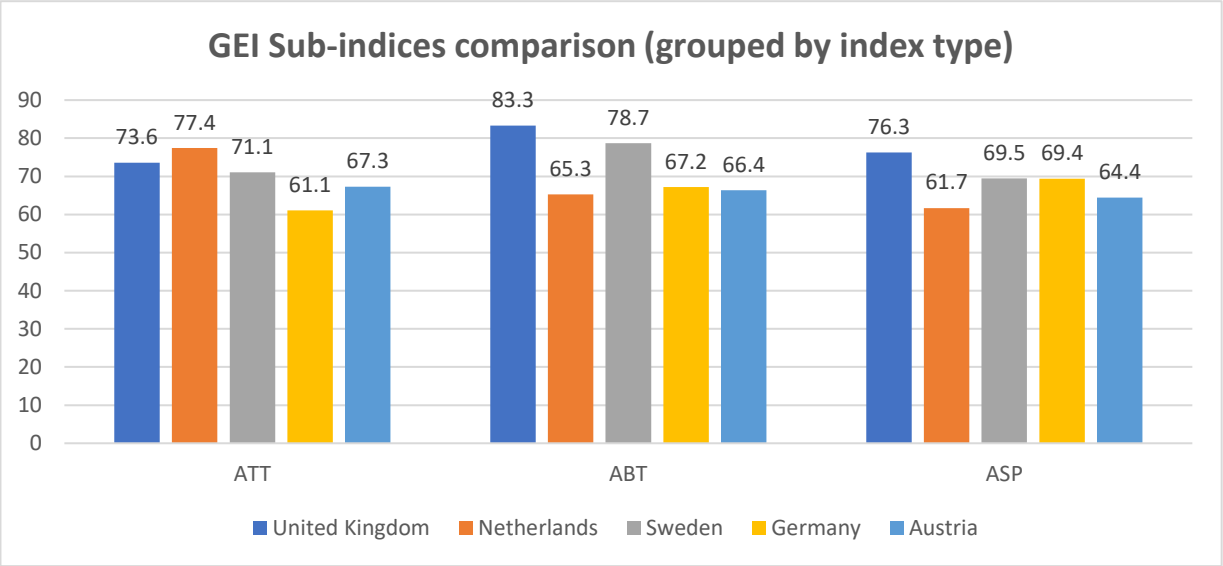


Figure 20 GEI Sub-indices comparison (grouped by index type)

Source: own development, based on (Ács, et al., 2018).

To deeper investigate possible reasons for Austria underperformance of the startup ecosystem, all underlying variables from indices will be derived and compared to define possible deviations.

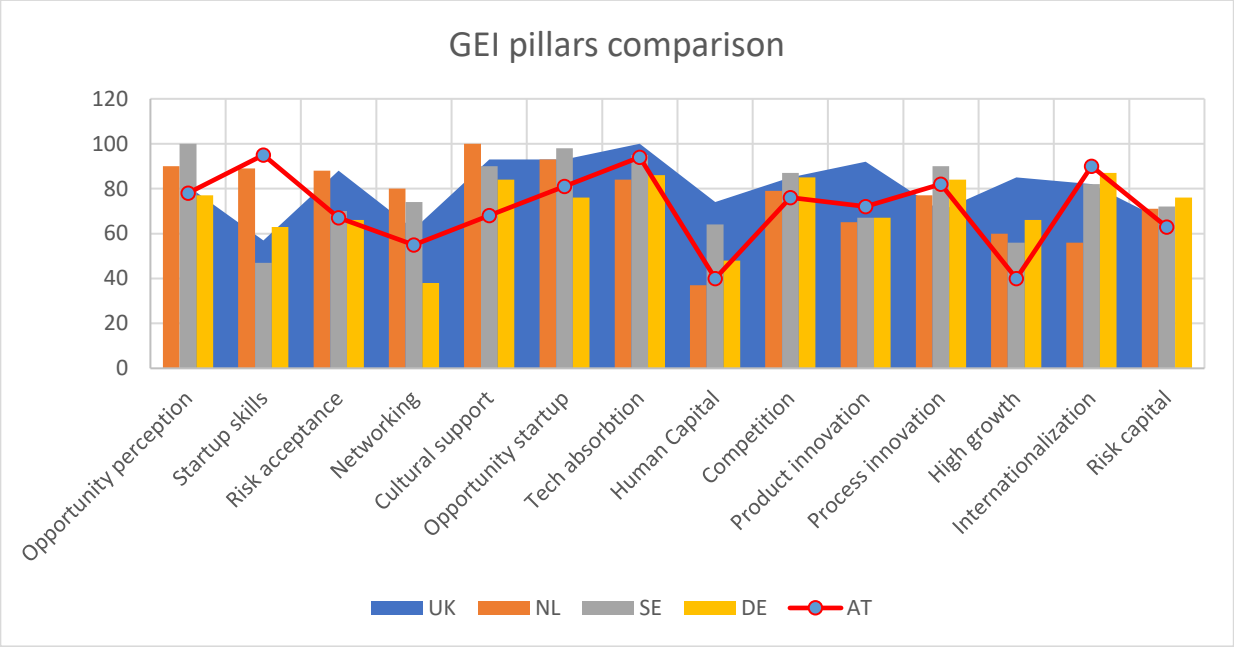


Figure 21 GEI pillars comparison

Source: own development, based on GEI 2018 countries' profiles (Ács, et al., 2018). See Appendix 4 for underlying data.

The UK outperforms Netherlands, Sweden, Germany and Austria in risk acceptance, human capital, product innovation. Other pillars don't show a significant correlation between startup ecosystem performance and pillars' score. Austria outperforms EU countries (other than the UK) in startup skills, tech absorption, process innovation and internationalization pillars, and underperforms in networking, cultural support, human capital and high growth aspirations.

1.21.3 Global Innovation Index decomposition

GII measures innovation productivity of nations through innovation efficiency ratio or difference between innovations input and output. The ratio reflects "…how much innovation output a given country is getting for its inputs" (Dutta, et al., 2018, p. 58). GII rank was decomposed to its elements to determine Austria's strengths, and weaknesses compared to other selected countries. The rank of each country consists of seven pillars, 21 sub-pillars and 91 blocks. Pillars from one to five represent innovation input, and pillars six and seven represent innovation output. GII inputs and outputs to some extent intersect with sub-indices and pillars in GEI, but GII target innovation productivity and performance of input and output components, rather than general cultural environment, business abilities and goals of entrepreneurs. Nevertheless, GEI and GII have a lot in common as both measures closely tied sides of business and entrepreneurship environment.

Innovation input pillars

Name and description of underlying sub-pillars and blocks[6]

1. Institutions "…captures the institutional framework of a country" and measure "Nurturing an institutional framework that attracts business and fosters growth by providing good governance and the correct levels of protection and incentives are essential to innovation".

Political environment

- Political stability & safety
- Government effectiveness

Regulatory environment

- Regulatory quality
- The rule of law
- Cost of redundancy dismissal, salary weeks

Business environment

- Ease of starting a business
- Ease of resolving insolvency

2. Human Capital - research level and standard of education and research activity level and quality.

[6] Description of pillars blocks and underlying components of GII. (Dutta, et al., 2018, pp. 58-62)

Education

- Expenditure on education, % GDP
- Government funding/pupil, secondary, % GDP/cap
- School life expectancy, years
- PISA scales in reading, maths & science
- Pupil-teacher ratio, secondary

Tertiary education

- Tertiary enrolment, % gross
- Graduates in science & engineering, %
- Tertiary inbound mobility, %.

Research & development (R&D)

- Researchers, FTE/mn pop.
- Gross expenditure on R&D, % GDP
- Global R&D companies, top 3, mn US$
- QS university ranking, average score top 3

3. Infrastructure "…communication, transport, and energy infrastructures", that "facilitate the production and exchange of ideas, services, and goods and feed into the innovation system through increased productivity and efficiency, lower transaction costs, better access to markets, and sustainable growth."

Information & communication technologies (ICTs)

- ICT access
- ICT use
- Government's online service
- E-participation

General infrastructure

- Electricity output, kWh/cap
- Logistics performance
- Gross capital formation, % GDP

Ecological sustainability

- GDP/unit of energy use
- Environmental performance
- ISO 14001 environmental certificates/bn PPP$ GDP

4. Market sophistication – a financial environment that "…supports investment, access to the international market, competition, and market scale are all critical for businesses to prosper and for innovation to occur".

Credit

- Ease of getting credit
- Domestic credit to private sector, % GDP
- Microfinance gross loans, % GDP

Investment

- Ease of protecting minority investors
- Market capitalization, % GDP
- Venture capital deals/bn PPP$ GDP

Trade, competition, & market scale

- Applied tariff rate, weighted mean, %

- The intensity of local competition
- Domestic market scale, bn PPP$

5. Business sophistication "…capture the level of business sophistication to assess how conducive firms are to innovation activity". In other words, how effectively business uses available highly skilled human resources to successfully compete and innovate.

Knowledge workers

- Knowledge-intensive employment, %
- Firms offering formal training, % firms
- GERD performed by business, % GDP
- GERD financed by business, %
- Females employed w/advanced degrees, %

Innovation linkages

- University/industry research collaboration
- State of cluster development
- GERD financed by abroad, %
- JV–strategic alliance deals/bn PPP$ GDP
- Patent families + offices/bn PPP$ GDP

Knowledge absorption

- Intellectual property payments, % total trade
- High-tech net imports, % total trade
- ICT services imports, % total trade
- FDI net inflows, % GDP 125
- Research talent, % in business enterprise

Innovation output pillars

Name and description of underlying sub-pillars and blocks[7]

6. Knowledge and technological output. "…covers all those variables that are traditionally thought to be the fruits of inventions and/or innovations".

Knowledge creation

- Patents by origin/bn PPP$ GDP
- PCT patents by origin/bn PPP$ GDP
- Utility models by origin/bn PPP$ GDP
- Scientific & technical articles/bn PPP$ GDP
- Citable documents H index

Knowledge impact

- New businesses/th pop.
- Computer software spending, % GDP
- ISO 9001 quality certificates/bn PPP$ GDP
- High- & medium-high-tech manufactures, %

Knowledge diffusion

- Intellectual property receipts, % total trade
- High-tech net exports, % total trade
- ICT services exports, % total trade

[7] Description of pillars blocks and underlying components of GII. (Dutta, et al., 2018, pp. 58-62)

- The growth rate of PPP$ GDP/worker, %
- FDI net outflows, % GDP

7. Creative output measure tangible and intangible results of successfully commercialized innovations in creative industries.

Intangible assets

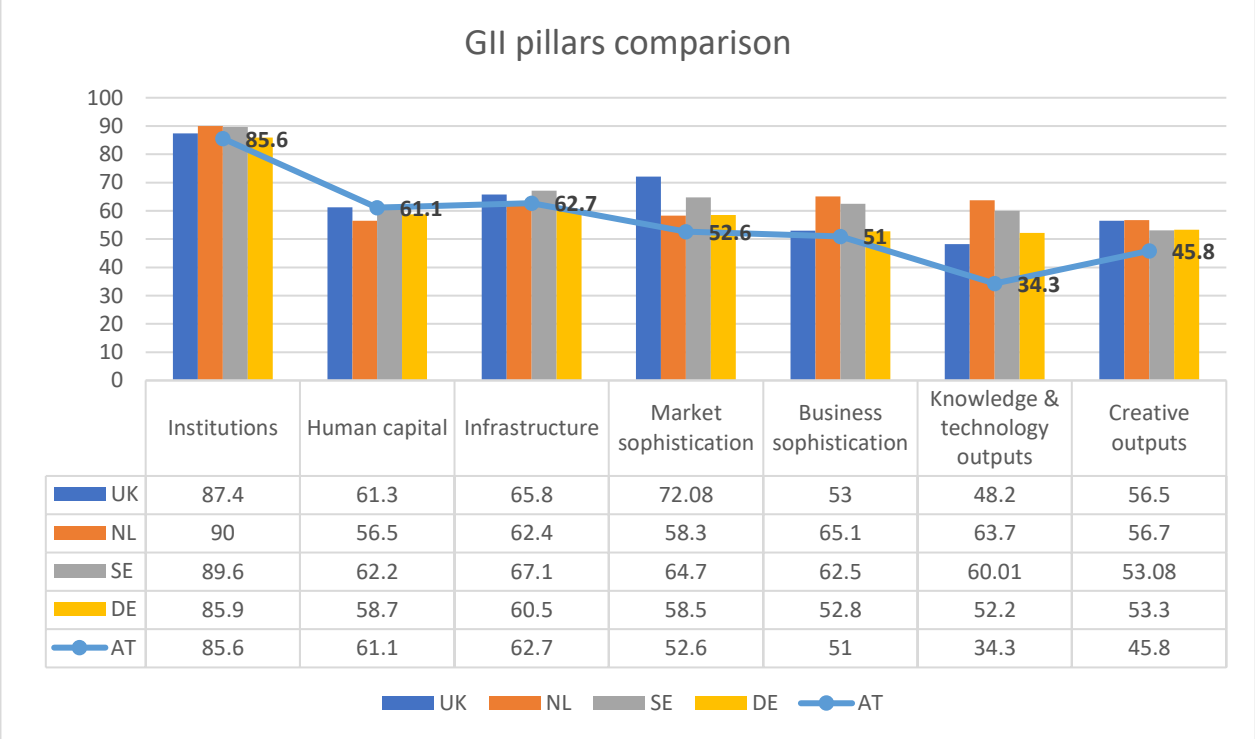
- Trademarks by origin/bn PPP$ GDP
- Industrial designs by origin/bn PPP$ GDP
- ICTs & business model creation
- ICTs & organizational model creation†

Creative goods & services

- Cultural & creative services exports, % total trade
- National feature films/mn pop.
- Entertainment & Media market/th pop.
- Printing & other media, % manufacturing
- Creative goods exports, % total trade

Online creativity

- Generic top-level domains (TLDs)/th pop.
- Country-code TLDs/th pop.
- Wikipedia edits/mn pop.
- Mobile app creation/bn PPP$ GDP



	Institutions	Human capital	Infrastructure	Market sophistication	Business sophistication	Knowledge & technology outputs	Creative outputs
UK	87.4	61.3	65.8	72.08	53	48.2	56.5
NL	90	56.5	62.4	58.3	65.1	63.7	56.7
SE	89.6	62.2	67.1	64.7	62.5	60.01	53.08
DE	85.9	58.7	60.5	58.5	52.8	52.2	53.3
AT	85.6	61.1	62.7	52.6	51	34.3	45.8

Figure 22 GII pillars comparison

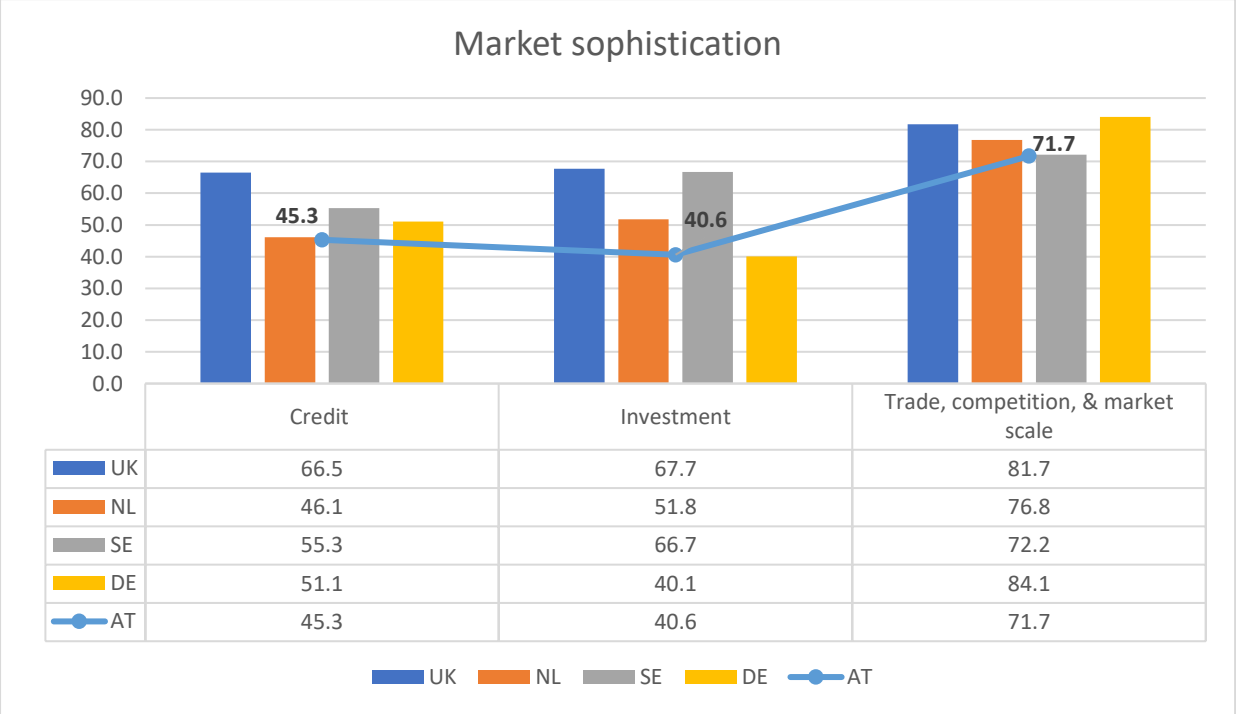
Source: own development, based on GII (Dutta, et al., 2018). See Appendix 5 for underlying data.

All countries are top performers in the global ranking. Austria performs well in Institutions despite the lowest score. Human capital is among the strongest sides of Austria, and it is of similar quality as in the UK and Sweden. It is important to underline that GEI showed human capital as the weak side of Austria. It's assumed that such difference is due to measurement methods. There are no issues with the Austrian infrastructure with 62,7 points, as it is of similar quality as in other countries.

There are two weak pillars for Austria in an innovation input group, namely Market sophistication and Business sophistication, as well as all pillars in innovation output group, namely Knowledge and technological output and Creative output. It is hypothesized, that reasons of Austrian startup ecosystem weakness within the compared group of countries could correlate with underperforming GII pillars. To proof this hypothesis and understand reasons for pillars underperformance, further decomposition to sub-pillars and blocks is necessary.

1.21.4 Market sophistication analysis

Market sophistication consists of 3 sub-pillars and nine underlying blocks to investigate. Out of nine blocks, seven were selected as complete and relevant.



	Credit	Investment	Trade, competition, & market scale
UK	66.5	67.7	81.7
NL	46.1	51.8	76.8
SE	55.3	66.7	72.2
DE	51.1	40.1	84.1
AT	45.3	40.6	71.7

Figure 23 Market sophistication comparison chart

Country	Ease of getting credit	Domestic credit to private sector, % GDP	Ease of protecting minority investors	Market cap., % GDP	VC deals/bn PPP$ GDP	The intensity of local competition	Domestic market scale, bn PPP$
UK	75,0	134,4	75,0	94,9	0,2	78,9	2880,3
NL	45,0	110,3	58,3	98,5	0,1	82,3	915,2
SE	55,0	128,7	68,3	n/a	0,2	75,1	521,7
DE	70,0	77,2	58,3	48,3	0,1	81,3	4149,6
AT	55,0	84,7	68,3	26,0	0,0	77,2	434,1

Table 2 Market Sophistication data

Source: own elaboration, based on GII 2018 (Dutta, et al., 2018).

Austria underperforms in all three sub-pillars. Biggest underperformance in credit and investment. Data clearly represent that Austria's capital market is relatively modest and can't reach the level of other countries. Market size is only 26% of GDP, compare to 94,9% and 98,5% in UK and Netherlands. The credit system is also less available for business than in the UK. A most important indicator of a successful startup ecosystem – the number of VC deals to PPP GDP is so insignificant, that cannot be properly screened by GII researchers. The overall density of financial services is low, and conditions are not as favourable for young ventures as in other selected countries.

1.21.5 Business sophistication analysis

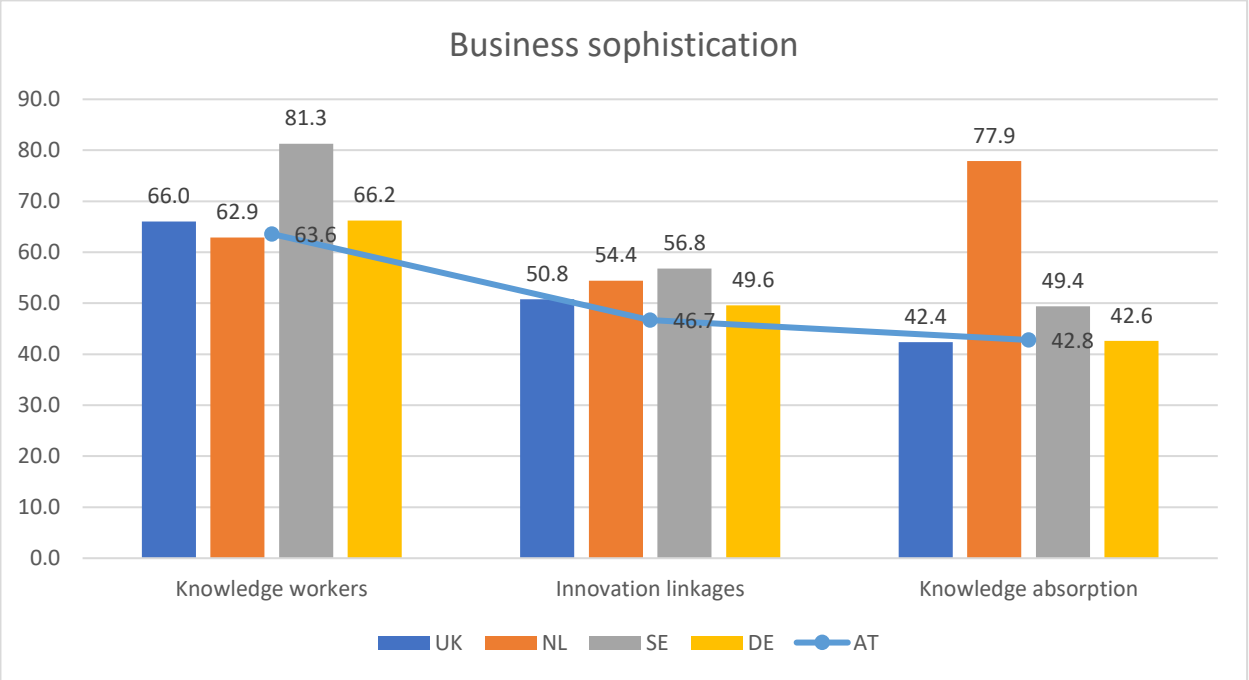


Figure 24 Business sophistication comparison chart

Sub-pillar	*Block*	UK	NL	SE	DE	AT
Knowledge workers		**66,0**	**62,9**	**81,3**	**66,2**	**63,6**
	Knowledge-intensive employment, %	48,5	47,2	52,3	44,4	40,6
	Firms offering formal training, % firms	n/a	n/a	70,3	n/a	n/a
	GERD performed by business, % GDP	1,1	1,2	2,3	2,0	2,2
	GERD financed by business, %	49,0	48,6	57,3	65,6	53,4
	Females employed w/advanced degrees, %	22,6	19,1	24,8	13,0	16,8
Innovation linkages		**50,8**	**54,4**	**56,8**	**49,6**	**46,7**
	University/industry research collaboration	73,1	76,1	70,7	72,9	63,5
	State of cluster development	72,6	73,4	67,4	73,9	65,7
	GERD financed by abroad, %	17,1	15,5	6,7	6,2	15,5
	JV–strategic alliance deals/bn PPP$ GDP	0,1	0,1	0,2	0,0	0,0
	Patent families + offices/bn PPP$ GDP	2,0	4,9	6,2	5,7	4,1
Knowledge absorption		**42,4**	**77,9**	**49,4**	**42,6**	**42,8**
	Intellectual property payments, % total trade	1,5	5,9	1,5	0,7	0,9
	High-tech net imports, % total trade	13,4	12,3	9,0	11,4	12,4
	ICT services imports, % total trade	1,7	5,3	3,1	2,0	2,0
	FDI net inflows, % GDP	5,0	17,5	1,1	1,2	-3,2
	Research talent, % in business enterprise	37,8	61,4	67,0	58,9	64,0

Table 3 Business sophistication data

Source: own elaboration, based on GII 2018 (Dutta, et al., 2018).

Business sophistication score for Austria reflects how business absorbs and access available innovation resources.

Overall, the Austrian business successfully uses knowledge-intensive employees, but on a much lower level compared to other countries, which on average utilize 10-30% more employees in knowledge-intensive areas. At the same time, Austrian companies spend an almost biggest share of resources on research and development (GERD – gross expenses on research and development). The same indicator for the UK is twice as low, compare to Sweden, Germany and Austria, but the innovative and creative output of the UK is much higher. It is assumed, that this indicator doesn't correlate with startup activity as most of the expenses were made by established corporations and not by SMEs (See block "new businesses th/pop" for more details).

Universities were awarded higher scores for their quality, but the overall level of collaboration educational and research centres with industry is 20% lower than in other selected

countries. This indicator purely represents findings in the literature review, that innovation ecosystem has two loosely bonded blocks: knowledge economy, which is based on fundamental research and commercial economy, which is driven by markets. Without partnerships between academic institutions and business available human capital can't be transformed into high value-added products and services.

Weak bonding of blocks is also affected by below average innovative/industrial clusters development, as clusters in some ecosystems play a crucial role in startup development. Austrian business also does not enter in any joint ventures, which may play an important role in knowledge exchange and obtain new competencies and absorption of international best practices.

Level of absorption of foreign intellectual property is lower than for other compared countries with the above average level of foreign talents absorption.

Austria imports ICT and high-tech products on the same level as other countries, but it cannot be a driver of innovation per se.

Summarize findings above, it is important to underline, that Austrian business underutilize available highly skilled workforce in knowledge-intensive areas and has weak cohesion with home universities, and other knowledge centres. Impact of weakly developed clusters cannot be a driver of innovation activity as well. Foreign intellectual property, international best practices, expertise and joint venture synergy, are not among top priorities of Austrian business. It is assumed that Austria

All the above together with weakly developed financial markets provide fewer opportunities for startups and shift the focus of startup development from evolutionary (as an organically developing spin-off from lab or company or garage) mostly to nurturing through acceleration and incubation programs. Though, this conclusion demands further proof. Further examination of data from innovation output pillars can reveal more information regarding Austrian competitive position among selected countries.

1.21.6 Knowledge and technology output analysis

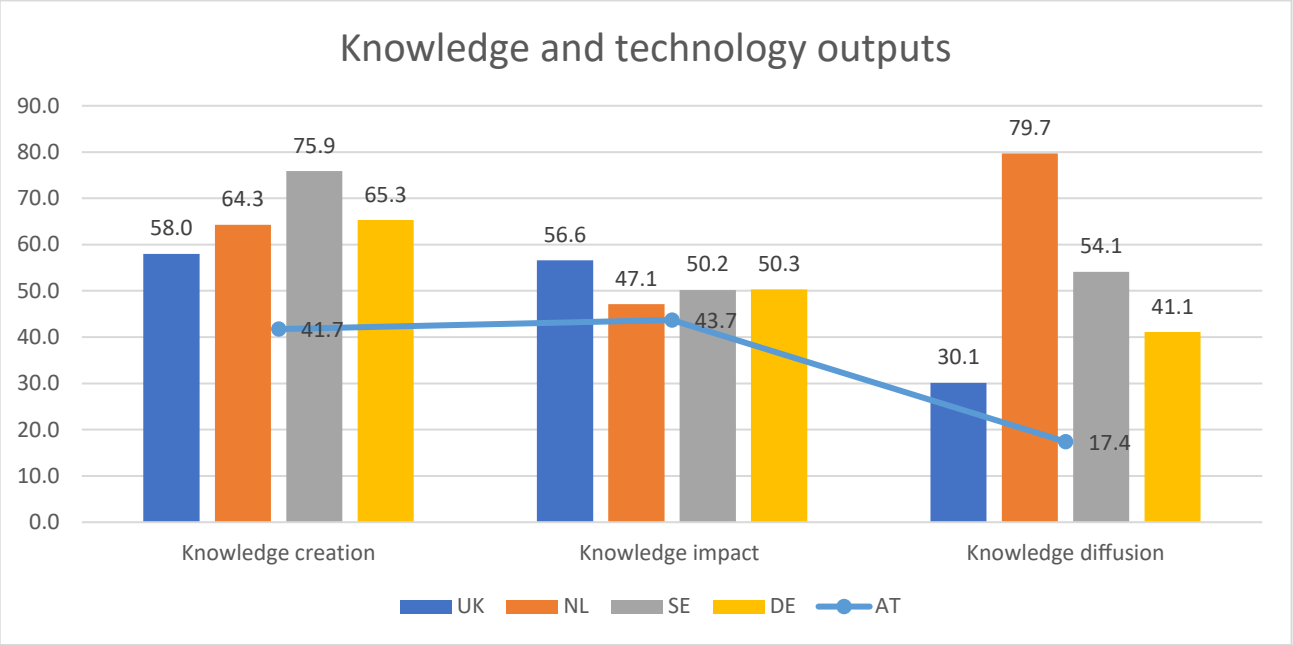


Figure 25 Knowledge and technology outputs comparison chart

Sub-pillar	Blocks	UK	NL	SE	DE	AT
Knowledge creation		58,0	64,3	75,9	65,3	41,7
	Patents by origin/bn PPP$ GDP	6,8	10,5	11,2	18,4	9,9
	PCT patents by origin/bn PPP$ GDP	1,9	4,8	7,6	4,6	3,2
	Utility models by origin/bn PPP$ GDP	n/a	n/a	n/a	2,5	1,2
	Scientific & technical articles/bn PPP$ GDP	25,3	22,8	32,1	17,1	24,0
	Citable documents H index	100,0	67,9	59,5	86,9	42,9
Knowledge impact		56,6	47,1	50,2	50,3	43,7
	Growth rate of PPP$ GDP/worker, %	0,4	1,1	1,5	0,6	0,2
	New businesses/th pop.	15,7	6,1	8,1	1,3	0,6
	Computer software spending, % GDP	0,8	0,7	0,6	0,6	0,6
	ISO 9001 quality certificates/bn PPP$ GDP	13,6	11,8	8,1	16,6	9,4
	High- & medium-high-tech manufactures, %	0,4	0,3	0,4	0,6	0,4
Knowledge diffusion		30,1	79,7	54,1	41,1	17,4
	Intellectual property receipts, % total trade	2,0	4,2	3,4	1,2	0,5
	High-tech net exports, % total trade	9,8	11,8	8,8	13,9	11,5
	ICT services exports, % total trade	3,1	6,2	6,6	2,2	3,1
	FDI net outflows, % GDP	-1,3	25,7	2,0	2,8	-2,7

Table 4 Knowledge and technology outputs data

SOURCE: Own elaboration, based on data from GII 2018 (Dutta, et al., 2018).

Knowledge and technology output of Austria is overall weak. First, sub-pillar - knowledge creation represents all inventive and innovative activity within the country, i.e. all performed R&D and scientific activity, which is not yet commercialized.

Analysis of knowledge impact is the effect of innovation pillars on the micro and macro economy. The underperformance of Austria in new businesses creation is overwhelmingly low, just 0,6 new companies versus 15,7 for the UK. This describes the low activity of citizens as entrepreneurs and directly affect probability to growth successful startup as only one out of ten startups survives and can grow and scale.

Growth of productivity is also twice as small compared to the closest competitor (UK) and 7,5 times smaller than group leader (Sweden). It is assumed, that slow growth is associated with the optimization of processes or incremental innovations, rather than with implementation of radical innovations. Prevalence of optimization and incremental innovation over radical innovations may be a consequence of underutilization of innovative inputs in business and weak collaboration with universities. Another possible explanation is specific of local entrepreneurial and business culture, where failure perceives negatively. Therefore, the implementation of less risky technologies may reduce the risk of failure.

Knowledge diffusion is a mirror metric from knowledge absorption and reflects the spreading of internal innovations outside the country. High-tech goods and ICT services are comparable to the data from other countries but taking into consideration low number of new businesses and relatively high number of received ISO 9001 certificates, highly likely majority of such export is performed by established corporations or subsidiaries of global companies. This implication is indirectly supported by a low level of intellectual property receipts (2,5 times lower than the weakest competitor and almost seven times lower than Sweden). Negative DFI outflow is caused by the prevalence of repatriated capital over internationally invested. Per se, this indicator represents the decreasing activity of Austrian business on foreign markets, but this assumption may be incorrect, as FDI should be measured within continuous time and consider many macroeconomic aspects.

1.21.7 Creative output analysis

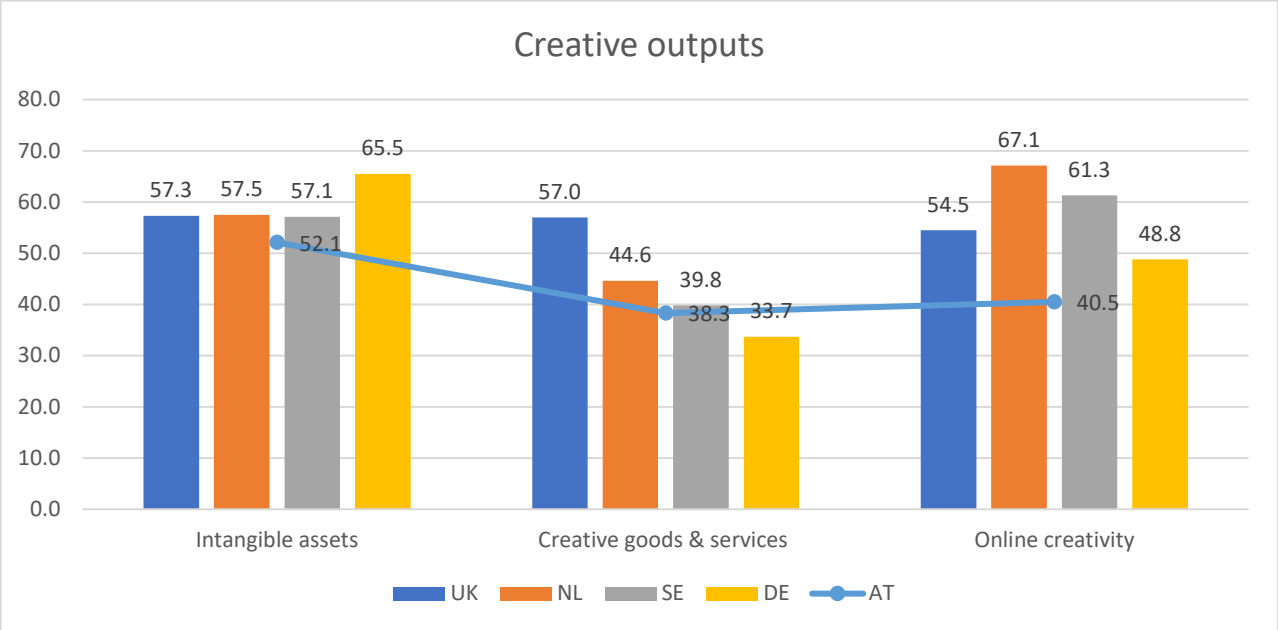


Figure 26 Creative outputs comparison chart

Sub-pillar	Blocks	UK	NL	SE	DE	AT
Intangible assets		**57,3**	**57,5**	**57,1**	**65,5**	**52,1**
	Trademarks by origin/bn PPP$ GDP	54,1	56,2	52,8	64,4	58,0
	Industrial designs by origin/bn PPP$ GDP	5,4	3,8	4,9	16,7	7,4
	ICTs & business model creation	82,4	84,4	81,2	78,5	70,9
	ICTs & organizational model creation†	79,4	81,0	81,4	78,0	65,8
Creative goods & services		**57,0**	**44,6**	**39,8**	**33,7**	**38,3**
	Cultural & creative services exports, % total trade	2,2	1,1	0,9	0,7	1,1
	National feature flms/mn pop.	6,6	7,2	7,4	3,9	6,5
	Entertainment & Media market/th pop.	65,6	50,2	72,4	59,3	65,7
	Printing & other media, % manufacturing	2,2	1,2	1,4	1,0	1,3
	Creative goods exports, % total trade	3,3	4,6	1,7	2,1	1,6
Online creativity		**54,5**	**67,1**	**61,3**	**48,8**	**40,5**
	Generic top-level domains (TLDs)/th pop.	61,0	77,3	42,5	54,5	36,6
	Country-code TLDs/th pop.	76,2	100,0	80,6	81,8	59,6
	Wikipedia edits/mn pop.	69,3	86,3	106,6	52,1	54,2
	Mobile app creation/bn PPP$ GDP	34,0	33,0	50,2	23,9	29,4

Table 5 Creative outputs data

Source: own elaboration, based on GII 2018 (Dutta, et al., 2018).

Creativity can be considered as the part of the overall innovation process, and measurement of specific metrics can be a supplementary indicator of common innovation level within the country and efficiency of the startup environment. The UK, as the leader in startup ecosystem performance, has the highest score in this pillar and Austria has the lowest one. All three sub-pillars represent different aspects of such creativity; intangible assets sub-pillar is the strongest one in creative output pillar for Austria. Country register many trademarks produce new industrial designs and models. Despite lower than for other countries overall score, there are no significant deviations.

Creative goods and services are overall low compare to the UK, but comparable to Sweden and bigger than Germany. Creative goods also include information services, advertising, market research services and represent the general activity of online and offline media. With reservations, it is concluded, that the activity of online media represents the general involvement of the population in the internet industry.

Last sub-pillar shows weak involvement of Austrian companies in global online commerce as a number of top-level generic and country-code domains is significantly lower than for all other selected countries. Mobile app creation indicator supports finding of weak participation in global online commerce with lower score compare to the UK, NL and SE. Wikipedia edits statistic should be interpreted with caution, as the German version of Wikipedia can be edited by citizens of any of German-speaking countries.

1.21.8 Phase 1 summary

Findings of the first research phase demonstrate that Austria has an overall satisfactory performing entrepreneurial ecosystem with good scores in startup skills, tech absorption, process innovation and internationalization, with some gaps in human capital, growth aspirations, networking and cultural support. At the same time, innovation ecosystem analysis demonstrates weak innovation output and significant gaps in innovation input pillars, namely market and business sophistication. Weak development of Austrian financial markets compares to selected countries overall diminish the ability of high-tech entrepreneurs to get necessary financial support and push those entrepreneurs to countries with more favourable conditions. Venture capital activity below the screening level also supports this conclusion. Despite the availability of good universities, Austrian business underutilize highly skilled employees in knowledge intensive areas and does not actively interact on the international scene due to weak absorption of global best

practices and expertise from joint ventures. Innovation activity of the business is also fractured due to insufficient development of industrial clusters.

Austrian innovation output demonstrates below average results. The low number of newly incorporated ventures low entrepreneurial activity, which also reduce chances to create a high-growth company as “mortality rate” among new highly-innovative ventures is overall high. It is concluded that innovation activity in Austria is mostly represented by existing corporations who integrate incremental innovations rather than radical, what overall affect productivity growth. A low number of intellectual property receipts demonstrate overall weakness in the creation of intellectual property, which reflects by intangible assets score. Next phase of research assess the performance of Austrian startup ecosystem, what is a superstructure above entrepreneurial and innovation ecosystems’ basis.

1.22 Phase 2. Analysis of startup ecosystem

1.22.1 Overview of phase 2

As was already mentioned in literature review and phase 1 of research, startup ecosystem is not the only derivative and superstructure of entrepreneurial and innovation ecosystems, but also has its own distinguishing characteristics, which are measurable, objective and comparable.

Phase 2 of the research consists of the following sections measurements:

- **Easiness of starting a venture** in selected countries
- **Demographic data** and assessment of available **human capital**
- **Ecosystem’s quantitative output**, i.e. number of active startups and distribution of development stages
- **Performance of financial backing system** through analysis of business angel’s and venture capital activity
- **The qualitative output of ecosystem**, namely the number of startup unicorns and job creation
- The measure of **startups’ internationalization** through the distribution of startup revenue sources.
- **Migration of startup founders** within the EU and assessment of their location preferences, push and location choice factors.

Summary of the abovenamed information allows us to determine the Austrian startup ecosystem evolution stage, analyze and highlight its major overall startup competitive offer among selected countries.

1.22.2 Ease of starting a business

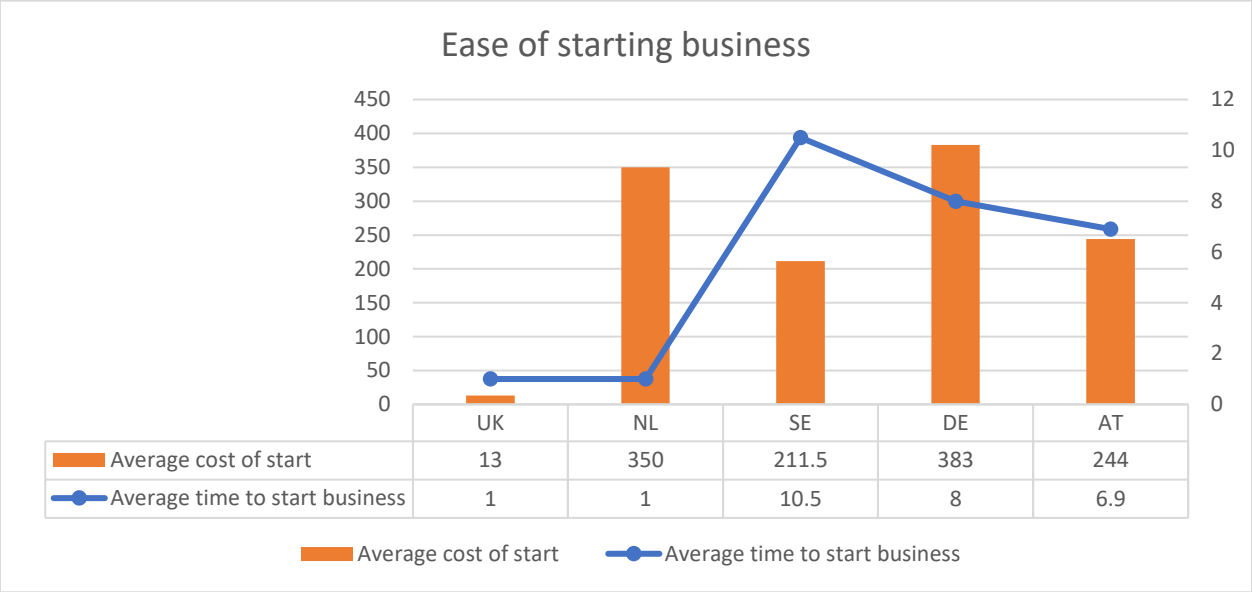


Figure 27 Ease of starting business chart

Sources: own elaboration, based on (Statista, 2018, pp. 13-14)

When time is of the essence, it is important to reduce the time to start a venture. UK and Netherlands are absolute winners in terms of time, despite the dramatic difference in the cost of company incorporation. Other comparable countries are lagging behind one-week timeframe and are hardly comparable to the first two leaders. Highly likely that founders are less sensitive to incorporation price in case of fast incorporation, as this expense is usually negligible, compare to other organizational and running costs of the venture. Nevertheless, the higher price and longer time, the higher barrier for young entrepreneurs to start the venture.

1.22.3 Origin of startups

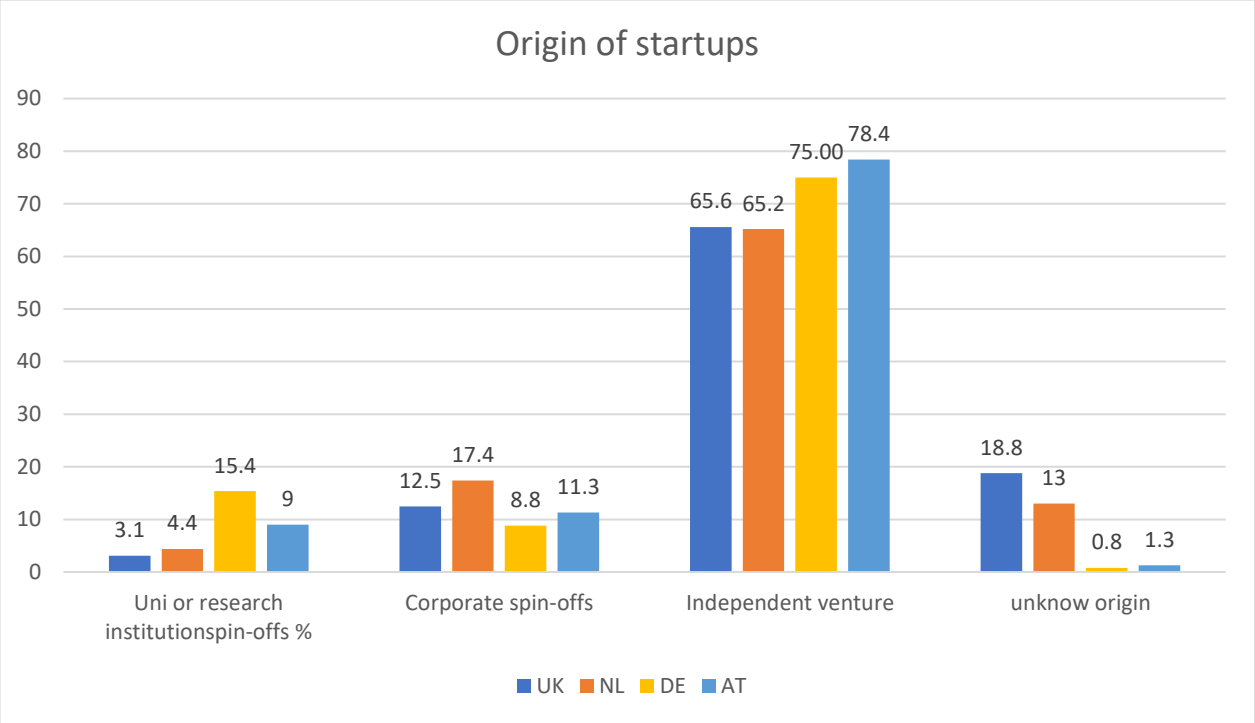


Figure 28 Origin of startups chart

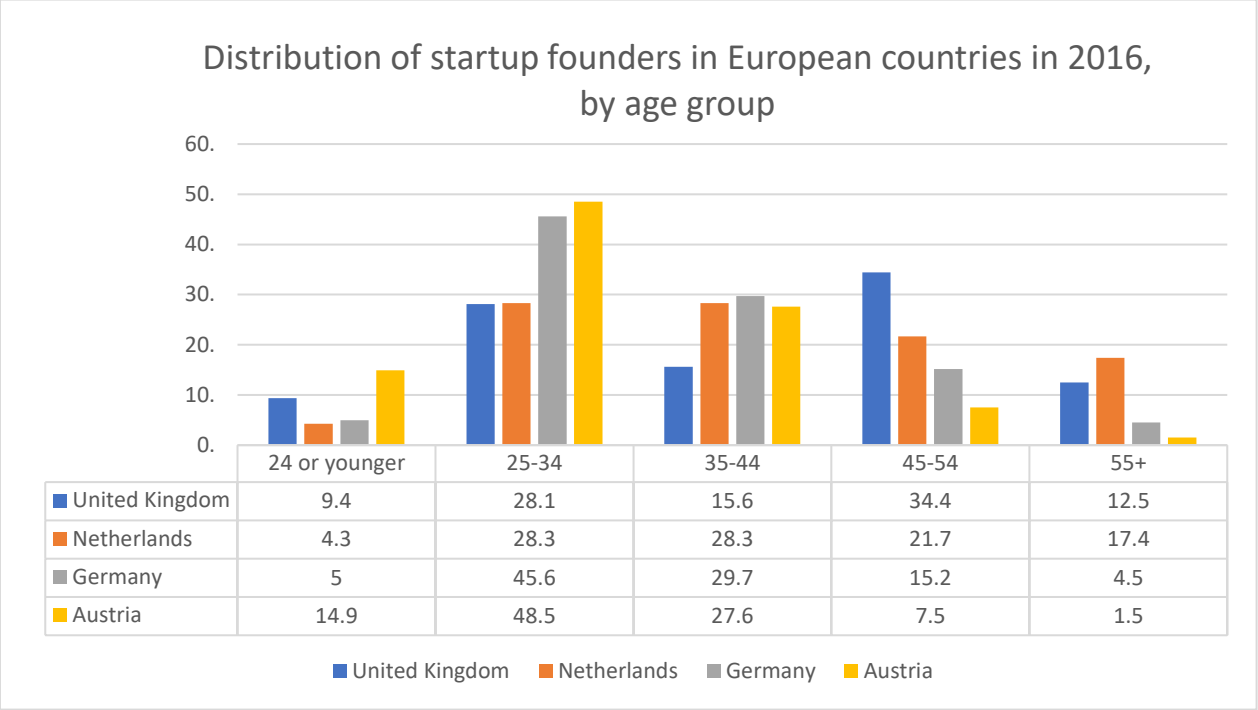
Sources: own elaboration, based on (Statista, 2018, pp. 15-18)

This data represents startup productivity of universities, research institutions and corporations in startup founding. The proportion between independent ventures and spin-offs may correlate with the productivity of the innovation ecosystem is and how active companies and universities in their commercialization attempts.

This metric has some limitations, as the methodology of European Startup Monitor may not cover all cases and a significant share of unallocated data for UK and Netherlands as well as the absence of any data from Sweden.

Nevertheless, Austria has the highest level of independent ventures (78,4%) and a good percentage of spin-offs (20,3%), which represents the third highest result after Germany and the Netherlands.

1.22.4 Age of founders



	24 or younger	25-34	35-44	45-54	55+
United Kingdom	9.4	28.1	15.6	34.4	12.5
Netherlands	4.3	28.3	28.3	21.7	17.4
Germany	5	45.6	29.7	15.2	4.5
Austria	14.9	48.5	27.6	7.5	1.5

Figure 29 Age of founders in European countries in 2016

Sources: own elaboration, based on (Statista, 2018, p. 11)

According to (Azoulay, et al., 2018) age of an entrepreneur is in direct correlation with venture success. Authors analysed data from US Census Bureau and selected companies, based on their innovation activity (availability of patents, venture capital investments, operation in the industry with a high fraction of STEM employees) and location in well-known entrepreneurial hubs. Such selection gave an average age of founder in early 40th and resulted varied across industries. For software and internet companies age was the lowest, and for more sophisticated and science-related industries, the average age was the highest. Nevertheless, among the top selection of the most successful companies (high growth in sales or employment), the average age was 45. It is assumed, that the higher average age, the more successful average startup is and more mature ecosystem. It is also assumed that a higher average age may reflect a greater variety of industries across the ecosystem.

Austria has the highest percentage of age groups “under 24” and “25-34”. It is assumed that the Austrian startup ecosystem is its early stage of development and probability of appearance of the high-growth venture is lower, compared to other selected countries.

1.22.5 Female founders

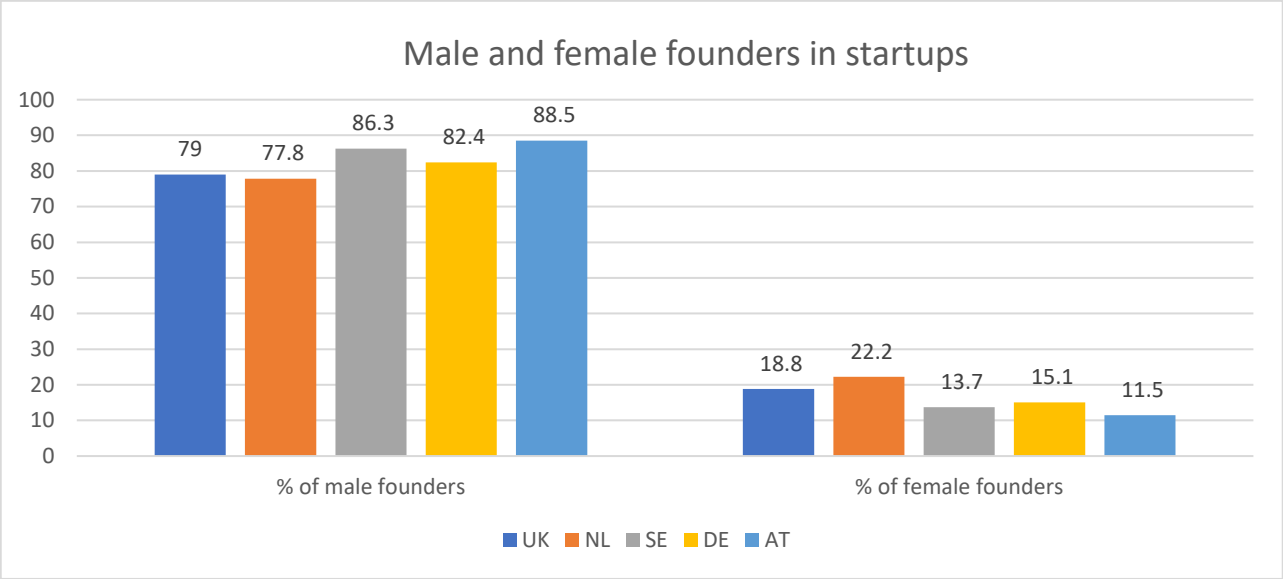


Figure 30 Male and female founders in startups

Sources: own elaboration, based on (Statista, 2018, p. 12)

The proportion of male and female founders in the startup ecosystem is directly linked to the performance of the ecosystem's local connectedness or effectiveness of the local entrepreneurial network. Global Startup Ecosystem Report 2018 summarized that women are more closely linked to the local entrepreneurial network and tend to build more relations with other founders. Women also demonstrate slightly different results in startup motivation and tends to run a startup to "change the world", while man tends to be more product oriented. At the same time, women are less connected to venture capital and use different sources of financing. The is no difference in the total addressable market or globalization aspirations between man and woman.

Among compared countries, Austria has the highest percentage of male founders and lowest of the female. This disproportion directly correlates with insufficient ecosystem performance from other metrics. To address this issue, Austria may reinforce woman support policies in order to promote female entrepreneurship and facilitate access to venture financing.

1.22.6 Level of founder's education

Innovations in high-technological sector demand highly skilled founders and key employees, though there is no direct evidence that founder's level education is a strong factor of success, in sophisticated industries it is an essential element of technology handling. It is discussed by (Marion, 2016) that there is a positive correlation between top education of at least one of startup founders and overall venture success. Those findings were supported by (Wadhwa, et al., 2008), who underlined the importance of high education in tech entrepreneurship. Most of the founders are middle-aged and have at least 16 years of experience before launching a startup. There is also "…biggest difference in business success … between tech founders with terminal bachelor's degrees and those with terminal high school diplomas" (Wadhwa, et al., 2008).

Austria has the highest amount of high school degree and college or somewhat university degree, in total – 23%, while leading countries have founders with high school degree in the range from 0% to 4% and major share of bachelor's and master's university degrees. This finding supports scientific findings of Marion and Wadhwa, and highly likely this significant disproportion could impact innovativeness and technological sophistication of Austrian startup products. This result also correlates to the lower percent of workers in knowledge-intensive employment and overall moderate innovation output pillars analyzed above.

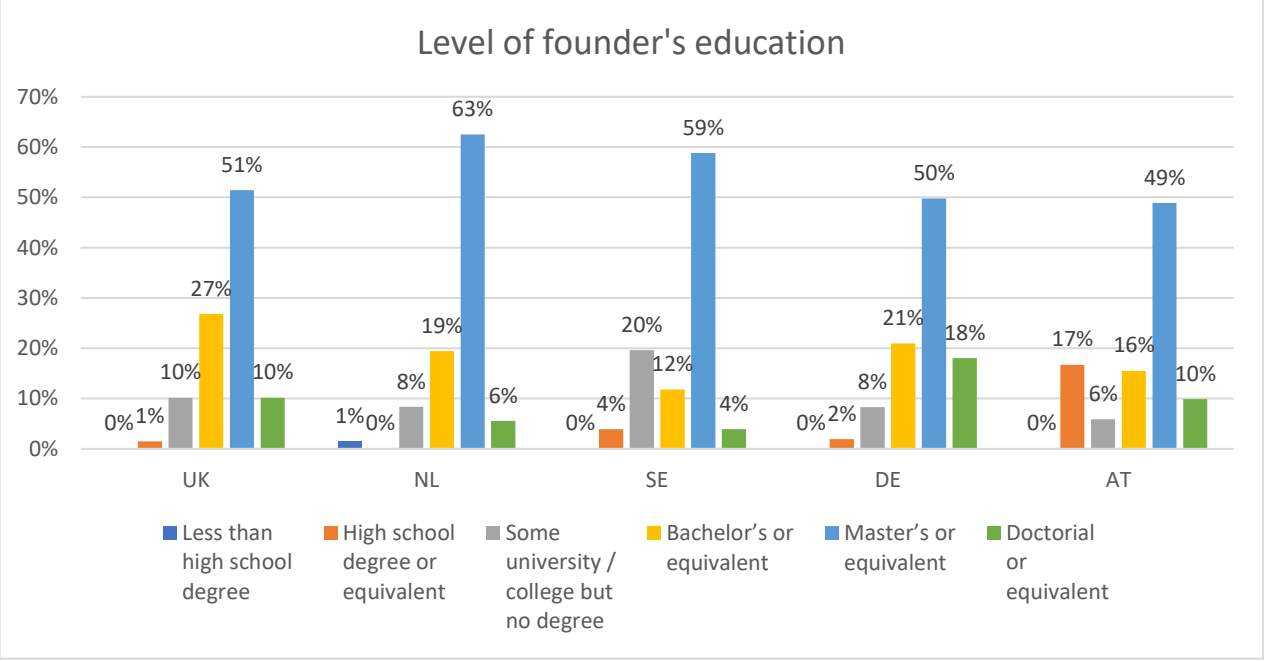


Figure 31 Level of founder's education

Sources: own elaboration, based on EU Startup Monitor 2018 (Steigertahl & Mauer, 2018, p. 27).

1.22.7 Professional developers pool

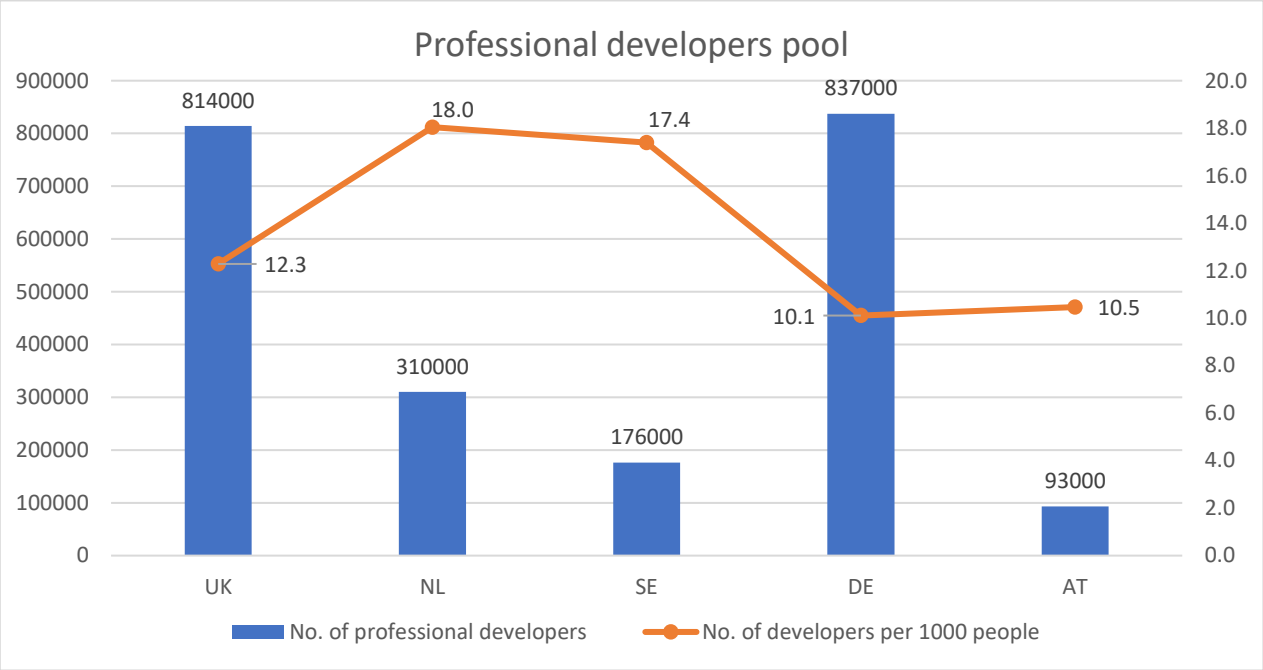


Figure 32 Professional developers pool

Source: Own elaboration, based on Startup & Venture Capital Landscape in DACH (Speedinvest X and Frontline, 2018, p. 13)

A developers' number is a multiple indicator. It may reflect the attractiveness of countries ecosystem, a number of tech companies within the ecosystem, availability of big corporations and overall level of knowledge-intensive labour utilization. The present graphic shows an absolute number of developers per country. But those numbers are not comparable, due to country size and difference in population. Therefore, the latest data population size data were taken from (Eurostat, 2019). The stacked line represents a number of developers per 1000 of citizens. Germany, despite the highest number of developers, has the lowest ratio (10,1) and Austria is just slightly higher (10,5). Developers concentration leaders are Netherlands and Sweden 18 and 17,4 developers per 1000 of the population). This graphic directly correlates with data on Knowledge-intensive employment from Global Innovation Index 2018, where Germany and Austria have lower results. Nevertheless, Austria is still among top-20 destinations for developers according to (Atomico & Slush, 2017).

1.22.8 Tech talents moving

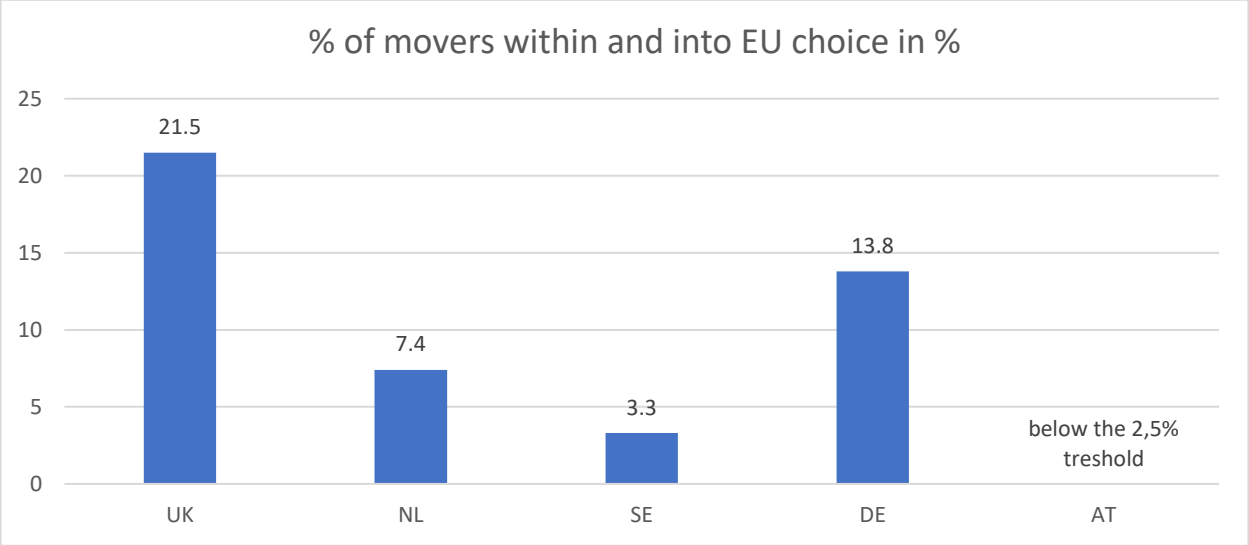


Figure 33 Per cent of movers within and into EU choice in %

Source: Own elaboration, based on (Atomico & Slush, 2017)

Another metric of ecosystem performance is the attractiveness of the country's ecosystem to talents within EU as well as outside EU. The move of tech talents to the country reflects growing demand in a highly skilled workforce. Demand can be driven by various factors, inter alia creation of a team in new startups, new employees demand in growing ventures, relocation of transnational corporations to country. Overall, tech talent moving is associated with positive changes in the economy and the startup ecosystem. The UK is the absolute leader in talents attraction, following by Germany and the Netherlands. Austria was not included in this graph as Austrian data was below 2,5% screening threshold.

1.22.9 Number of startups

This important metric represents the overall evolution of the startup ecosystem. Global Startup Ecosystem Report approach strongly associate this metric with development phase and performance. However, this metric is the vaguest, as the legal definition of a startup is not yet developed in EU, and therefore there is no single approach in startup identification and screening among researchers and authors of reports (on international or national levels). TechCrunch database is based on voluntary registration and therefore may be incomplete.

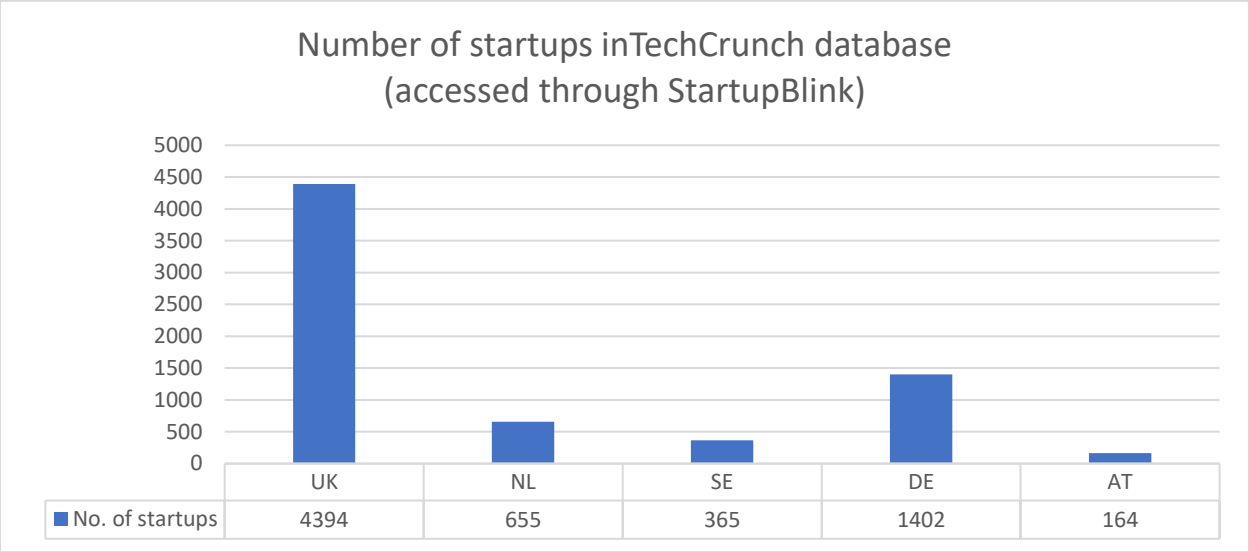


Figure 34 Number of startups in TechCrunch database

Source: Own elaboration, based on https://www.startupblink.com data. Accessed on 15.06.2019.

Current figures can be utilized to get a rough outlook on ecosystem size and overall performance. The UK is the absolute leader with the highest number of startups, and Austria is represented only by 164 registered companies. Nevertheless, Austrian Startup monitor 2018 provide different figures. For the period 2014-2017 were founded **1534** startups, and in the year 2018, during report composition, **368** startups participated in the survey, and 181 startups were from Vienna (biggest startup hub in Austria) (AIT Austrian Institute of Technology, AustrianStartups, WU Gründungszentrum, 2018).

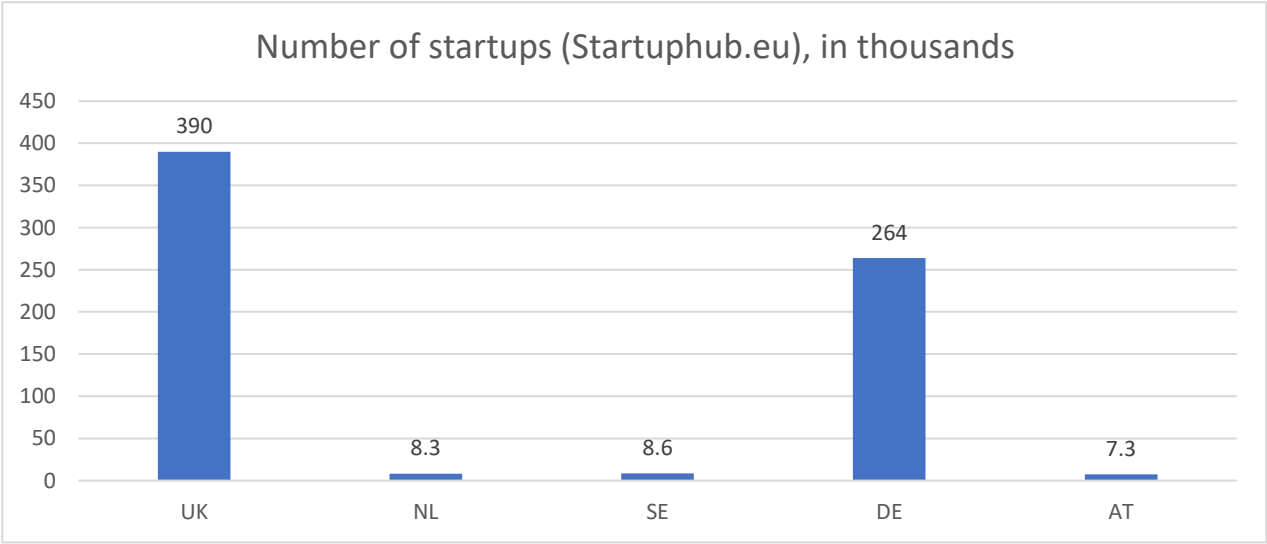


Figure 35 Number of startups in Startuphub.eu database

Source: Own elaboration, based on http://www.startuphubs.eu/ data. Accessed on 17.06.2019.

Europe's startup ecosystem platform startuphubs.eu, use own screening algorithm of public company's registers and get totally different numbers, but overall relation between company numbers in the UK or Germany and Austria remains the same. A high number of companies explain the leading positions of the UK and Germany as a destination for talent's choice.

1.22.10 Startups' average age and distribution of development stages

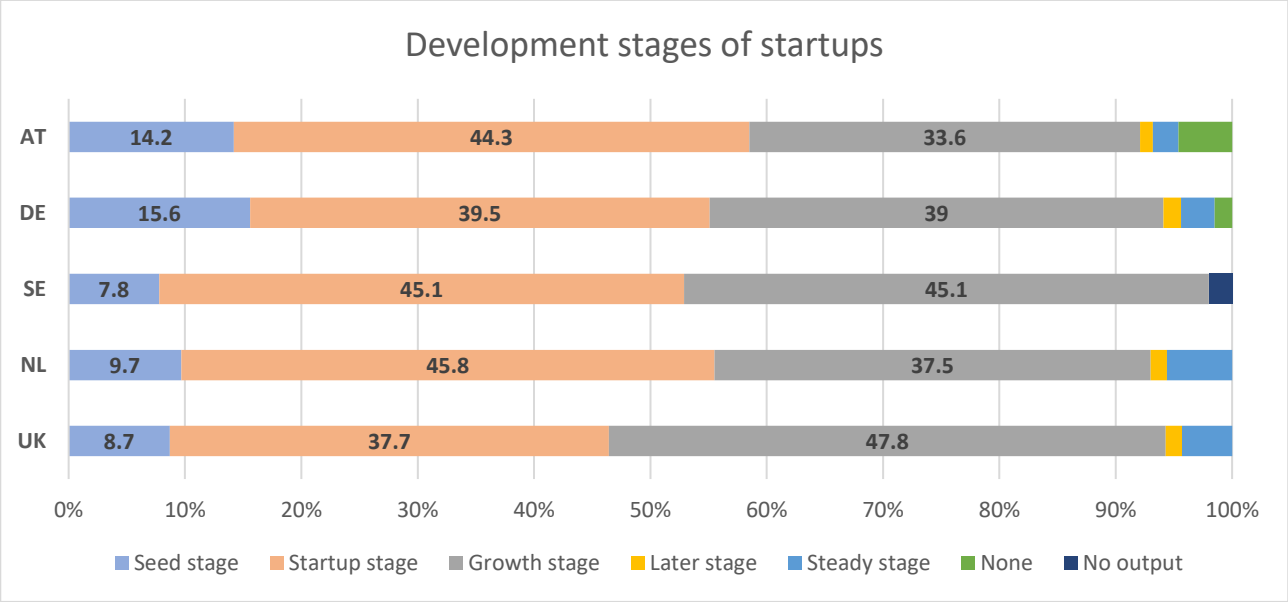


Figure 36 Development stages of startups

Sources: own elaboration, based on EU Startup Monitor (Steigertahl & Mauer, 2018, p. 30)

Country	UK	NL	SE	DE	AT
Average age of startup, years	2,7	2,3	n/a	2,5	2,5

Table 6 Average age of startups

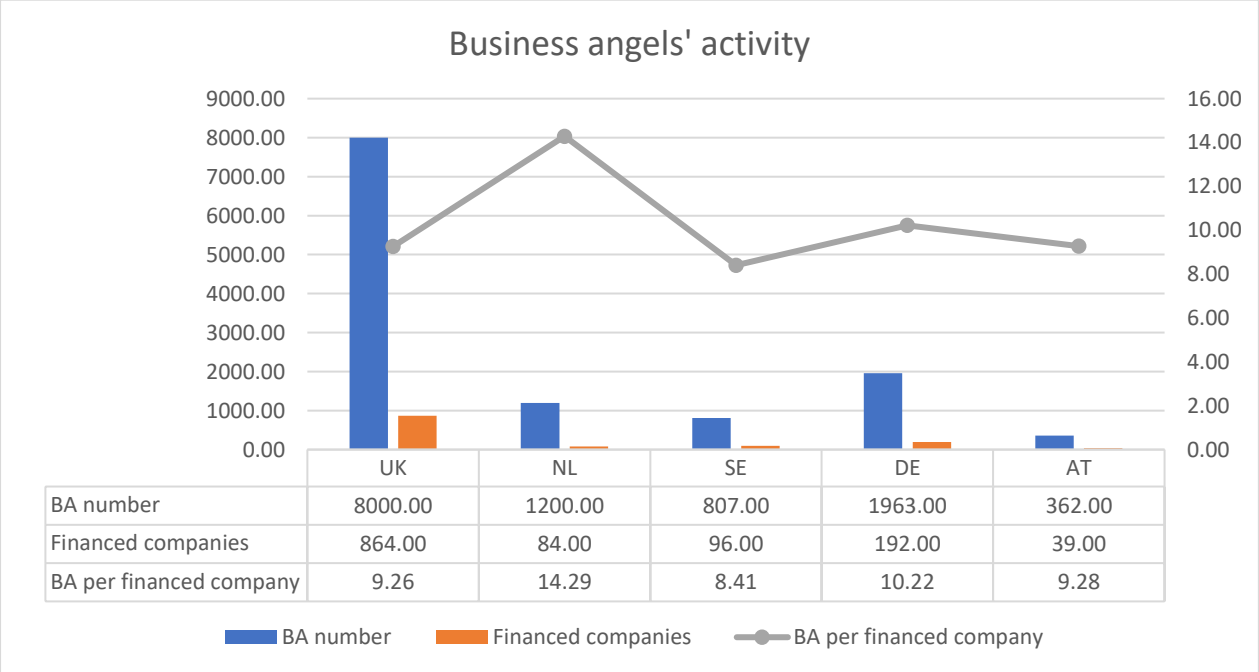
Sources: own elaboration, based on (Statista, 2018, p. 23)

Presented data is the subject to careful interpretation, but it is assumed, that longer average age is the consequence of a higher survival rate of a startup. At the same time, the distribution of startups on development, stages reveal an interesting pattern. Most developed ecosystems, according to Blink Ecosystem Report, has very short seed stage, compare to Austria and Germany. It is assumed that Startups may get seed financing faster and move to the next stage. At the same time, the UK has a very interesting distribution of development stages. Startup stage is the shortest among all countries. It can be a contribution of the well-developed ecosystem

and high level of market sophistication (high number of business angels, venture funds and overall saturated financial market). In such a well-developed ecosystem, startups can faster validate the product, process early-adopters' feedback and move to the growth stage. As the startup stage is the riskiest one, good ecosystem helps to sort out viable from not viable ideas faster and allow successful startups quick transition to the growth phase. In the startup ecosystem, where the overall number of startups high, a number of failures are also high, but every unsuccessful attempt increases the experience of team and founder and raise the overall level of tacit knowledge within the local startup community and increase the probability of success in next attempt. Therefore, in mature ecosystem highest share of startups locates in a growth stage, while seed and startup stages are shorter compared to less developed ecosystems.

Austria has the shortest growth stage and the longer sum of seed and startup stages, and this defines the Austrian startup ecosystem as less developed, compared to other selected countries.

1.22.11 Business angels' activity



	UK	NL	SE	DE	AT
BA number	8000.00	1200.00	807.00	1963.00	362.00
Financed companies	864.00	84.00	96.00	192.00	39.00
BA per financed company	9.26	14.29	8.41	10.22	9.28

Figure 37 Business angels' activity

Sources: own elaboration, based on (Statista, 2018, pp. 12-16)

Business angels are essential for the startup ecosystem as they provide initial financing for a venture on the pre-seed and seed stages, where minimal viable product, business model or

customers' pool are not yet in place. The higher amount of business angels, the more developed ecosystem is, but cause-effect relation between a number of business angels and the overall number of startups (or ecosystem's startup output) is not obvious. Therefore, a direct comparison of angels' number or number of financed companies between countries is irrelevant. More relevant is the number of available angels per one financed company. This ratio is particularly important because it represents the activity of existing angel's pool. In average, there are 10,3 business angels available per every financed company and most of the compared countries have a similar level of activity, meantime the Netherlands is the outlier with 14,29 business angels per one financed company. It is assumed that the Netherlands has an excess of business angels, and their overall level of activity is lower, compared to the UK and other countries. The activity of Austrian business angels is of the same level as in the UK.

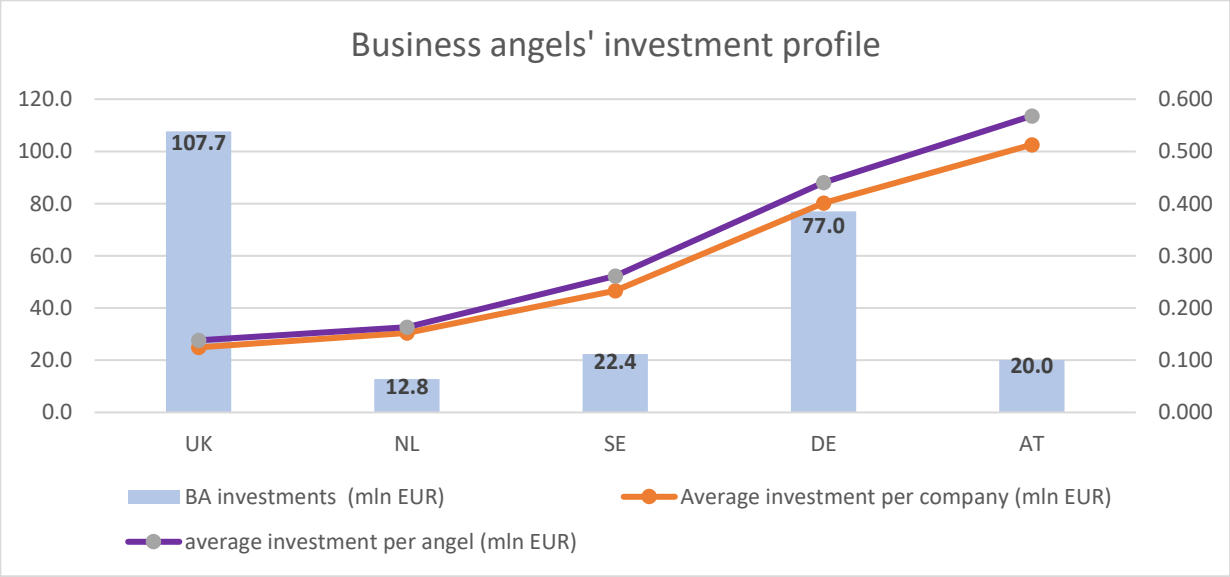


Figure 38 Business angels' investment profile

Country	BA investments (mln EUR)	Average investment per company (mln EUR)	average investment per one BA (mln EUR)
UK	107,7	0,125	0,013
NL	12,8	0,152	0,011
SE	22,4	0,233	0,028
DE	77,0	0,401	0,039
AT	20,0	0,513	0,055

Figure 39 Business angels' investment data

Sources: own elaboration, based on (Statista, 2018, pp. 12-16)

On the next stage, it is important to analyze business angels' investment profile, namely the number of invested funds. Chart and table below represent two important ratios, the namely average size of seed funding per company (total amount of invested funds divided by the number of funded companies) and the average size of financing per one business angel (total amount of invested funds divided by a number of available business angels). It's important to underline, that countries are allocated on the chart according to their ecosystem performance rating (from left to right, UK is the most developed and Austria is the least developed ecosystem among selected), and we see, strong negative correlation between level of ecosystem development and amount of funds per one company and per one angel.

The UK as the leader has the lowest amount of investments per one angel – only 13,000 Euro, highly likely, that in the saturated ecosystem a high number of business angels distribute risk within the pool and bear the less financial burden, while average Austrian business angel invests 55,000 Euro, as the overall number of angels is smaller.

The average size of seed financing for one company is in average 125k Euro in the UK and 515k Euro in Austria. It is assumed, that startups in developed UK ecosystem may receive venture financing faster than in Austria as startups pass seed stage in average two times quicker than in Austria (see chart distribution of startup development phases).

1.22.12 Venture capital activity

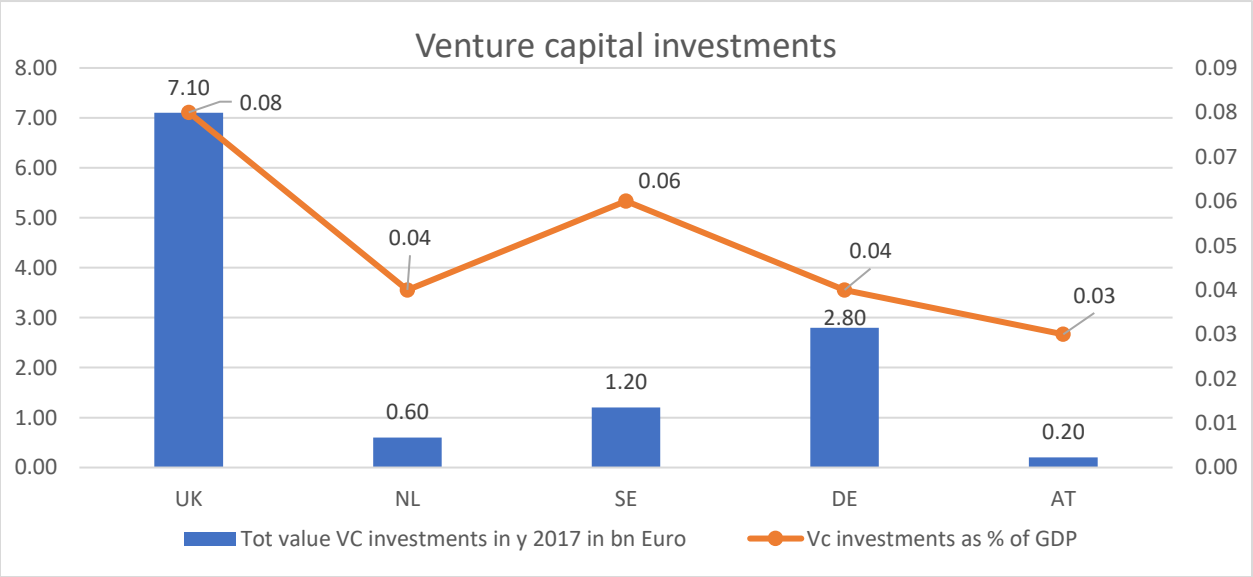


Figure 40 Venture capital investments

Sources: own elaboration, based on Venture Capital in Europe (Statista, 2018, pp. 25, 29)

Venture capital (VC) is an essential element of every startup ecosystem. VC nurture ecosystem with necessary financing for startups on any stage of development. In some cases, VC financing can be provided even on seed stage and therefore, it plays an important role of enabler for a startup.

VC is an indispensable element as investments in startups are risky, and banks and other more traditional financial institutions simply cannot enter this area due to regulatory requirements. Adding more elements to the country's financial system create additional opportunities for national and foreign investors. VC has can be of a different origin: local, international private, corporate or even quasi-governmental. Diversification of sources of funds reduce risk and financial burden for particular investor and at same time increase investment opportunities, as high variety of investors may enrich VC fund's management policy with their expertise and business connections.

Apart from financing, VC plays an important role in the cohesion of ecosystem stakeholders. So-called smart-money is a mixture of financing, mentoring and advising of a startup, which allows to build a network and includes many ecosystem stakeholders in the process.

VC investments chart above demonstrates how a developed ecosystem is different from its competitors. UK number of VC investments almost two times outperform the sum of investments in the Netherlands, Sweden, Germany and Austria. This is an absolute metric, and it is good to estimate the potential size of the ecosystem.

Another metric is VC investments as a percent of countries GDP, and this metric directly correlates with the development of the ecosystem. Austria has 2,6 times less VC investments as a % of GDP than the UK. Thin VC presence within the country inhibits overall entrepreneurial and innovation activity and substantially reduce a country's competitive offer for immigrant founders.

1.22.13 Unicorns

Role of unicorns (startups with capitalization more than 1 billion US Dollars) cannot be underestimated. When a startup grows and reach such an impressive valuation, it dramatically increases international recognition of startup ecosystem, attracts not only new entrepreneurs but also investors, tech talents and connect ecosystem to a global pool of resources. The appearance of unicorns are quite rare, but the most desirable output for entrepreneurs and investors. Regular appearance and exit of unicorns characterize the high level of ecosystem development. The data into the chart presents three metrics: number of unicorns, their valuation as of year-end 2017 and aggregated value for the period 2013-2017. While number and value of unicorns may vary from

year to year (after exit event, the unicorn is not recognized as a startup anymore and is not included into the ratings), the aggregated value remains the most reliable data reflecting ecosystem performance. UK is the outstanding leader with 56 billion EUR of total unicorns' valuation following by Germany, the closest neighbour of Austria in ecosystem rating. While Germany performs in many relative metrics similar to Austria, it is able to produce an impressive number of unicorns with an aggregated valuation of 35 billion EUR. Distribution of unicorns correlates with a total number of startups, the pool of developers per country, amount of business angel and VC investments. Absence of evident correlation with other metrics does not mean that these metrics are irrelevant to the birth of unicorns. Therefore, further research behind the scope of this study is necessary.

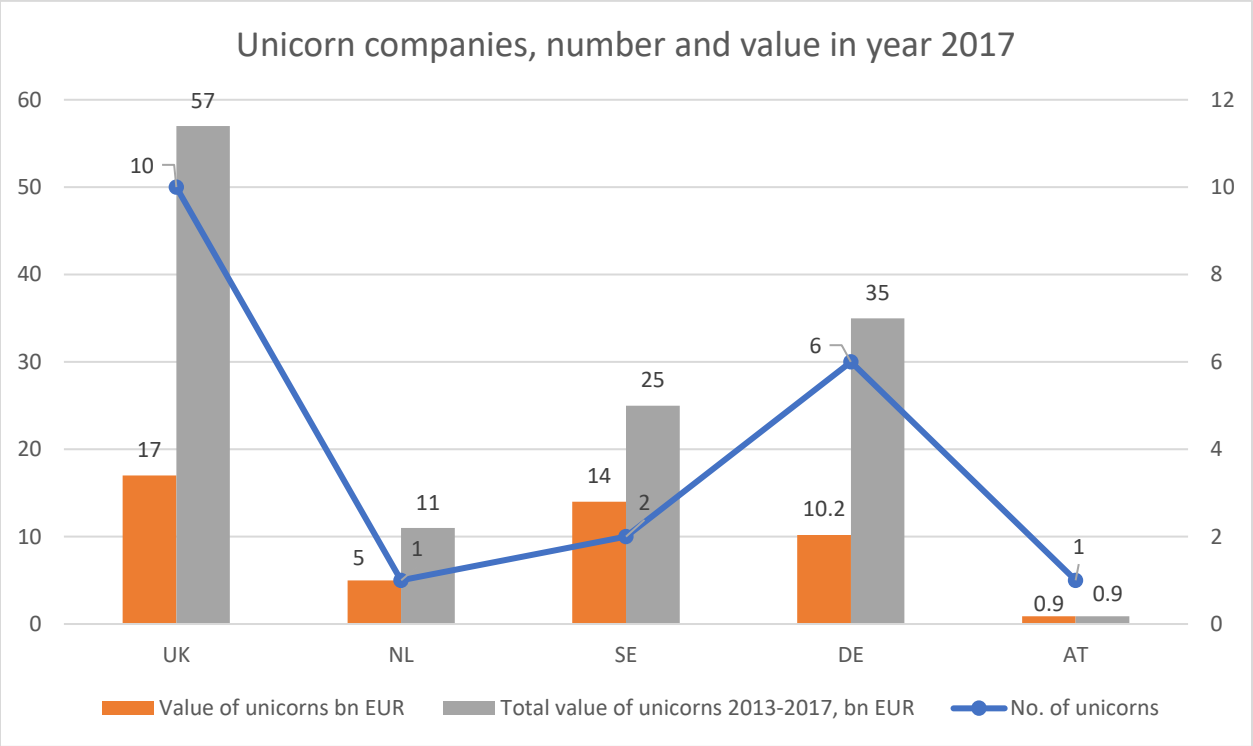


Figure 41 Unicorn companies, number and value in year 2017

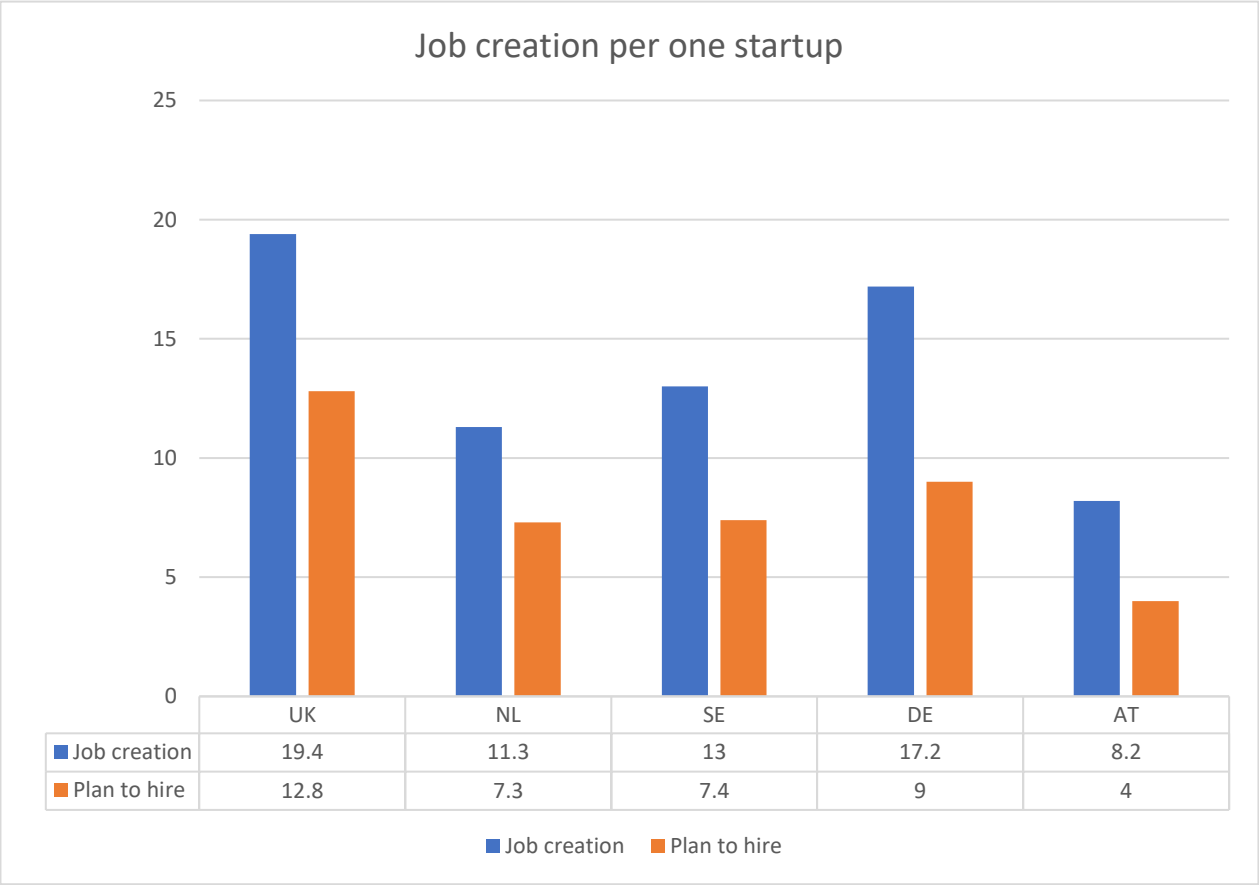
Sources: own elaboration, based on Venture Capital in Europe (Statista, 2018, pp. 15-18)

1.22.14 Impact of an ecosystem on job creation

As was discussed in the review of scientific literature, one of the main impacts of high-tech opportunity-driven entrepreneurship is the creation of new jobs. Current data represents the impact of startups on a country's employment. On average, in the EU, one startup creates 12,8

jobs and plan to hire, on average, 7,5 more people. While depending on the level of ecosystem development figures may significantly vary from country to country.

The UK creates 2,5 more jobs per one startup than Austria and plans to hire 3 times more people. German startups hire and plan to hire 2 times more people than Austrian startups. Overall jobs data support previous findings that the Austrian startup ecosystem is characterized as emerging, and its full potential is not uncovered.



	UK	NL	SE	DE	AT
Job creation	19.4	11.3	13	17.2	8.2
Plan to hire	12.8	7.3	7.4	9	4

Figure 42 Job creation per one startup

Source: own elaboration, based on EU Startup Monitor (Steigertahl & Mauer, 2018, p. 12)

1.22.15 International orientation of startups

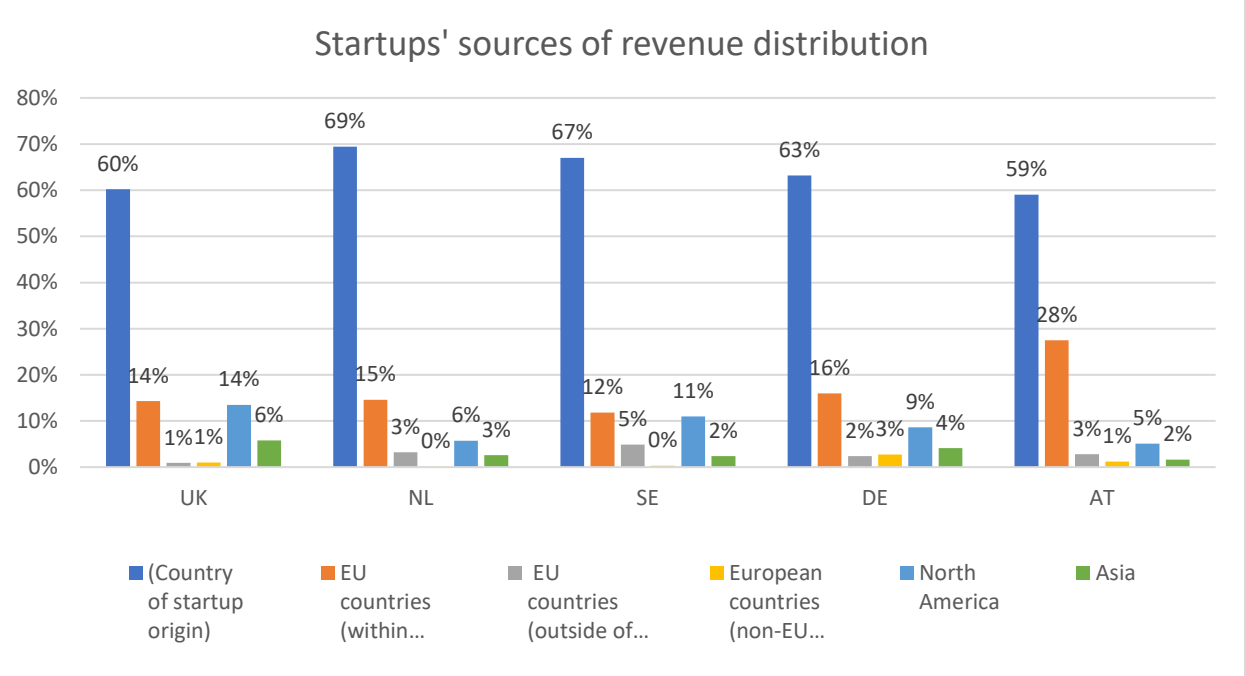


Figure 43 Startups' sources of revenue distribution

Source: own elaboration, based on EU Startup Monitor (Steigertahl & Mauer, 2018, p. 14)

Be big and going global is in startup's DNA. Therefore, it is important to measure from what territories already existing startups extract their revenue. This metric doesn't measure competitiveness, but it helps to understand what patterns exist in each country and how it may affect the decision of entrepreneurs to establish a venture in particular jurisdiction. There are two biggest markets: the EU market, including countries inside and outside Eurozone and US market. The third important market is Asia. While access to home and EU markets is not a concern for any country due to the free trade agreement, UK startups are much more internationally oriented, as North American and Asian markets comprise 20% of overall revenue. Austrian startups, apart from the home market, have the highest share of the revenue from other EU countries, it characterizes Austria as strong EU-oriented country. At the same time, location of Austria in the CEE region eases access non-EU countries on the east and south of Europe. It's important to underline that 5% of revenue from North American market looks less significant than 9-14% for UK, Germany or Sweden, nevertheless, for a small country like Austria, it is the third major direction of sales.

1.22.16 European startup founders' preferences

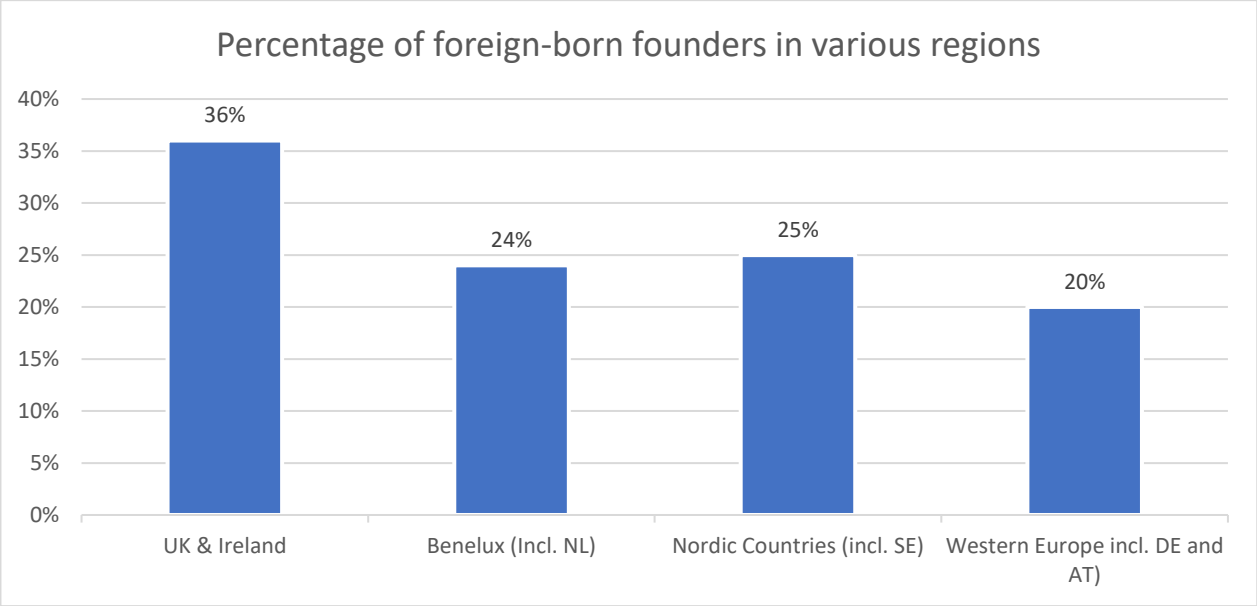


Figure 44 Percentage of foreign-born founders in various regions

Source: Own elaboration, based on Startup Heatmap Europe 2017 (Thannhuber, et al., 2016)

In order to connect analysed ecosystem metrics and attractiveness of ecosystem to immigrant founders, selected results of Startup Heatmap Europe research for years 2016 and 2018 (hereinafter – SHE 2016, 2017 and 2018) are laid out and discussed in this study.

Subsequent analysis of SHE for the years 2016-2018 revealed that share of foreign-born founders in Europe rose from 21-23% to 28% in the year 2018.

As was discussed in the literature review, the role of immigrant founders cannot be underestimated, while diversity, immigrant motivation, level of education plays an important role. Most successful ecosystems have the highest share of immigrant founders as demonstrate results of SHE 2017. Western European region has on average 45% less immigrant founders than UK and Ireland region.

1.22.16.1 Push factors analysis

There are two main forces impact the founder's decision to move abroad. First is motivation, and another is a cumulation of push-factors. Motivation analysis showed that 28% of founders moved abroad specifically to launch a startup, while other motivational factors included employment

(31%), education (18%), family (21%). Those motivational factors should be taken into account as they drive 2/3 of foreign-born individuals to launch a startup after they moved.

Analysis of push factors shows, that startup ecosystem and culture affected 23% of all the

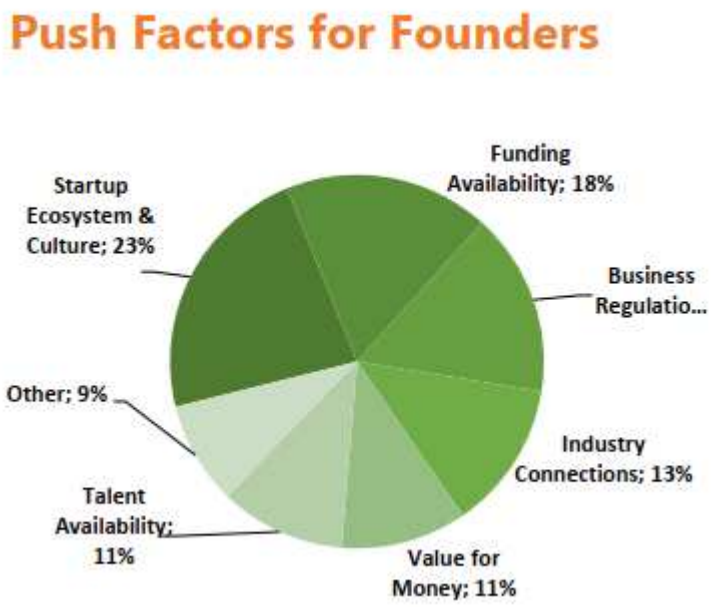


Figure 45 Push factor for founders

Source: The rise of the interconnected startup. Startup Heatmap Europe (European Startup Initiative, 2018)

founders when funding availability affected only 18%, but jointly, they comprise half of the total factors. Another half of the factors represent the general quality of the business environment, which plays a crucial role for startup founders. Overall, weak startup ecosystem with low financing capabilities in combination with unsatisfactory business conditions inhibit startup activity and encourage emigration of founders.

1.22.16.2 Location choice factors

On another side, startup founders migrate to the new country and new ecosystem, and some factors are more important than the other in choosing a new home for a startup.

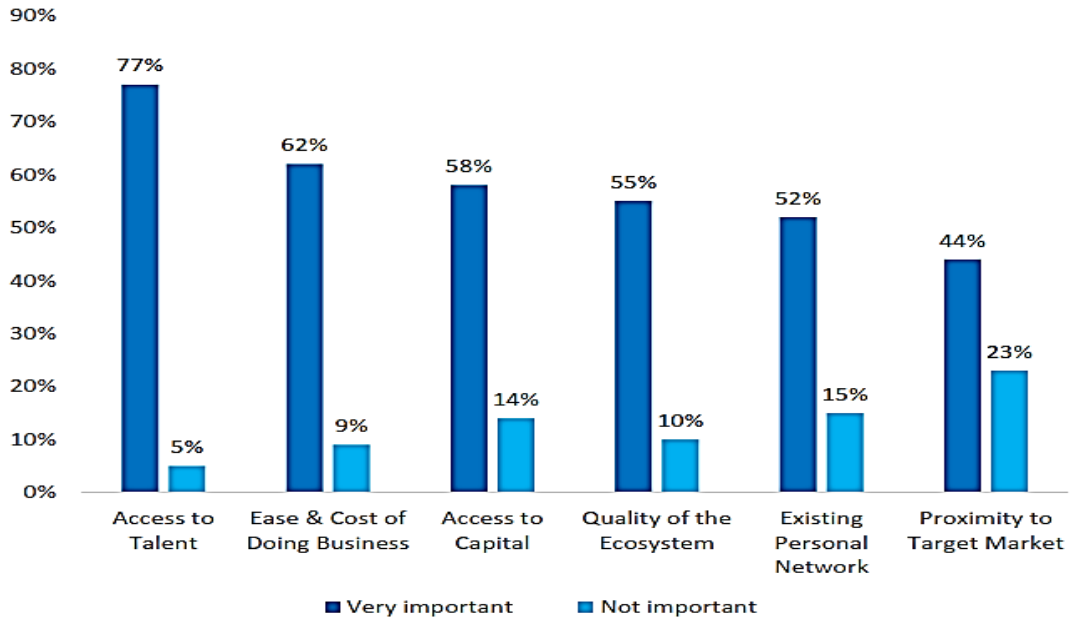


Figure 46 Top Factors for location choice

Source: Startup Heatmap Europe (European Startup Initiative, 2017)

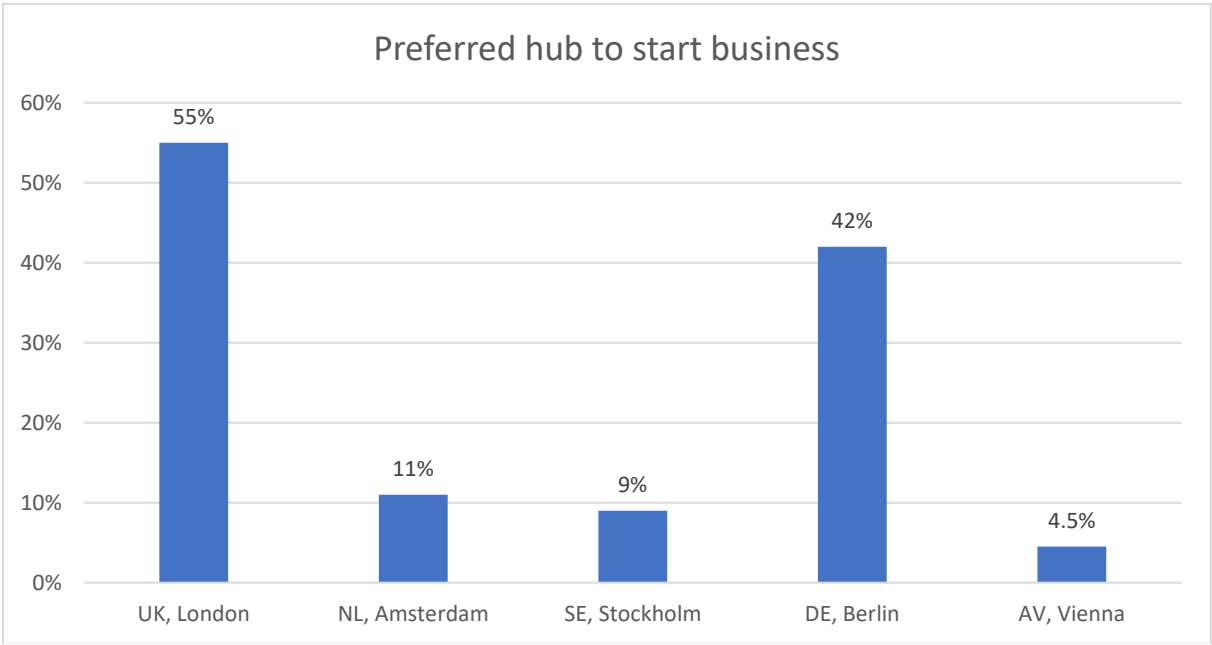


Figure 47 Preferred hub to start business

Source: own elaboration, based on Startup Heatmap Europe (European Startup Initiative, 2017)

Availability of tech talents in place is the most crucial factor for founders. Business costs and financing options are the second and third most important factors, following ecosystem quality.

Data, analysed in phase 2 of this research shows, that Austria underperforms in human resources with smallest developers' pool and low attractiveness for tech talents, Austria has low score in market sophistication due to low density of capital and overall costs of doing business are high (e.g. time and cost of starting business).

The survey, performed by SHE in the year 2017 showed that London and Berlin are true international hubs to start a business, due to the highest number of foreign founders, who would like to start their business. A high number of founders also reinforced by the level of countries diversity (founders from more than 25 countries chose Berlin and London as a desired destination). Amsterdam and Stockholm are strong emerging hubs with 11% and 9%. Vienna is the least desired destination in this group, and it shows many issued which should be addressed in order to rise ecosystem competitiveness. Nevertheless, Vienna has a lot of advantages and can be a strong competitor within a region.

1.22.17 Phase 2 summary

Summarizing phase 2 of the study, the Austrian startup ecosystem can be characterized through the interpretation of metrics in light of top four factors for location choice:

1. **Access to talents (human capital)**
    - Disproportionally presented female founders reduce local connectedness of ecosystem
    - Share of founders with high school and a college degree (23%) is the highest among selected countries. It may inhibit the amount of sophisticated and high tech startups
    - The modest pool of developers prevents foreign founders from relocating to Austria and push out local founders, who faced with developers shortage
    - Less than 2,5% of tech talents consider Austria as a desirable destination to move.
2. **Ease and cost of doing business**
    - Starting a business in Austria takes one week, compared to 1 day in the UK
    - Low level of new companies
    - Relatively high taxes, healthcare and social insurance contributions
    - Long-lasting process of relocation to non-EU founders and developers.
3. **Access to capital**

- Business angels' number is sufficient to the number of financed startups, but the average amount of investment per angel is the highest among selected countries (55k EUR vs 11K Eur in NL) what may reduce investment capabilities of angels
- Level of venture capital financing is overall adequate to the level of current startup activity, but the amount of investments as a % of GDP is the lowest within the selection. Limited opportunities for financing, especially on later stages, inhibit the founder's decision to move in or to stay in the country.

4. Quality of ecosystem (ecosystem output)

- Distribution of startups development phases is shifted to seed and startup phases while the growing phase is the smallest among selected countries
- Total number of startups is only 1534 (counted from the year 2013)
- One not yet internationally recognized unicorn company (Tricentis)
- Several multimillions exit events (Runtastic, mySugr, Shpock).
-

Those findings identify Austrian startup ecosystem as a transitional ecosystem between activation and globalization phases according to GSER method. Phase 3 presents results of a quantitative survey taken among CIS founders, tech talents and other people from the industry.

1.23 Phase 3. Field survey on the attractiveness of compared ecosystems to CIS founders

1.23.1 The relevance of assessed respondents

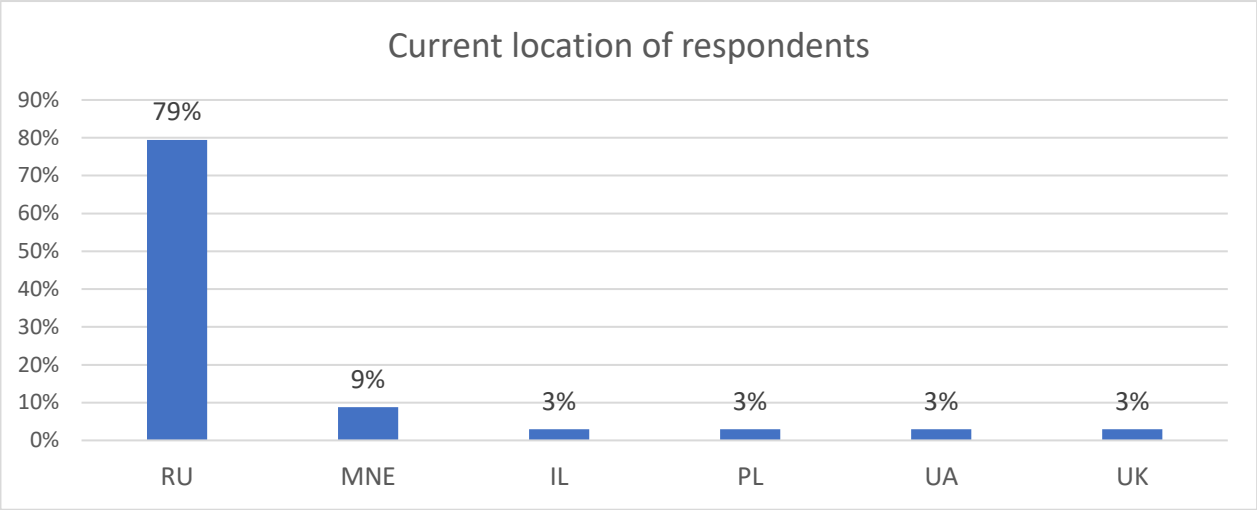


Figure 48 Current location of respondents

Among the accessed respondents, the majority has Russian (32 respondents) and minority (2 respondents) - Ukrainian citizenship. Current place of residence of 79% is Russia, while 21 % of respondents temporary or permanently moved from Russia or Ukraine to other countries but still engaged in various startups with Russian or Ukrainian origin as founders, key employees,

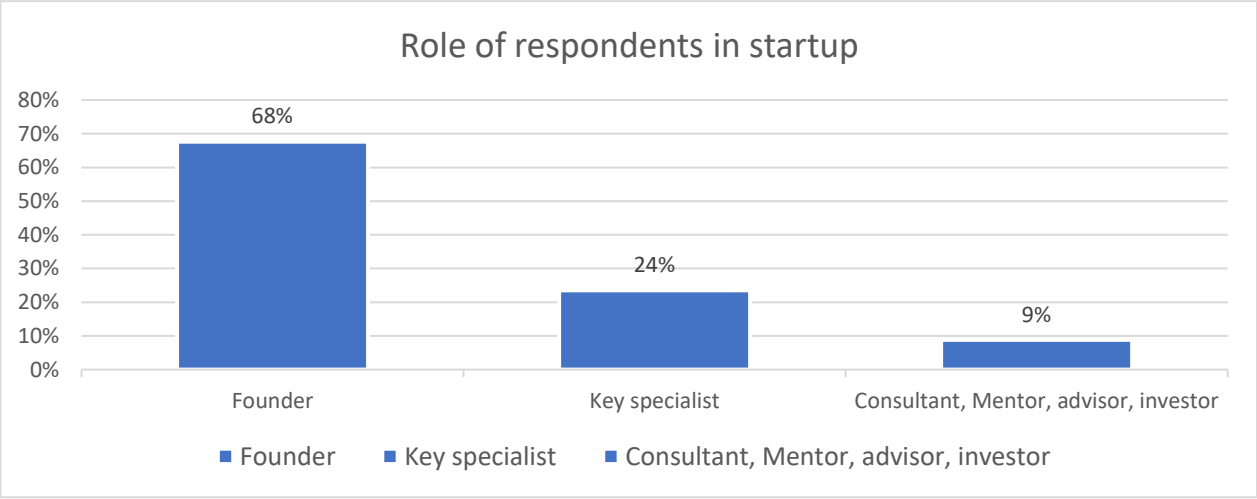


Figure 49 Role of respondents in startup

mentors, consultants, investors or advisers. It is assumed that the diversity of current locations could positively affect results due to the intercultural experience of not CIS-domiciled respondents.

68% of all respondents are startup founders, and 24% are key specialists, who engaged in startup on an equity basis and can be considered as a relevant target group. Consultants, mentors, advisors and investors overall clearly understand the current situation in the industry and provided answers on behalf of their supported or invested startups. Role in startup question also had the possibility of a free answer, but none of the respondents used this option.

1.23.1.1 Startup profile assessment

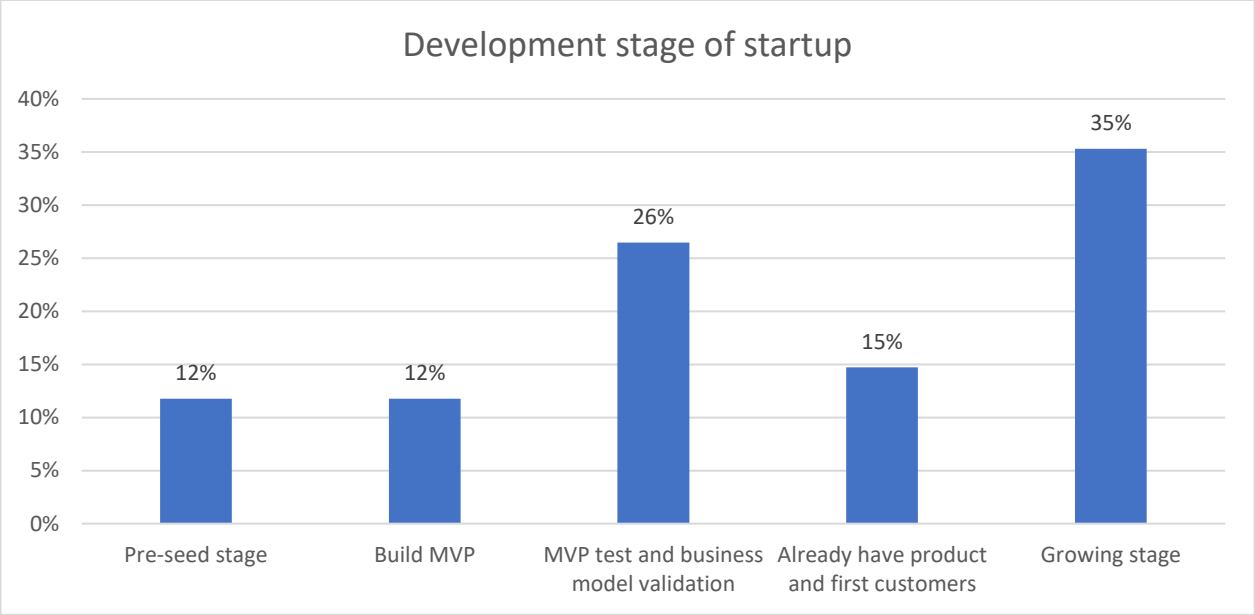


Figure 50 Development stage of startup

Distribution of startups' development stages shows that 50% of startups already have customers, and 35% are on the growing stage. Another 26% of startups developed MVP and currently validate the business model. In total, 76% of startups already practically assessed surrounding business conditions and 35% of growing startups might be considered as, to some extent, mature. Level of startup maturity usually correlates with the learning curve of founders and deeper understanding of startup needs, therefore given answers in respect of relocation of startup abroad are more deliberate. Startups with MVP and customers are usually more desirable for relocation as those stages directly correlate with the viability of the underlying idea and overall product marketability.

1.23.1.2 Startup sectors distribution

It is assumed that the broader range of startup sectors are presented, the more relevant are results. In total, 17 different sectors are presented with the

highest amount in the EdTech sector and drones, robotics and new methods of the manufacturing sector. A higher variety of startups sectors overall positively correlate with the

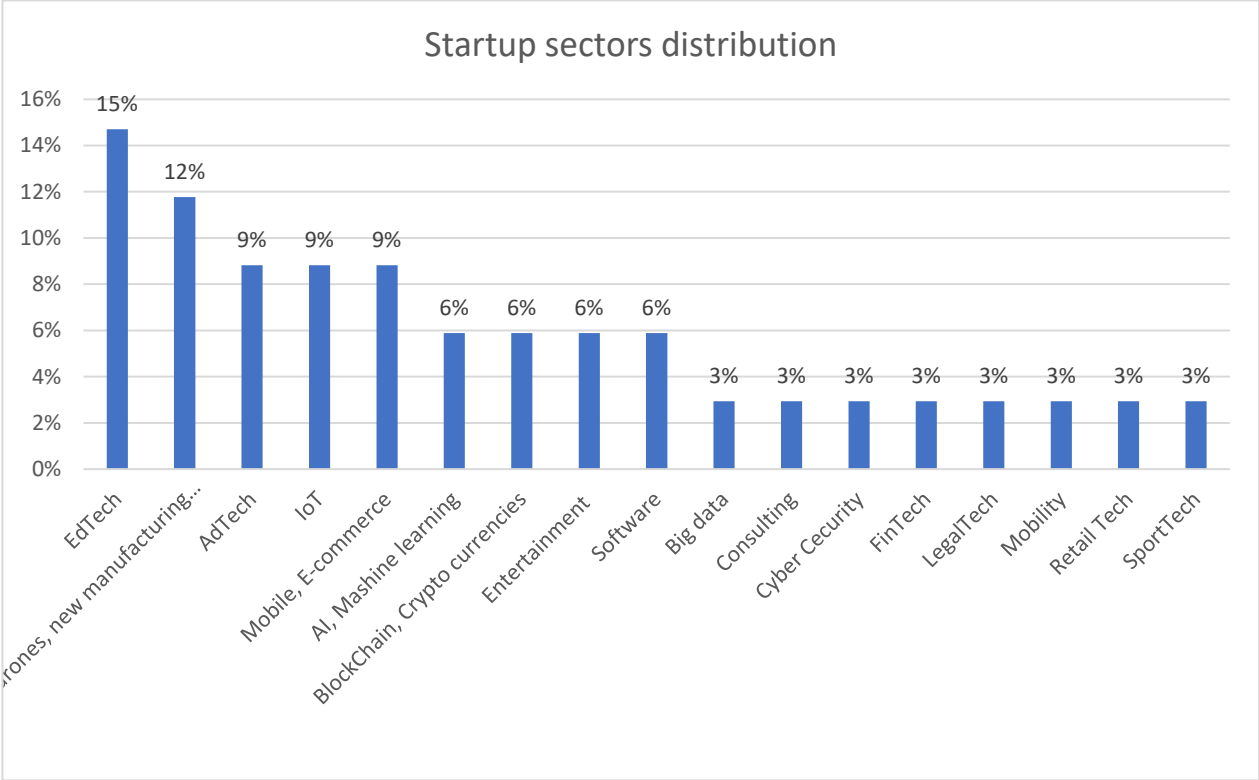


Figure 51 Startup sectors distribution

relevance of push factors' assessment as different sectors face different challenges and have different needs. Distribution shows as software as well as hardware startups, which represents high diversity of assessed respondents.

1.23.1.3 Level of product's innovation

Respondents were offered with the availability to assess their product on 5 level scale. 88% of respondents assessed their products in the range from moderately to very innovative, or from 3rd to 5th level. At the same time, most of the answers are distributed between moderate (38%) and fair (38%) level of innovations, with only 12% of replies falling on the maximum level.

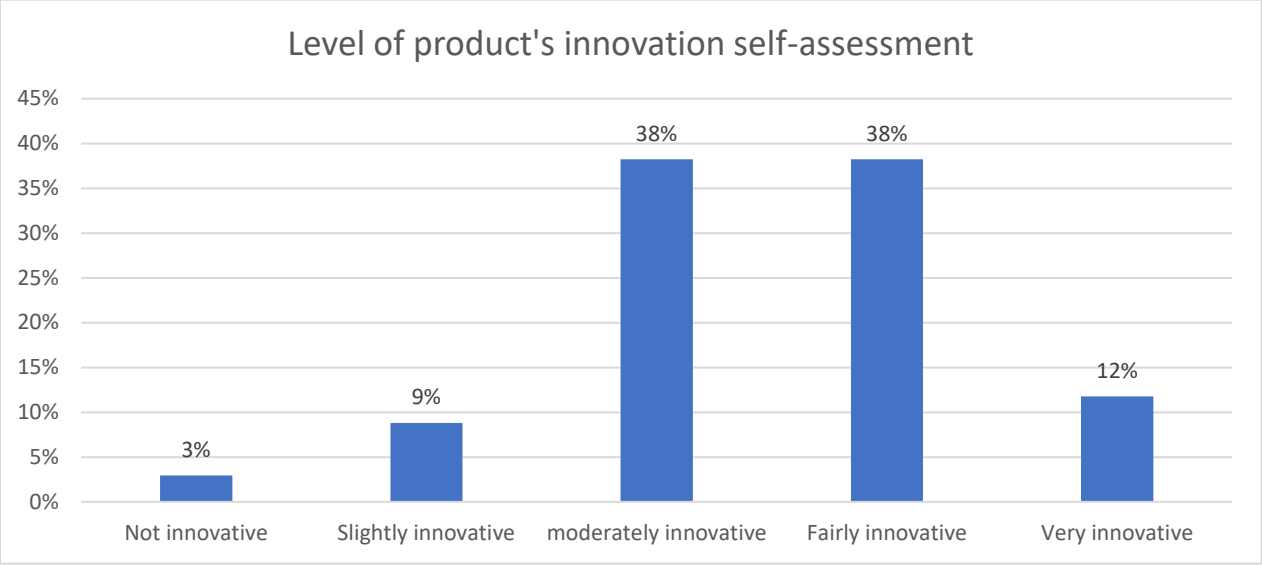


Figure 52 Level of product's innovation self-assessment

Summarizing the relevance assessment part, it is concluded, that the survey respondents are strongly associated with the startup industry through their role and assessment of their startups. The latter was assessed via development stage, innovativeness and level of product innovation. Analysed data shows high diversity, which can be considered as overall beneficial for survey results.

It is concluded, that the survey is reliable within the desired level of confidence and calculated margin of error.

1.23.2 Demographic data results

Demographic data of accessed respondents consists of three main blocks:

- Gender distribution
- Age distribution
- Level of education.

1.23.2.1 Gender distribution

Received gender distribution of respondents shows the high share of female respondents (26%) compare to data from female founder's analysis in phase 2 of current research, with the highest share of 22,2% in the Netherlands and the lowest share of 11,5% in Austria.

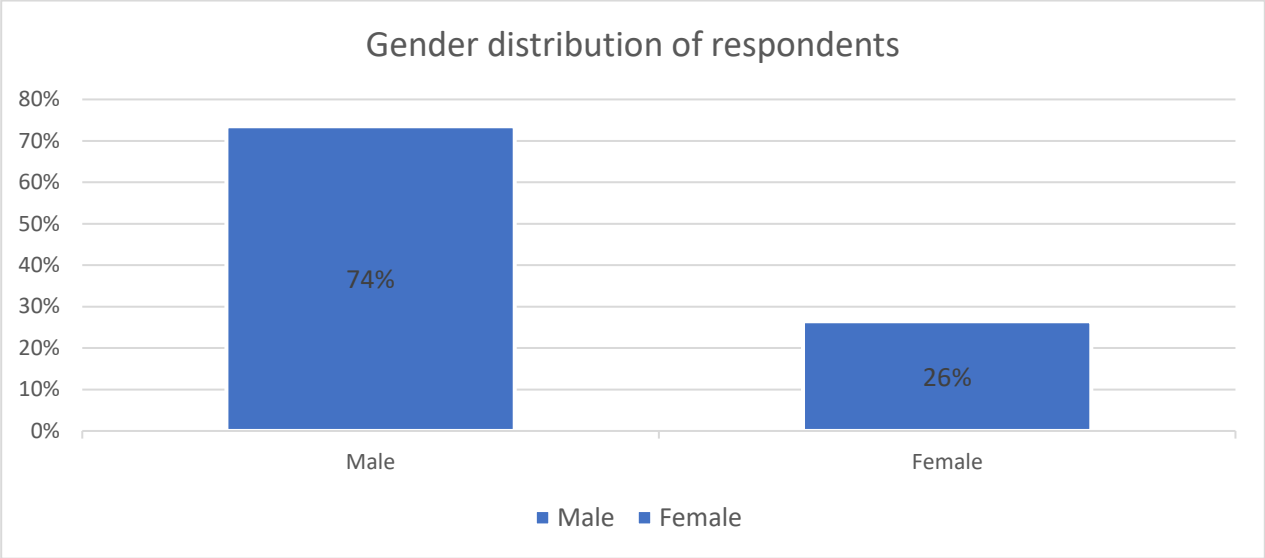


Figure 53 Gender distribution of respondents

1.23.2.2 Age distribution

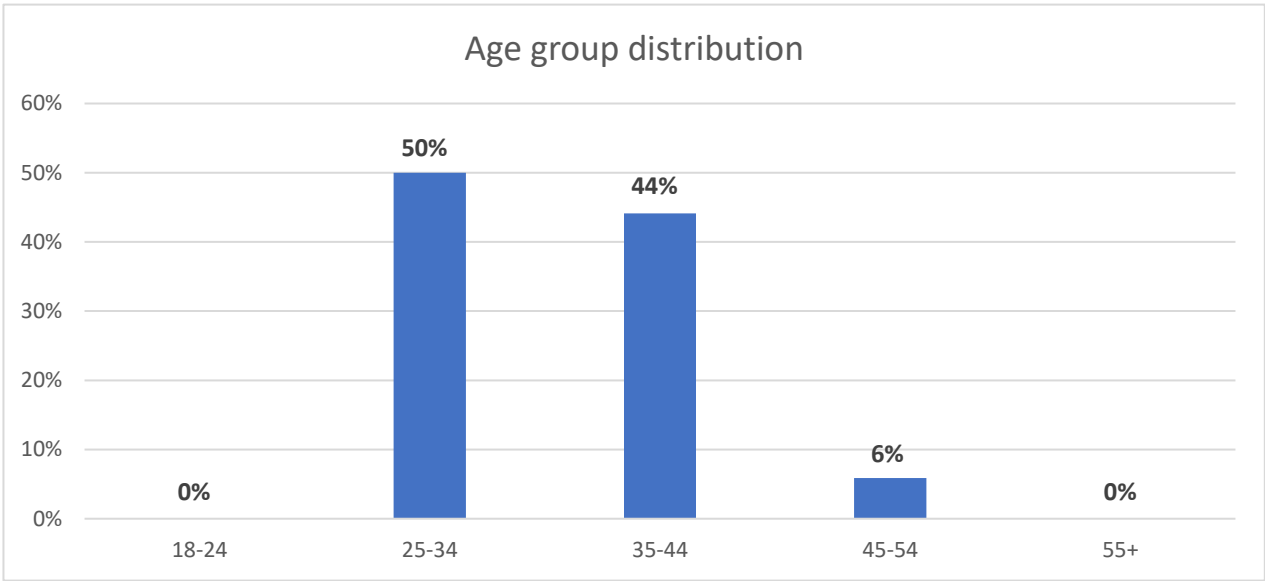


Figure 54 Age group distribution

Age of the respondents was categorized on similar groups according to statistic on startup founders in European countries. Majority of respondents are in two groups 25-34 and 35-44 what is in line with phase 2 findings, but more detailed distribution shows, that just 4 respondents are younger than 30 years and 28 respondents are between 30 and 40 years, and two are older than

40. The average age of respondents is 33,6 years. Age data demonstrates significant experience of founders and key employees and may positively effect on venture success.

1.23.2.3 Level of education

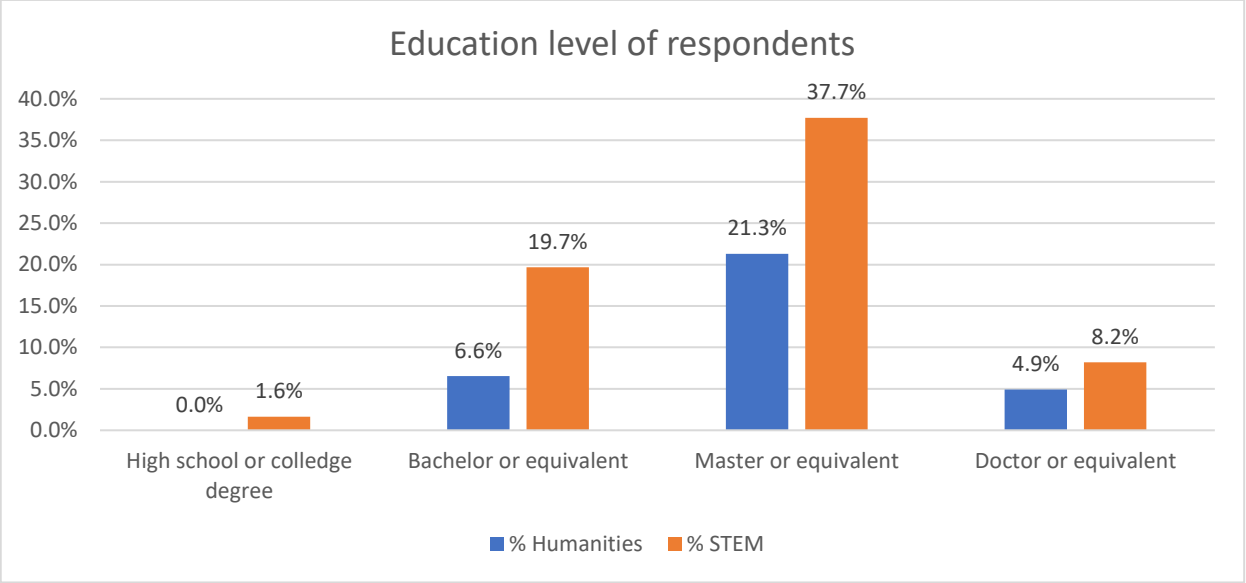


Figure 55 Education level of respondents

The overall surveyed population is highly educated, Respondents answered, that in a startup team, 85,3% has a university degree and 13,1% with a doctorate. Following our theoretical findings in chapter 2, it was discussed the importance of STEM education among for startup founders and those who are engaged in innovations development. 65,6% of respondents confirmed at least university level degree in STEM and one respondent with a college degree in STEM (1,6%).

Austria has 65% of founders with a university degree and 10% with a doctorate, though this statistic does not take into account separation on STEM and humanitarian sciences. Overall, it is concluded that the surveyed population is highly educated and can be considered as attractive in European countries in the founder's or tech talent's role.

1.23.3 Startup relocation attitude results

Majority of respondents consider relocation of startup abroad with only 9%, who preferred to stay in their home countries. Distribution of positive (65%) and likely positive (26%) results demonstrate

strong public opinion about startup relocation as a potential option. Variance in results in view of 16,6% margin of error doesn't change the overall picture.

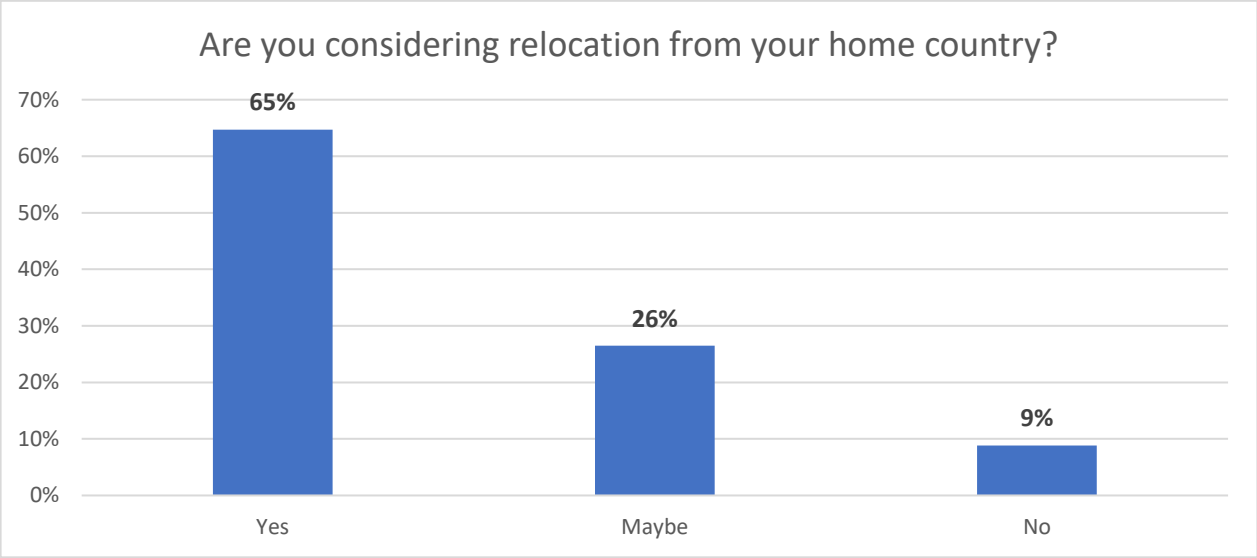


Figure 56 Considerations on startup relocation

1.23.4 Push factors results

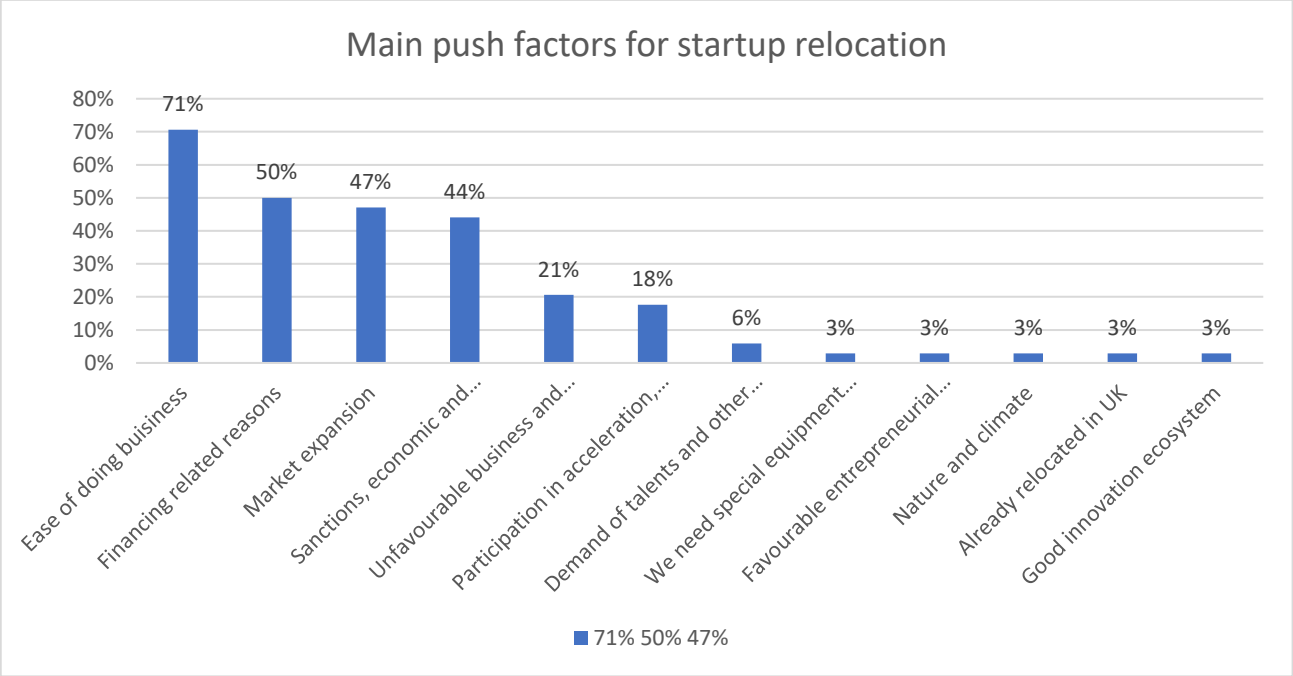


Figure 57 Main push factors for startup relocation

To deeper estimate potential push factors affecting startups in their home country, the survey allowed to choose several most suitable answers (factors), including a possibility to give a free answer.

71% of respondents chose ease of doing business as the most important push factor, basing their decision or willingness to relocate startup abroad. This finding is overall corresponding with results of a study in Global Entrepreneurship Index 2018 referred in phase 1 of the present study, where Russian Federation is overall rated with 78th place, while Austria rated with the 16th place among 137 assessed countries.

Financing of a startup is an essential element of any ecosystem, and a general lack of financing inhibits startup's growth. The current central bank interest rate in Russia is 7,5% per annum (http://cbr.ru/, assessed on 22.06.2019), and startup as a new business usually doesn't have any assets which can be used as collateral, apart from founder's private property. Therefore, bank financing conditions are usually restrictive for startups on an early stage. At the same time, the venture capital industry in Russia is loosely developed and significantly inhibited by international sanctions, which overall damaged financial sector of the national economy. Existing VC funds prefer to invest in startups on later stages due to a reduced risk of failure. Therefore, many startups on early stages remain underfinanced and looking for financing in different countries.

Market expansion capabilities are limited in Russia, due to the weakly internationalized national market, which was impacted by slowing national economy and overall falling population's income.

Sanctions, economic and political situation doesn't allow to long-term planning and increases the overall level of uncertainty for a startup. Therefore, this factor was selected by respondents as one of the most important.

18% of respondents, considering the possibility to participate in foreign acceleration or education program as a potential trigger for further startup relocation. It underlines the importance of international experience and foreign best practices by assessed respondents.

It is interesting to underline, that need talents and other problems with the human capital indicated only 6% of respondents, what support data from GEI 2018 assessment of Russia, where the level of human capital was indicated as overall high.

1.23.5 Factors for location choice

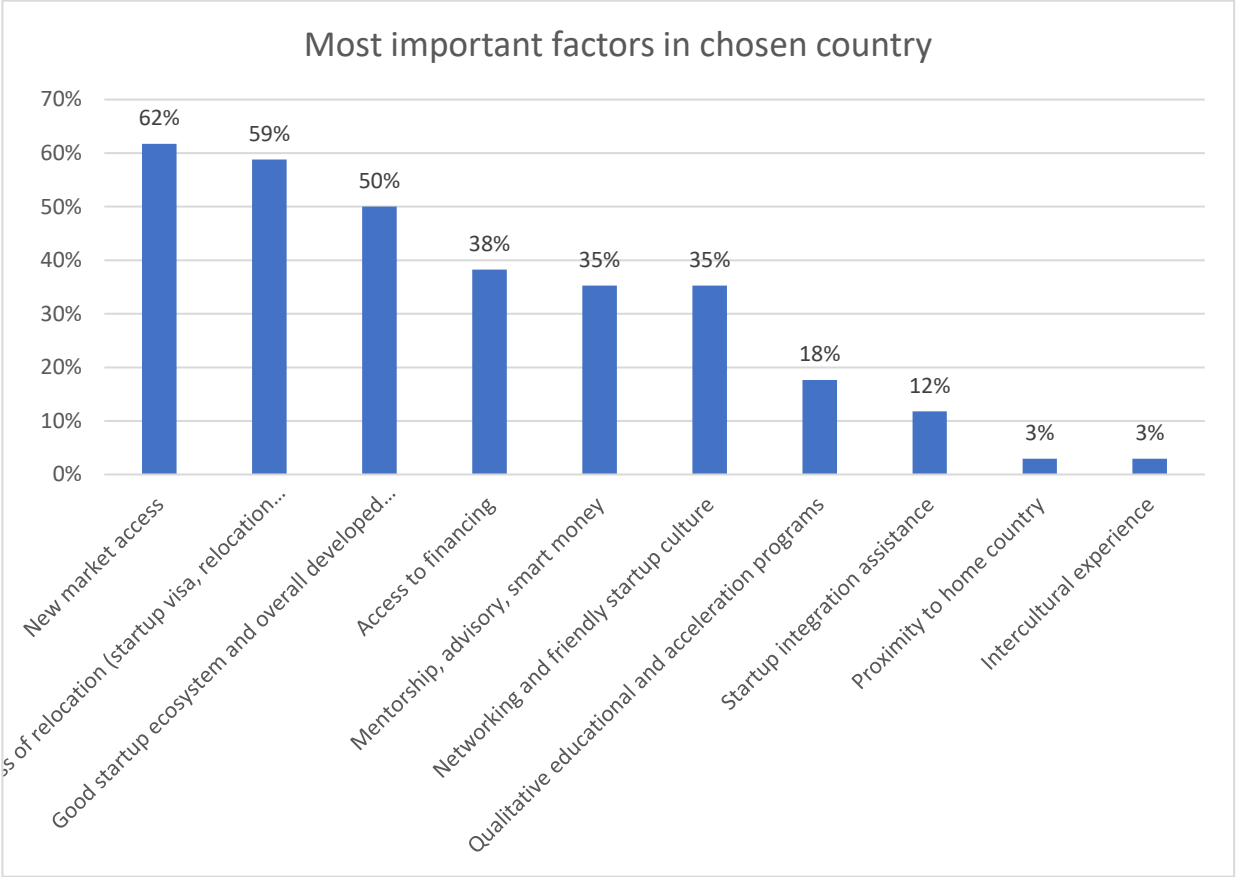


Figure 58 Most important factors in chosen country

Assessing the most important factors in the potential country for startup relocation, respondents were given the opportunity to choose several pre-defined answers and / or add their own factor(s). Those free-given answers were subsequently translated from Russian and grouped for better understanding and coherence with the data, analysed in phase 2.

Factors may be divided into three groups, based on the frequency of responses.

The first group (50%-62%)

1. Access to the new market (62%)
2. Easiness of startup relocation (59%)
3. Quality of startup ecosystem and level of a country's development (50%).

The second group (35%-38%)

1. Access to financing (38%)
2. Mentorship, advisory, smart money (35%)
3. Networking and friendly startup country (35%)

The third group (3%-18%) includes statistically less significant and free given answers, while they represent minor share, they still should be considered as important factors in some relocation cases.

1. Qualitative educational and acceleration programs (18%)
2. Startup integration assistance (12%)
3. Proximity to home country (3%)
4. Intercultural experience (3%)

Compare to top factors for relocation, discussed in phase 2 of the study; it is important to underline, that distribution of answers for CIS respondents is overall different, due to unequal starting positions for EU and CIS founders. While EU founders enjoy the overall well-developed environment, freedom of movement and single market all over the EU, CIS founders, work in an overall different business environment, they are restricted by visa requirements and try to push products on weakly developed and fragmented markets. Therefore, CIS founders perceive relocation of startup to the EU as an overall significant upgrade.

While for EU founders identify proximity to target markets as the least concern due to the common European market, for CIS startups, access to the target market is the biggest concern (62%), thus relocation to any of the EU countries automatically increases market reach.

Easiness of startup relocation is specifically CIS-relevant factor, as Russian founders require a visa even for a short-term visit in European countries, while Ukrainian founders not so long ago enjoy visa-free entrance to EU. Nevertheless, permanent relocation of venture for any CIS startup involves passing through numerous bureaucratic visa procedures, and it is time and money consuming with sometimes not guaranteed result. Therefore, easiness of startup relocation, including the availability of startup visa and active relocation assistance in the receiving country is considered an important factor for 59% of respondents.

Quality of startup ecosystem and level of country's development is a complex factor, which for CIS founders specifically includes i.a. ease of doing business. As was mentioned in surveyed

push factors, unsatisfactory business conditions in the home country) was mentioned by 71% of CIS respondents. Data from phase 2 research shows that EU founders place ease of doing business on the second and quality of the startup ecosystem in the fourth place.

Access to capital (financing) is the third important concern for EU founders and third push factor and the fourth location choice factor for CIS founders. Overall financing is important for all founders, regardless of their origin, but for startups on growing phases access to new markets may be a more important factor, than sole financing, because new clients increase revenue and possibility for bootstrapping and organic growth.

Access to talents is the biggest concern for EU founders, but overall is not an issue for CIS founders, as Russia and Ukraine have a significant pool of developers and usually Russian startup relocate all or pool of leading developers abroad together with the startup, while in Ukraine only business development team relocates, while developers mostly stay at home country. Ukrainian model is the so-called model of an interconnected (or distributed) startup, where startup headquarter is located in one of the main startup hubs and employees are located all over the world. For software and internet startups, the interconnected model may be economically feasible and efficient.

All other factors are related to the different aspects of the startup ecosystem and maybe overall considered as a detailed projection of requirements to a new ecosystem.

It is important to highlight proximity to home country factor. While it is mentioned by respondents as a less important factor, it may still have some value, like proximity to old friends and parents may be a valuable factor of founder's psychological comfort and subconsciously considered as a competitive advantage.

1.23.5.1 Language preferences of CIS founders

The SHM 2018 study found that "34% of founders maintain strong relation to home after moving abroad " (European Startup Initiative, 2018, p. 6). This finding corresponds to the findings of immigrant talents behavioural patterns in the U.S., discussed into chapter two.

It was hypothesised, that familiar language environment in a receiving country for CIS startup may provide an additional competitive advantage. Respondents were asked, whether the professional community and other startups sharing the same native language will be important.

Survey results showed that native speakers in a receiving country is an important factor only for 26% and somewhat important for 44% of respondents, while for almost 30% this factor is totally irrelevant. It is concluded, that native language community is not a decision-making factor, but it still has some importance for CIS founders as it probably reduces the overall level of stress and increase the level of confidence, especially during startup relocation phase and shortly afterwards.

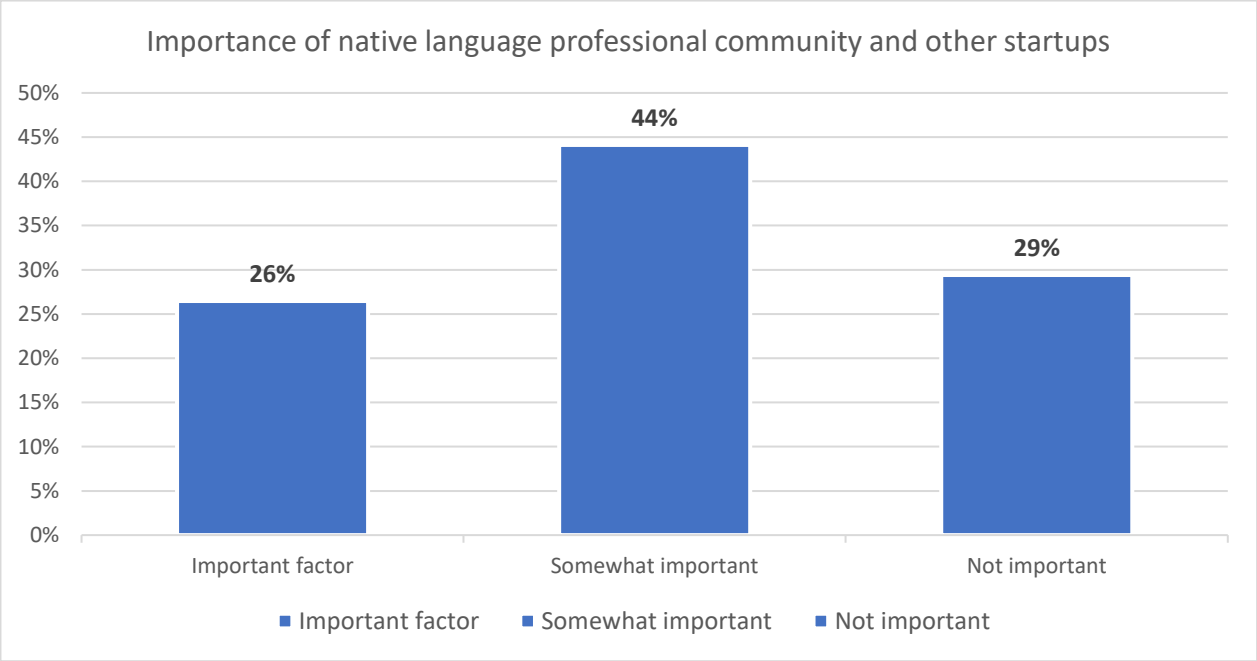


Figure 59 Importance of native language professional community and other startups

1.23.5.2 Importance of English-speaking ecosystem

As the English language is a lingua franca for international business and startup scene, it was decided to ask respondents: how important for them to use the English language in a new country without strong demand or necessity to learn the local language? This question is particularly important for the assessment of the Austrian startup ecosystem competitiveness, as Austria is a mostly German-speaking environment. Universal language environment may provide a significant competitive advantage for the ecosystem and play an important role in ecosystem globalization. Survey results demonstrate strong demand in English-speaking ecosystem. For 41% of respondents, the English-speaking environment is an extremely important factor and for 35% is of moderate importance, but in total 76% are concerned on the main speaking language in a new country.

The dominance of English language in international business may play an important role of UK startup ecosystem prosperity and be an important factor for immigrant founders not only from CIS but other countries as well. It is concluded, that extensive usage of English language in the Austrian startup ecosystem may gain ecosystem recognition on the international level and attract more immigrant founders.

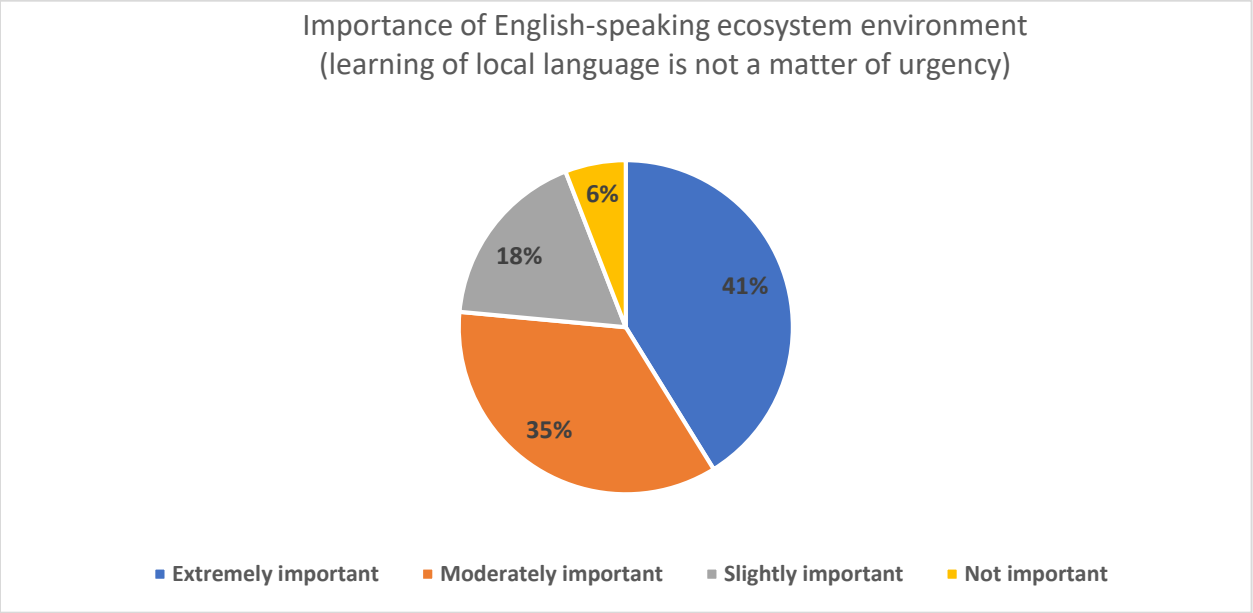


Figure 60 Importance of English-speaking ecosystem environment

1.23.6 The attractiveness of selected EU countries for startup relocation

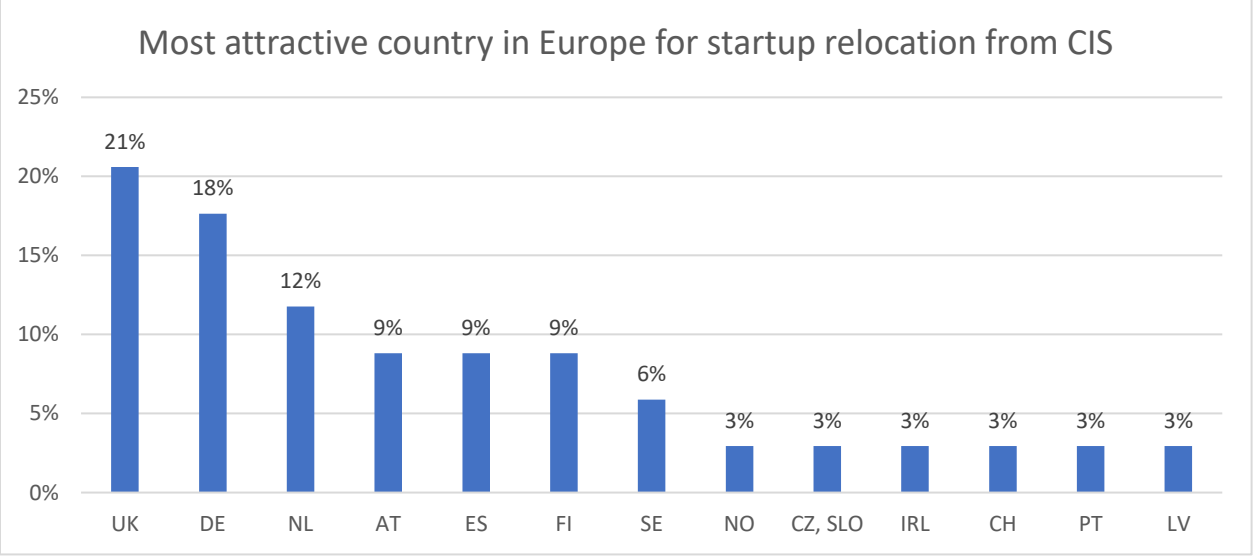


Figure 61 Most attractive country in Europe for startup relocation from CIS

Throughout the present study, four most competitive EU ecosystems were compared with Austrian ecosystem. All those countries, namely the UK, Germany, Netherlands, Sweden and Austria, were included in the survey, as well as the possibility to give a free answer. Respondents were asked: "What is the most attractive country in Europe for startup relocation". The UK, with 21% of respondents, is the leader, following by Germany with 18% of answers and the Netherlands with 12%. Austria, Spain, Finland got an equal number of answers (9% each) and formed a second popular group. Within this group it is important to underline the role of Finland, as main startup hub - Helsinki locates only 300 km away from Saint Petersburg, the second largest city in Russia and strong scientific and innovation hub. As an example, GoTech contest is conducted in St. Petersburg every year and provide winners with access to the Finnish startup ecosystem and financial support. Finnish startup visa also facilitates the relocation of startups from Russia to Finland.[8] Among outsiders and free-given answers respondents named Norway, Czech Republic, Slovakia, Ireland, Switzerland, Portugal and Latvia.

Figure 62 Free associated reason for relocation

[8] https://www.gotech.vc/en/novosti/novosti_gotech/opportunities_in_finland/ Accessed on 24.06.2019

Apart from choosing the most attractive country for startup relocation, respondents were asked about fist free associated reason for relocation to the chosen country. Received answers were further processed through a tag generator to visualize most frequent replies. Frequency of answers correlates with the font size. Respondents mostly mentioned market size, language (mostly English), VC, financing, ecosystem, good, quality, conditions, etc. Analysis of free-given answers overall confirms that market, ecosystem quality, financing and familiar language are the most important factors in the selection of potential country for startup relocation.

1.23.7 Awareness of respondents on the country's startup ecosystem offers

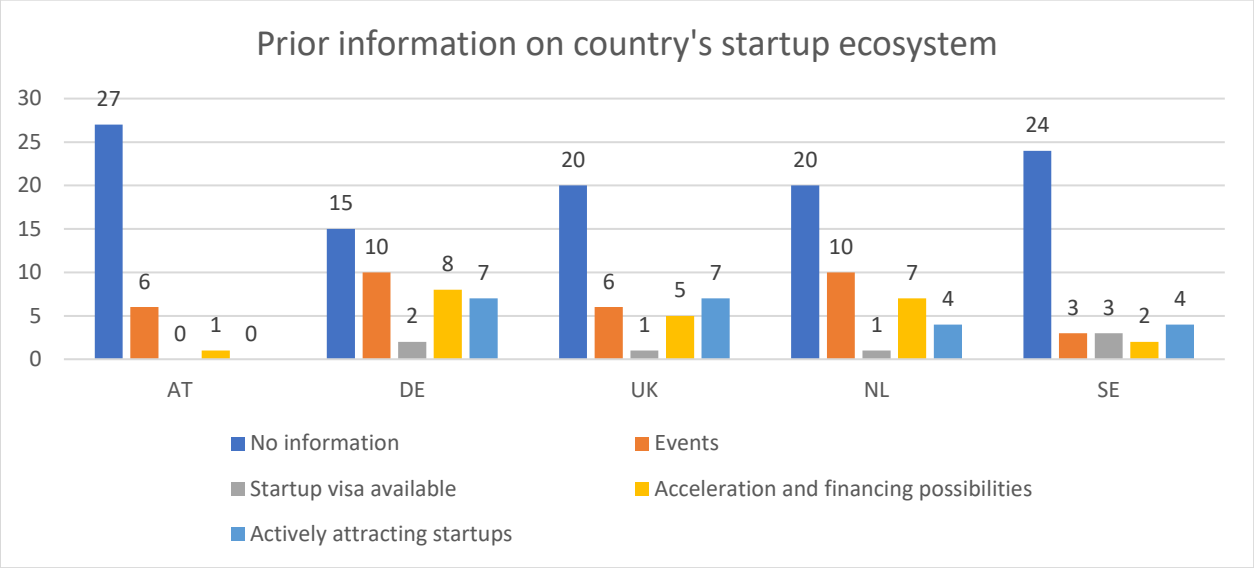


Figure 63 Prior information on country's startup ecosystem

Respondents were asked if they aware of any of the specific kind of information regarding each country's startup ecosystem. Answers were distributed from the least specific information on the left side of the chart to most specific to startup relocation of the right. Respondents were mostly aware of specific information in the UK and Germany, following by the Netherlands and Sweden. Results of this part of the survey mostly correlate with the answers on the question "Most attractive country in Europe for startup relocation". Austria is an outsider in this question, as 27 respondents out of 34 didn't know anything about the Austrian startup ecosystem, 6 respondents heard information about startup events in Austria and one person about acceleration and financing possibilities. This result demonstrates significant gap in media about the Austrian startup ecosystem offers, events and advantages.

1.23.8 Phase 3 summary

Summarizing phase 3 of research, it is important to highlight the following findings:

- The survey was conducted within a specific target group, representing CIS startup industry.
- Respondents are mostly founders or key employees in startups, and their level of education is of comparable level to EU founders.
- Most of the respondents relocate or maybe relocate startup abroad, while minority does not consider this option.
- Push factors are closely linked with the overall country's level of development and specific features, like sanctions, economic or political environment.
- CIS founders relocate startups closer to new markets, in the good ecosystem and overall developed country, where they have the possibility to rise to finance.
- Founders pay attention to the easiness of relocation and language situation in the destination country.
- The overall level of awareness about startup ecosystems in different countries correlates with the level of ecosystem development.
- CIS founders don't consider Austria as an attractive option for startup relocation as they are not aware of Austrian startup ecosystem characteristics and offers.

Conclusion

1.1 Research results

During the research, the following questions were formulated:

- What is the current competitive position of the Austrian startup ecosystem?
- How attractive is the Austrian startup ecosystem to entrepreneurs from CIS countries?

The first question was investigated within the first two phases of the research. Phase one of research compared the data from 3 indices, representing the aggregate performance of entrepreneurship, innovation and startup ecosystems and their total performance score. Due to the significant amount of underlying data, the researcher decided to deeper analyse those ecosystems, which demonstrate underperformance. The latter was determined as the country's score behind the standard deviation from the average score within the compared EU countries.

The research demonstrated that Austria is generally underperforming compare to selected countries, namely the UK, the Netherlands, Sweden and Germany with the total average performance of 46% what is the lowest score and lays below the lowest level of the standard deviation of 49%. Entrepreneurship ecosystem score of Austria is the same as for Germany and is on the low border of the standard deviation range with 66%. As this ecosystem score is still within deviation range, thus it was considered as a satisfactory and further investigation was not included in the scope of this study. General underperformance of Austria was linked to the unsatisfactory performance of innovation ecosystem (51,3% vs low border of the standard deviation of 55%) and startup ecosystem (22,8% vs low border of the standard deviation of 25%). Both ecosystems were subject to further research.

Innovation ecosystem score of Austria and selected countries were decomposed to underlying seven pillars and sub-pillars and further analysed. Further investigation demonstrated that in innovation input, market and business sophistication pillars are overall underperforming as well as knowledge and technological and creative outputs pillars in innovation. Summary of the market sophistication pillar research revealed low financial market capitalizations, the smallest market scale and the amount of VC deals which was below the screening level of innovation index. The weakly developed financial market provides fewer opportunities for young business (as well as for startups), reduce the range of potential investments for funds or high net worth individuals.

Business sophistication pillar analysis shows a high number of gross expenses on research and development financed by local and international business, a high percentage of the

research talents in business enterprise, a high number of high-tech net import, and good patent activity demonstrated by the increased number of patent families submitted into several patent offices.

Among underperforming blocks are:

utilization of human capital:

- low per cent of knowledge-intensive employment
- the low share of females with advanced degrees compared to the UK, the Netherlands, Sweden, but higher than in Germany;

innovation linkage and knowledge absorption:

- weak collaboration between universities and industry
- the weak level of cluster development
- absence of international joint ventures
- the low number of payments for intellectual property
- low volume of ICT services import.

Analysis of innovation output pillars demonstrated underperformance compare to selected countries. Among good performing blocks are patent activity, number of scientific and technical articles, computer software spending, number of ISO 9001 quality certificates and percentage of high and medium-high-tech manufactures. In knowledge, diffusion is characterised by good export activity with a high number of high-tech net export and average ICT export. Weak blocks include low h-index (citation index), the slow growth rate of productivity, dramatically low number of new businesses and income from international intellectual property trade.

Creative outputs of innovation are characterized by sufficient intangible assets production with the dominance of industrial designs and trademarks and moderate deficit in ICT production. Online creativity sub-pillar demonstrates an overall low number of top-level domains and the average number of mobile app creation.

Summary of innovation ecosystem pillars analysis demonstrates a well-developed industry with the dominance of international corporations and medium enterprises. The implication of big corporations' dominance is supported by a low number of new businesses and specific patterns discovered in innovation pillars. Corporate research centres are well-financed, perform a substantial number of researches and register many patents, but international recognition of those

intellectual work and new knowledge exchange are weak. Slow labour productivity growth rate may indicate the dominance of incremental over radical innovations as within big corporation incremental innovation is the easiest and the safest way. At the same time, corporations weakly cooperate with universities and do not form industrial clusters or joint ventures with other corporations what inhibits knowledge exchange. There are enough talents in established enterprises, but just a few of them engaged in new business. Gained and collected knowledge mostly stays within corporations and universities and does not actively trickle down. The software development sector is overall good, but not within internet commerce as a number of top-level domains is much lower compared to other countries.

Innovation ecosystem of Austria has all necessary components for a successful performance like good institutions, high level of human capital, well-developed infrastructure but the thin capital market, the dominance of big corporations and low rate of new business restrict diffusion of knowledge and successful commercialization of inventions. Those findings may overall decrease the number of home high-tech startups.

The second phase of the research investigated the comparative competitiveness of the Austrian startup ecosystem. Following Isenberg ecosystem domains were investigated during phase 2: policy, human capital and finance. Austria was compared to the same top-performing countries as in phase 1. Policy domain was represented by two metrics: time and cost of starting a business. While those metrics are very simple, nevertheless, they reflect the overall attitude of public institutions to the creation of a smooth and barrier-free environment for entrepreneurs. Austria demonstrated average performance within the group of laggards (6.9 days and 244 Euro to start a business), while the UK is an ultimate leader with only one day and 13 Euros to incorporate a company. While time and costs of starting a business are less important in the long run, nevertheless those indicators impose some inconvenience, extend the time for dealing with public institutions and distract the entrepreneur from business development tasks.

Human capital domain was represented by the gender distribution of founders, their level of education, number of software developers within the country and global attractiveness of the country to tech talents. Majority of the Austrian startup founders are males (88,5%) within the age groups 24 or younger and 25-34 with 23% share of high school or college graduates. Those findings are different from selected EU countries and indicate a less mature stage of ecosystem development. As was underlined in the research, high level of education and higher age significantly contribute to the venture success and enable founders to work with sophisticated technologies. At the same time, the lowest share of female founders reduces local connectedness

of the startup ecosystem and could also indicate cultural gaps, preventing females from starting their business.

Finance domain was represented by the number and activity of business angels and venture capital. While VC investments were below screening level in the research of the innovation ecosystem, nevertheless, this is a crucial factor representing ecosystem competitiveness. Business angels and VC activity are sufficient to the current level of startup ecosystem activity, but overall weak financial markets (assessed through market sophistication pillar in the innovation ecosystem) may reduce financing opportunities for startups. At the same time, the lowest share of mature startups may indicate insufficient financing on later stages and relocation of those startups in other countries. As was discussed, financing is among the top reasons for startup relocation, and the importance of that factor can't be underestimated. Overall, the finance domain indicates an early stage of ecosystem development. The final assessment within phase 2 was done through the research of the startup ecosystem output, represented by the overall number of startups in international databases, number of unicorns, distribution of the development stages and origin of startups. Austria has the lowest number of startups, the highest proportion of early stage startups, one almost unicorn and few multimillions exits.

Phase 2 of the research characterises the Austrian startup ecosystem as an emerging ecosystem and the least developed and the least competitive, compared to the UK, the Netherlands, Sweden and Germany. Projection of results via GSER methodology characterises the Austrian ecosystem as transitional from activation to globalization phase. On EU or global scene, the Austrian ecosystem can't directly compete with other selected ecosystems, but on local and regional levels it has an advantage and may attract entrepreneurs and tech talents from less-developed eastern EU and non-EU countries. An increased number of startups may rise chances for successful exit events due to active interaction of startups between each other and other ecosystem stakeholders, the rise of local connectedness and regional recognition of ecosystem, establishment and shaping of local culture, pushing up the learning curve and attracting international financing resources.

Increase of startup activity in Austria may also positively affect innovation ecosystem by encouraging big corporations for intrapreneurship and spin-off of their inventions. Increased ecosystem activity may further rise attractiveness of ecosystem to software developers, tech talents within and outside the EU. All those steps help the ecosystem to growth and successfully pass through various development stages.

Phase 3 answered the second question of this research and discovered a low level of the Austrian startup ecosystem attractiveness among the survey respondents. While the majority of the respondents recognize the U.S. and Europe as a potentially attractive destination, only 9% consider Austria as an attractive destination. Leaders are the UK, Germany and the Netherlands. Entrepreneurs from CIS countries are searching good startup ecosystem in a developed country with good market access, uncomplicated conditions of relocation and access to financing. It is also a highly desired factor - the English-speaking environment of the receiving ecosystem. It does not prevent founders from learning the local language but reduce anxiety and increase comfort.

While all the named EU countries have barrier-free access to the common European market, nevertheless they all have a different level of attractiveness. This attractiveness is an aggregate of ecosystem personal perception of the respondent, media awareness, available information of funding possibilities, ease of relocation and perception of ecosystem friendliness. Awareness about ecosystem results demonstrated an overall lowest level for Austria and the highest level for the UK, Germany and the Netherlands. Awareness results correlate with the attractiveness of the ecosystem, which highlights the importance of the ecosystem's management and stakeholders' efforts in promoting local offers, events and success stories.

The researcher would like to underline, that accessed respondents represented highly educated entrepreneurs and tech talents seeking a better place to relocate their ventures. Those people may be a valuable source of human resources for nurture and growth of the Austrian startup ecosystem in the nearest future. Therefore, the attention of the ecosystem's management and key stakeholders to the CIS region should be considered as a factor of competitive advantage.

1.2 Limitations and proposals for future research

While the present study covered a significant field, nevertheless it has some limitations due to the nature of secondary information sources, used in phase one of the research.

The first limitation appears due to the use of secondary sources of information, namely Global Innovation and Global Entrepreneurship indices. Both reports have different, and in some cases not explained in details methods. Therefore, both indices are sufficient for a rough and quick assessment, but a deeper understanding of ecosystems functioning and interconnection between stakeholders is a subject for a separate study. Particularly, it is important to underline the necessity of further investigation of the Austrian innovation ecosystem, especially the measurement of

innovation activity of corporations and SMEs, as well as the interaction between ecosystem stakeholders, namely universities, research centres and business.

The second limitation is connected to the Isenberg's model of high-tech and innovative entrepreneurship ecosystem, which was used as a basis for startup ecosystem assessment. The researcher used a limited number of ecosystem domains to assess competitiveness due to the absence of a unified measurement approach among data sources in different EU countries as well as to the tacit nature of some domains, like cultural. Therefore, implications of the research are based on the selected metrics reflecting performance of policy, human capital and finance domains. Further research on those and other domains is necessary as well as the elaboration of unified measurement approach for startup ecosystem performance. Performance and level of internationalization of Austrian supporting stakeholders should be taken into account as well because those stakeholders play an important role in ecosystem globalization and international recognition, as well as their readiness to work with immigrant entrepreneurs.

1.3 Recommendations for ecosystem management and stakeholders

Despite the least competitive position among the selected EU countries, Austria has numerous advantages, namely good infrastructure, governmental institutions, high quality tertiary education, the presence of the global business and many "hidden champions". Austria has a central location and equal distance to western and eastern countries of Europe. Moreover, Austria is a part of the DACH market with the biggest EU economy – Germany and most innovative economy – Switzerland. As was concluded from GII research, Austria has good innovation ecosystem inputs, but the utilization of available resources and innovation output are weaker than in compared countries. Development and implementation of special measures to encourage innovation activity may help to improve the situation and positively affect the startup ecosystem.

The Austrian startup ecosystem is on its transition from the Activation to the Globalisation phase. To complete transition, it is essential to increase ecosystem's output in terms of startups number as well as the ratio and value of successful exits. Austria has many important startup events, high amount of the early stage funding per startup, rapidly- developing startup hub – Vienna with the best quality of life and moderate cost of living. All those factors could positively affect high-tech entrepreneurs' migration to Austria. Globalization phase assumes active interaction with other startup ecosystems and the removal of immigration constraints.

Austria has already implemented startup-visa program, but as survey results demonstrated, CIS entrepreneurs are not aware of the Austrian startup ecosystem offer, and the majority of founders do not consider moving their ventures to Austria. Respondents' education profile, CIS startups shows highly educated founders and key employees, who could be a valuable source of talents for the Austrian ecosystem. Many startups already have an MVP or customers, and around one third of the startups are on the mature stage. Thus, relocation of those startups reduce risk of failure and could be beneficial for the Austrian ecosystem.

CIS startups particularly pay attention to the new market access, easiness of relocation, financing capabilities, availability of English-speaking ecosystem environment. Availability of native-speaking professional community and other startups could also increase the attractiveness of the Austrian ecosystem. While access to the EU market is not a competitive advantage of Austria among the EU competitors, easiness of relocation and friendly, English-speaking startup community can be distinguishing factors and increase ecosystem attractiveness.

Nevertheless, the cost of labour and overall tax burden in Austria are higher compare to Eastern Europe and CIS countries, thus some adjustments and allowances for newly-came startups could be beneficial.

It is essential for ecosystem management and key supporting stakeholders to elaborate centralized policy and general roadmap to promote Austrian startup ecosystem advantages and offers for startups from Eastern European and CIS countries to establish and sustain talents' migration flow. Brexit may give an additional impulse to the Austrian ecosystem as if the UK loose free access to the European market, thus more founders may consider other EU countries for relocation and this event may be a positive driver for the Austrian ecosystem development.

It should be also considered by ecosystem management to ensure the full cycle of startups' development, sufficient financing on all development stages, availability of corporate customers for exits as well as clear and uncomplicated legislation for an initial public offering on EU securities market.

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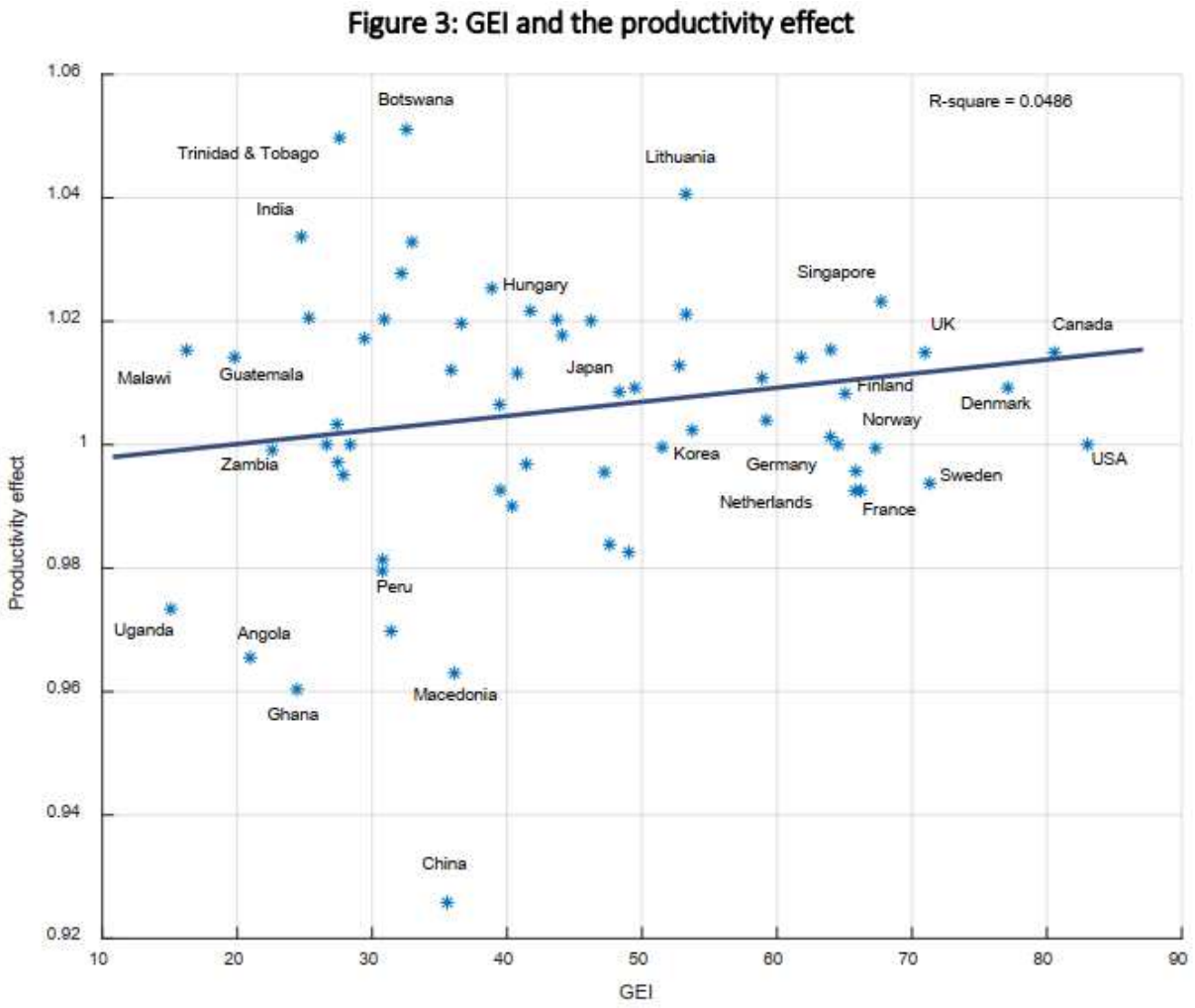
Appendices

Appendix 1

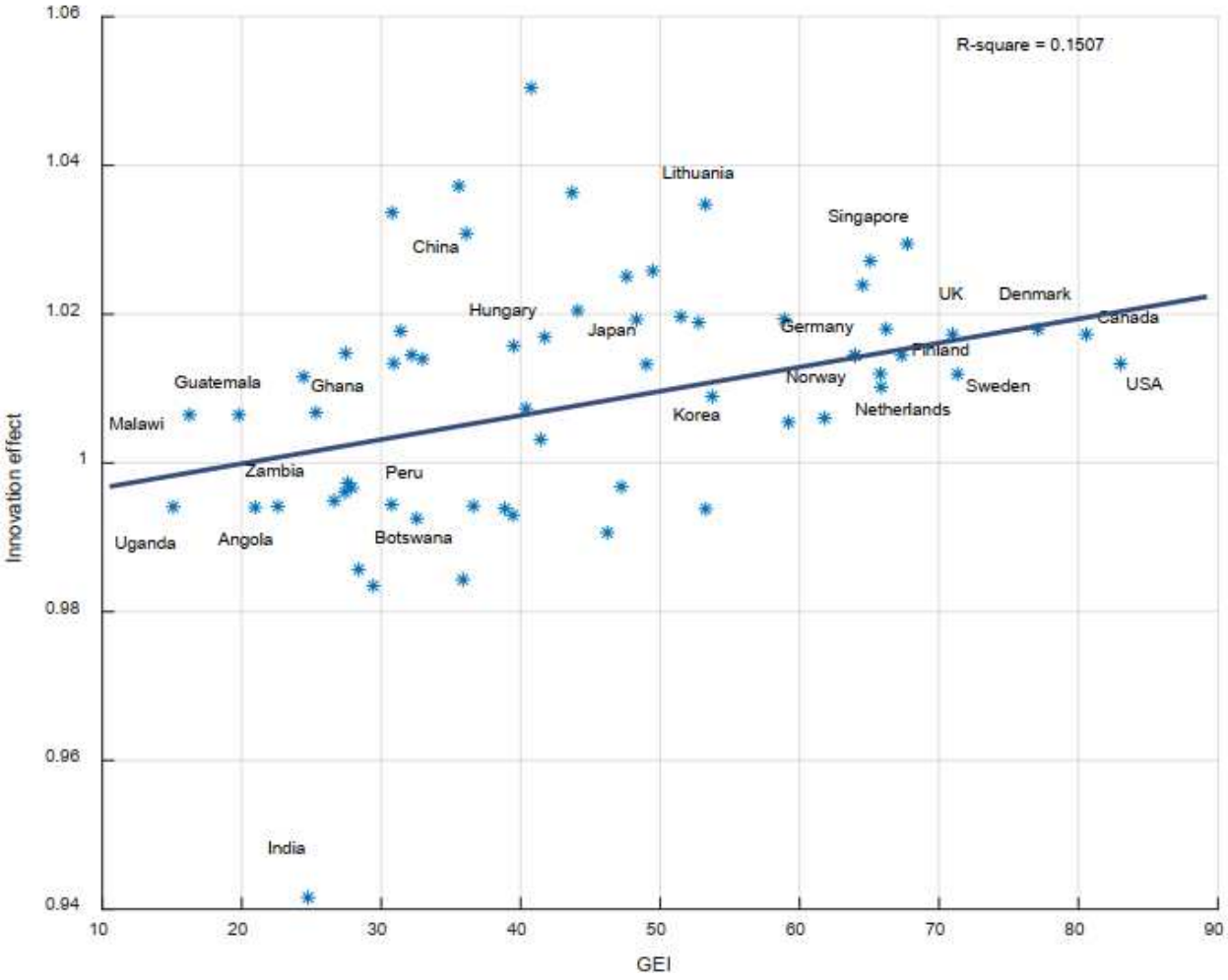
Source: Global Entrepreneurship index 2018. P. 27.



Appendix 2

Source: Global Entrepreneurship index 2018. P. 28.

Figure 4: GEI and the innovation effect



Appendix 3

Source: Global Entrepreneurship index, StartupBlink, GII.

Country	Blink	GEI	GII	Total Points
United Kingdom	37,90%	78,00%	60,10%	58,70%
Netherlands	29,30%	68,00%	63,10%	53,50%
Sweden	29,00%	73%	63,10%	55,00%
Germany	28,30%	66,00%	58,00%	50,80%
Austria	22,80%	66,00%	51,30%	46,70%
Russia*	24,70%	25,00%	37,90%	29,20%
EU average	29%	70%	59%	53%
EU st.dev	5%	5%	4%	4%
EU max value	34%	75%	63%	57%
EU min value	25%	66%	55%	49%

***Russia was added as an example of selected CIS country to demonstrate comparative level of development. Scores of Russia were not included into the calculation of the EU mean or standard deviation.

Appendix 4

GEI 2018 countries' profiles comparison

Country	Opportunity perception	Start up skills	Risk acceptance	Networking	Cultural support	Opportunity startup	Technabsorbtion	Human Capital	Competition	Product innovation	Process innovation	High growth	Internationalization	Risk capital
UK	81	57	88	62	93	93	100	74	85	92	70	85	82	65
NL	90	89	88	80	100	93	84	37	79	65	77	60	56	71
SE	100	47	70	74	90	98	95	64	87	67	90	56	82	72
DE	77	63	66	38	84	76	86	48	85	67	84	66	87	76
AT	78	95	67	55	68	81	94	40	76	72	82	40	90	63
EU MEDIAN	81	63	70	62	90	93	94	48	85	67	82	60	82	71
EU MEAN	85,2	70,2	75,8	61,8	87	88,2	91,8	52,6	82,4	72,6	80,6	61,4	79,4	69,4
EU ST.DEV	8,704	18,6	10,048	14,8	10,8074	8,2801	5,946	14,221	4,176	9,972	6,74	14,6	12,1	4,76

Appendix 5

GII 2018 input and output score

Country	Institutions	Human capital	Infrastructure	Market sophistication	Business sophistication	Knowledge & technology outputs	Creative outputs
UK	87,40	61,30	65,80	72,08	53,00	48,20	56,50
NL	90,00	56,50	62,40	58,30	65,10	63,70	56,70
SE	89,60	62,20	67,10	64,70	62,50	60,01	53,08
DE	85,90	58,70	60,50	58,50	52,80	52,20	53,30
AT	**85,60**	**61,10**	**62,70**	**52,60**	**51,00**	**34,30**	**45,80**

EU MEDIAN	87,40	61,10	62,70	58,50	53,00	52,20	53,30
EU MEAN	87,70	59,96	63,70	61,24	56,88	51,68	53,08
EU ST.DEV	1,82	2,08	2,40	6,64	5,75	10,28	3,95

Appendix 6

Survey questions

Title: Survey of the attractiveness of the selected EU countries in case of startup relocation.

Question 1: Please select your current place of residence.

- Russia
- Ukraine
- Other (free answer).

Question 2: Please select your role in a startup.

- Founder
- Key employee
- Consultant, mentor, advisor, investor
- Other (free answer).

Question 3: Please select the development stage of your startup.

- Pre-seed stage
- Build MVP
- MVP test and business model validation
- Already have a product and first customers
- Growing stage
- Other (free answer).

Question 4: Please select the most appropriate sector for your startup.

- EdTech
- Robotics, drones, new manufacturing technologies
- AdTech
- IoT
- AI, Machine learning
- Blockchain, Crypto currencies
- Cyber Security
- FinTech

- Other (free answer).

Question 5: Please select the level of your product innovativeness.

- Not innovative
- Slightly innovative
- moderately innovative
- Fairly innovative
- Very innovative.

Question 6: Are you considering relocation from your home country?

- Yes
- Maybe
- No.

Question 7: What are the most important reasons for relocation? Please select several most appropriate answers.

- Financing related reasons
- Ease of doing business
- Participation in acceleration, incubation programs or education
- We need special equipment and conditions for product development
- Sanctions, economic and political situation in the home country
- The demand for talents and other HR related factors
- Unfavourable business and market conditions in the home country
- Market expansion
- Other (free answer).

Question 8: What are the most attractive directions? Please choose not more than 2 variants.

- North America
- Europe
- Asia
- Australia and New Zealand
- Other (free answer).

Question 9: If you decided to move to Europe, what country would be the most attractive for you?

- Austria
- Germany
- The Netherlands
- The United Kingdom
- Sweden
- Other (free answer).

Question 10: What are the most important aspects in chosen direction?

- Access to financing
- Qualitative educational and acceleration programs
- New market access
- Easiness of relocation (startup visa, relocation assistance)
- Mentorship, advisory, the smart money
- Good startup ecosystem and overall developed country
- Startup integration assistance
- Networking and friendly startup culture
- Other (free answer).

Question 11: Please describe fist free associated reason for relocation to the chosen country.

- Free answer.

Question 12: What did you hear about the startup ecosystem in those countries? Please put checkmarks where appropriate.

	No information	**Events**	**Startup visa available**	**Acceleration and financing possibilities**	**Actively attracting startups**
Austria					
Germany					
The Netherlands					
The United Kingdom					
Sweden					

Question 13: Is the availability of native-speaking professional community, and other startups in a new country an important factor for you?

- Important factor
- Somewhat important
- Not important.

Question 14: How important is the use the English language in a new country without demand or necessity to learn the local language?

- Extremely important
- Moderately important
- Slightly important
- Not important.

Question 15: Please select the average age of founders.

- Free answer.

Question 16: Please select the appropriate level of education within the team (put checkmarks where appropriate).

Education level	**Humanities**	**STEM**
High school or college degree		
Bachelor or equivalent		
Master or equivalent		
Doctor or equivalent		

Appendix 7

Survey results

Question 1.

Current location	Count	%
RU	27	79%
MNE	3	9%
IL	1	3%
PL	1	3%
UA	1	3%
UK	1	3%

Question 2.

Role in startup	Count	%
Founder	23	68%
Key specialist	8	24%
Consultant, Mentor, advisor, investor	3	9%

Question 3.

The development stage of a startup	Count	%
Pre-seed stage	4	12%
Build MVP	4	12%
MVP test and business model validation	9	26%
Already have the product and first customers	5	15%
Growing stage	12	35%

Question 4.

Sector	Count	%
EdTech	5	15%
Robotics, drones, new manufacturing technologies	4	12%
AdTech	3	9%
IoT	3	9%
Mobile, E-commerce	3	9%
AI, Machine learning	2	6%
Blockchain, Crypto currencies	2	6%
Entertainment	2	6%
Software	2	6%
Big data	1	3%

Consulting	1	3%
Cyber Security	1	3%
FinTech	1	3%
LegalTech	1	3%
Mobility	1	3%
Retail Tech	1	3%
SportTech	1	3%

Question 5.

Level of innovations self-assessment	Count	%
Not innovative	1	3%
Slightly innovative	3	9%
moderately innovative	13	38%
Fairly innovative	13	38%
Very innovative	4	12%

Question 6.

Are you considering relocation from your current country?	Count	%
Yes	22	65%
Maybe	9	26%
No	3	9%

Question 7.

Main relocation factors	Count	%
Ease of doing business	24	71%
Financing related reasons	17	50%
Market expansion	16	47%
Sanctions, economic and political situation in the home country	15	44%
Unfavourable business and market conditions in the home country	7	21%
Participation in acceleration, incubation programs or education	6	18%
The demand for talents and other HR related factors	2	6%
We need special equipment and conditions for product development	1	3%

Favourable entrepreneurial culture	1	3%
Nature and climate	1	3%
Already relocated in the UK	1	3%
Good innovation ecosystem	1	3%

Question 8.

Destination	Count	%
North America	19	56%
Europe	27	79%
Asia	9	26%
Australia and New Zealand	2	6%
BRICS	1	3%
Africa	1	3%

Question 9.

The most attractive country in Europe	Count	%
UK	7	21%
DE	6	18%
NL	4	12%
AT	3	9%
ES	3	9%
FI	3	9%
SE	2	6%
NO	1	3%
CZ, SLO	1	3%
IRL	1	3%
CH	1	3%
PT	1	3%
LV	1	3%

Question 10.

Most important factors in the chosen country	Count	%
New market access	21	62%
Easiness of relocation (startup visa, relocation assistance)	20	59%
Good startup ecosystem and overall developed country	17	50%
Access to financing	13	38%

Mentorship, advisory, the smart money	12	35%
Networking and friendly startup culture	12	35%
Qualitative educational and acceleration programs	6	18%
Startup integration assistance	4	12%
Proximity to home country	1	3%
Intercultural experience	1	3%

Question 11.

Family, London, language, culture, quality of life, co-founder location, good conditions for favourite sports activity, the rule of law, developed infrastructure, definitely not Europe, legislation, size of market, English-speaking world, no reason, good conditions for favourite sports activity, market size, English language, prior experience, rapidly-growing market, infrastructure, absence of adequate VC financing in Russia, market size, English language, VC financing, ecosystem quality, ecosystem quality, accelerators, ecosystem quality, accelerators, level of country's technological development, developed legal market and fast-growing LegalTech industry, market size, overall good accelerator programs, taxation, convenient location, market size, business is sensitive to innovations, new possibilities, VC investor's, recommendation, prior knowledge of language.

Question 12.

	No information	**Events**	**Startup visa available**	**Acceleration and financing possibilities**	**Actively attracting startups**
AT	27	6	0	1	0
DE	15	10	2	8	7
UK	20	6	1	5	7
NL	20	10	1	7	4
SE	24	3	3	2	4

Question 13.

Reply	**Count**	**%**
Important factor	9	26%
Somewhat important	15	44%
Not important	10	29%

Question 14.

Importance	Count	%
Extremely important	14	41%
Moderately important	12	35%
Slightly important	6	18%
Not important	2	6%

Question 15.

Age Group	Count	%
18-24	0	0%
25-34	17	50%
35-44	15	44%
45-54	2	6%
55+	0	0%

Question 16.

Education level	Humanities	STEM	% Humanities	% STEM
High school or college degree	0	1	0.0%	1.6%
Bachelor or equivalent	4	12	6.6%	19.7%
Master or equivalent	13	23	21.3%	37.7%
Doctor or equivalent	3	5	4.9%	8.2%