

How to apply global experience? Technology Student start-ups to Russia-Finland. Analytical study.

Bazueva S., Bulatova K., Egorova A., Povarov S.

Content

Introduction	олика колика колика колика колика колика кол
Chapter 1. Analysis of the regulatory and regulatory conte- development	kt of student start-up
1.1. Strategies, roadmaps for the development of relevant practices for supporting student start	universities and ups 7
1.1.1. Support measures implemented at diff	erent levels
1.1.2. Opportunities and limitations to the de startups	velopment of student 14
1.1.3. Legal basis and restrictions on the deve technology entrepreneurship and start	elopment of student ups 15
Chapter 2. Overview of Student Startup Development in th	e University context 19
2.1. Acceleration and engineering infrastructure fo student startups	r the development of 19
2.2. Startup as an educational tool (educational plant of and continuing education)	rograms, initiatives
2.3. Forms of interaction with industrial partners, c in the context of the development of startups	orporations and SMEs among students 34
Chapter 3. Analysis of the development of student startups Russia and Finland	s in the border region of 45
Chapter 4. Recommendations in the field of support and de by students in the perspective of economic grow cooperation between Russia and Finland	evelopment of startups vth and international 54
Conclusion	
References	

Introduction

The speed of technological change, the dynamics of consumer markets and improving quality of life standards stimulate widespread interest in entrepreneurial activity and the creation of a startup.

According to Vedomosti¹, in late November – early December 2020, several major reports on the state of venture capital investments in the United States and Europe were published, which indicate record amounts of investments attracted to startups – both in the United States and in Europe in 2020.

According to an OSCE study² assessing the role of public research in innovative entrepreneurship, academic startups (created by students, doctoral students, and recent university graduates) account for about 15% of all startups in the sample. Their share is higher in science-intensive areas such as biotechnology – 23%. In most countries and tech industries, undergraduate startups account for the highest proportion of all academic startups.



Figure 1. Share of academic start-ups in Crunchbase by country and type

Note: The Sample is limited to companies created after 2001 and having received at least one VC investment.

The graph is limited to top 20 countries in terms of number of start-ups.

Source: Authors' elaborations on www.crunchbase.com

^[2]http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=DSTI/CIIE(2018)13/FINAL&docLanguage=En

⁽¹⁾https://www.vedomosti.ru/technology/articles/2020/12/09/850144-tehnologicheskie-startapi



Figure 2. Share of academic start-ups in Crunchbase by technological field and type

Note: The sample is limited to companies created after 2001, located in OECD or BRIICS countries, and having received at least one VC investment. The graph is limited to top 25 technologies in terms of number of start-ups.

Source: Authors' elaborations on www.crunchbase.com

Sources of Pictures³

At the same time, the researchers note that startups from the academic environment are more likely to be located in the same urban areas where the base organization (university, institute, academy) is located in which they appeared and where their founders studies / studied, which indicates the importance of taking into account the spatial, characteristics and regional specifics of the dissemination of knowledge⁴.



Figure 3. Innovative academic start-ups are located closer to their alma mater Proportion of firms located in the same Functional Urban Area than its alma mater RI

Note: Sample restricted to firms that report information on city and that can be geo-located in Functional Urban Area (FUA) or region, and linked to a university that can be geo-located in a FUA or a region.

Source: Authors' elaborations on www.crunchbase.com and RATSTAT data.

¹³PUBLIC RESEARCH AND INNOVATIVE ENTREPRENEURSHIP Preliminary cross-country evidence from micro-data http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=DSTI/CIIE(2018)13/FINAL&docLanguage=En ¹⁴PUBLIC RESEARCH AND INNOVATIVE ENTREPRENEURSHIP Preliminary cross-country evidence from micro-data http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=DSTI/CIIE(2018)13/FINAL&docLanguage=En

Sources⁵

In this regard, it is relevant to conduct an analytical study of student start-ups in the field of technology and innovation in the context of the economic development of the border region of Russia-Finland. The relevance of the study is determined, on the one hand, by attention to the growing market of technology startups and student entrepreneurship practices, on the other hand, by an emphasis on practical recommendations, taking into account the peculiarities of cross-border cooperation between Russia and Finland.

The aims of the study are:

- analysis of the development of student startups in the border region of Russia and Finland
- study of the best practices for the development of student startups in the leading EU countries with a high innovation development index
- formation of recommendations in the field of support and development of startups by students in the perspective of economic growth and international cooperation between Russia and Finland

Within the framework of the study, the following tasks were solved:

- 1. The concept of "student start-up" and the basic methodological foundations are considered
- 2. Analyzed the normative and regulatory context of the development of student startups
- **3.** The university context of the development of student startups is considered

The research report consists of an Introduction, 5 main chapters, a Conclusion, a List of Sources and Annexes on $__$ p.

^[5]http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=DSTI/CIIE(2018)13/FINAL&docLanguage=En

Chapter 1. Analysis of the regulatory and regulatory context of student start-up development

The concept of "student start-up": the main methodological foundations of the research

Startup concept

A startup is usually a small company with a short operating history. The term was first used in Forbes magazine in August 1976 and Business Week in September 1977.

Stephen Blank, the influential visionary and entrepreneur of Silicon Valley, defined startups as "temporary structures that exist to find a reproducible and scalable business model⁶." There are widespread references to this definition. "The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses" author Eric Rees notes that "a startup can be called an organization that creates a new product or service in an environment of high uncertainty⁷."

Student startup concept

The business environment is changing rapidly all over the modern world, mid-sized and large companies shape the demand for agility, and startups provide the right marketing agility, agility, and an innovation-friendly culture. This culture allows to quickly learn and quickly develop new business models. Therefore, businesses are creating a request for startup entrepreneurship as a skill. For this reason, businesses are creating a request for startup entrepreneurship as a skill. Accordingly, there is a need to establish training programs, a startup format as a diploma and modern methods of entrepreneurship (working with clients, business canvas, lean startup, and so on). Following this systematic approach, start-up entrepreneurship itself is an ongoing process of learning to deal with new trends, patterns and changing contexts.

^[6]https://steveblank.com/2010/01/25/whats-a-startup-first-principles/

⁷⁷Эрик Рис. Бизнес с нуля. Метод Lean Startup для быстрого тестирования идей и выбора бизнес-модели = The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses. – М.: Альпина Паблишер, 2014. – 256 с. – ISBN 978-5-9614-4628-9.

1.1. Strategies, roadmaps for the development of universities and relevant practices for supporting student startups

1.1.1. Support measures implemented at different levels

Country-level support measures for student start-ups

The developed countries foster knowledge and innovation-based economy. In XX century most innovations came from the large corporations that had R&D departments and had collaborations with universities' labs. Technology boom started in the 1990s with wide use of the Internet and was supported in the 2000s with mobile technology. Suddenly small companies could develop and go to market in 1-2 years, when corporations needed 5-10 years. Small companies are agile, they can pivot current business model and are closer to consumers. New technology nowadays comes more from small companies - startups. Therefor for building an innovative economy many countries invest in creating startup ecosystems, that give favorable climate for startups to generate and perform.

NORWAY

In 2020 The Research Council of Norway opened a Student Entrepreneurship funding scheme. Students compete for funding of their business ideas. The scheme has 2 aims:

1. to transfer promising research results into products

2. to increase entrepreneurship among students and foster an entrepreneurship culture in institutions of higher education

In proposals students should point out technological and other critical risks to their projects. The financial support must be used to reduce technology or concept-related risks to diminish uncertainties that hold back projects from moving forward to the commercialisation process⁸.

NETHERLANDS

In 2010-2018 the Ministry of Economic Affairs and Climate and the Ministry of Education, Culture and Science implemented the "Valorisation" (knowledge use) Programme which was aimed at transferring scientific work to economic and societal impact. Key part of the programme was the support of students' and professors' startups via "Valorization" centers with the facilities to provide support activities to researchers and students with promising ideas, as well as to starting and established companies in a region. Each valorization center acts as a hinge, connecting the domains of research and education with application domains of socio-economic relevance⁹. After the program terminated its activities, participating in the program Universities continue to support the performance of the created valorisation centers¹⁰.

GERMANY

German Ministry for economic affairs and energy carry out the EXIST Business Start-up

^[8]https://www.forskningsradet.no/en/call-for-proposals/2020/student-entrepreneurship/ ^[9]https://stip.oecd.org/assets/TKKT/CaseStudies/12.pdf

⁽¹⁰⁾https://www.oecd-ilibrary.org/sites/9789264292048-en/index.html?itemId=/content/publication/9789264292048-en&_csp _=61270420bee1db46d1538aa54ae33023&itemIGO=oecd&itemContentType=book#fr01 Grant program. Students, graduates and scientists from universities and research institutes who have innovative technology-based start-up projects and innovative knowledge-based services based on scientific findings can apply to it. Funds could be used to cover personal living expenses, material and equipment and coaching. The maximum period of funding is one year. After 3 month participants attend the Entrepreneurial Team seminar. The aim of the seminar is to help develop the qualities of a team of their potential and entrepreneurial soft skills. After 10 month participants should provide a business plan¹¹.

Support measures for student startups at the regional and city level

Initiatives on regional and city level are aimed at encouraging, inspiring and funding student startups. There are elements of a startup ecosystem in cities such as accelerators, incubators, technoparks, etc, that provide more hands-on support but they are in general for entrepreneurs and not only for students so they will not be reviewed here.

THE MORPHEUS CUP (EU)¹²

The Morpheus Cup is an entrepreneurial competition for students across European Union. The competition was launched in 2015, as a response to the upcoming major talent shortage on the European employment market.

*Entrepreneurship skills help people find and create high quality jobs, and enable them to become confident and motivated citizens. This is why promoting these skills is a priority for me. The European Institute for Innovation and Technology and its education programs play a vital role in this, offering young people unique opportunities to develop entrepreneurial skills and foster innovation in Europe, "said Tibor Navracsics, Commissioner for Education, Culture, Youth and Sport ahead of the upcoming Innovelt in Budapest¹³.

There are 2 formats:

- 1 The Morpheus Day live competition like a hackathon where students tackle a challenge in a day. This is a full day of conference and live project pitching in Luxembourg
 - a Competition between teams of 2 to 4 people
 - **b** Testing the ability to offer innovative solutions in a short time
 - Organization by skills and coverage of different tracks
 - **d** Unique experience of meeting with employers
 - e A mix of games, quizzes, hackathons, exhibitions and parties
 - f Networking on a European scale
- 2 The Morpheus Cup is a remote entrepreneurship contest for projects. 3 selected applied projects in each category (AI, IoT, consumer experience, healthtech, HRtech) go to semi-final pitch session. Winners will go for the final pitch session. Final winner will get a cash prize to develop their startup¹⁴. 26 awards and prizes worth 50,000 euros are available, as well as the opportunity to declare yourself to potential employers, partners and investors.

^[11]https://www.exist.de/EN/Programme/EXIST-Business-Startup-Grant/content.html

^[12]http://www.morpheuscup.com/

^[13]https://www.forbes.com/sites/adigaskell/2016/04/05/how-can-student-entrepreneurship-be-encouraged/?sh=4ae234fc30d0 ^[14]https://www.morpheuscup.com/about

EU STARTUPS (EU)¹⁵

EU-Startups is the largest online publication in the EU dedicated to startups. The publication writes about internet and tech startups from Europe and provides readers with data-driven analysis, interviews and news related to startups. In addition, other types of news from the technology space are published that have a commercial or cultural impact on startups in Europe. A specialized online publication is not only a tool through which a startup agenda is presented in the media, but a networking platform where you can learn about potential investors, find like-minded people, a team or a project for investment. Social networks of such media become a place for the formation of a community that shares the same values and can exchange practical advice, cases, and skills. Every month EU-Startups.com reaches an audience of 30,000 readers from all over Europe who are tech-savvy and interested in European startups¹⁶. Vision / mission of the publication: to unite the European startup community and stimulate entrepreneurship in Europe. The key activities of EU-Startups:

- **1** Formation of a base of startups in Europe, where people can find a team, job and a project for investment.
- 2 Holding the annual online EU-Startups summit¹⁷. At the event, organizers showcase a selection of Europe's most rapidly growing and disruptive startups and gathers a community to learn from some of the most successful European entrepreneurs of our time. The EU-Startups Summit 2021 will bring together over 1,500 founders, startup enthusiasts, corporations, business angels, venture capitalists and media representatives from all over Europe. Some regions do not create a separate initiative but a system of initiatives and goals that are then implemented by a newly created agency.

KERALA STARTUP MISSION (KERALA, INDIA)¹⁸

In 2014 the government of Kerala created Technology Startup Policy in order to develop a startup ecosystem. In 2017 came out an update of the policy. It had 3 key initiatives:

- 1 Youth Entrepreneurship Development Program. It is for improving entrepreneur talents during incubation period
- 2 Technology Innovation Zone. It is an incubator hub for multiple domains and technology sectors under a single roof
- **3** Fab Kerala Network. Set of two Fablabs at Technopark, Thiruvananthapuram and Kerala Technology Innovation Zone, Kochi

To support the startup ecosystem, the government has different stage funding, annual innovation challenge, technology commercialization center / platform, future research labs that introduces students and startups with emerging technology, capabilities and knowledge needed to succeed in today's world, mentoring support, access to government. Since 2017 Kerala state government is encouraged to purchase products and services from

^[16]https://www.eu-startups.com/become-a-sponsor/

^[17]https://www.eventbrite.de/e/eu-startups-summit-tickets-63330019794

^[18]https://startupmission.kerala.gov.in/student-schemes

Kerala's startups and Kerala Startup Mission is an intermediary in that¹⁹.

Kerala Startup Mission as the nodal agency implements the policy and startup ecosystem support. With Startup Policy 2017 Kerala Startup Mission changed its focus to innovation driven entrepreneurship (figure 4).



Figure 4. Kerala Startup Mission model²⁰

When it comes to student startups Kerala Startup Mission offers following:

- Skills and knowledge:
 - O Future Technologies Lab provides necessary tools, equipment and infrastructure for Research & Development of emerging technologies and serves as platform to introduce it to startups and students. The current key focus areas are: 1. Virtual Reality (VR) and Augmented Reality (AR) 2. Artificial Intelligence (AI) 3. Robotics 4. Brain Computer Interface (BCI).
 - O Start-up-Leadership Academy and Training Programme that are based on learning through experience.
 - FABLAB programme encourages startups in printed electronics.
 - The International Entrepreneurial Exchange Programme is aimed at giving students and young entrepreneurs of the Kerala state maximum exposure to the international startup ecosystems and also to foster cooperation between startup

^[19]https://www.startupindia.gov.in/content/dam/invest-india/Templates/public/Kerala%20Startup%20Ecosystem%20Report%202019.pdf ^[20]https://www.startupindia.gov.in/content/dam/invest-india/Templates/public/Kerala%20Startup%20Pollcy%202017.pdf • ecosystems across the world. Participants visit the most advanced / mature startup destinations for an exchange programme where they interact with startups / clients in that ecosystem. This will enhance marketing / funding opportunities for the local startups and also give an international exposure for their products.

Funding:

O Innovation Grant which could be given on different stages:

- Idea Grant will be primarily for startups who have a Prototype or MVP to develop the final version of MVP
- Productization Grant is to launch a product
- Scale-up Grant is to help startups ramp up their product / sales
- R&D Grant will be given to highly promising hardware or deep tech Startups with working prototype / IP which needs to be developed into a final product through extensive R&D
- Patent Support System. Means of support are provided to student entrepreneurs who are able to secure a patent

Kerala Startup Mission has set up Innovation and Entrepreneurship Development Centers in 281 Institutions across India which provide avenues for creative students to transform their innovative ideas into viable products and services. Innovation and Entrepreneurship Development Center works as the first launch pad for a student's entrepreneurial journey and provides them with access to cutting edge technology, world class infrastructure, high quality mentorship, early risk capital and global exposure.

In student entrepreneurship policy the government of Kerala puts all the efforts to encourage student entrepreneurship on technology business incubators²¹.

Student start-up support measures at the university level

Universities as innovative hubs with an access to a handful of researchers, modern equipment, creative innovators, wide range of partners have a unique opportunity to be a motherland of startups. Stanford University is a great example of that. The way they embedded innovation and entrepreneurship in their culture is extraordinary. Faculty members and students all are encouraged to build a company. If it was not for Stanford, probably, Silicon Valley would not have become the way it is now.

Startup culture can be fostered by creating a network of opportunities. Below we listed a number of universities that have a wide range of startup ecosystem elements.

IMPERIAL COLLEGE LONDON (UK)

The university has the Imperial Enterprise Lab²² where student entrepreneurs can get access to:

- 1. Inspirational events where entrepreneurs share their stories
- 2. Networking events
- 3. Pitch contests
- 4. Pre-accelerate program for women WE Innovate

^[21]https://startupmission.kerala.gov.in/frontend-pdfs/1.Student%20Enterpreneurship%20Scheme_1st%20-GO-2%281%29.pdf/ksum_frontend_pdfs ^[22]https://www.imperialenterpriselab.com/

- 5. Funding opportunities1
- 6. Entrepreneurial competition Venture Catalyst Challenge
- 7. Summer Accelerator
- 8. Different advising instruments

The university also has a master program MSc Innovation, Entrepreneurship & Management. More information about the program you can find in section 3.2.

Also the university has the White City incubator²³ for deep science startups. More information about the incubator you can find in section 3.1.

ITMO UNIVERSITY

ITMO University has an embedded entrepreneurship as one of core values. It is the first Russian university that sold shares in a small innovative enterprise. The University has:

- 1. Technopark
- 2. Engineering center
- 3. Entrepreneurship center
- 4. Design workshop and lab for students (OLIMP and FabLab)
- 5. SumIT and Future Technologies acceleration programs
- 6. FundIT fundraising school and Technology Brokering School²⁴
- 7. Co-working spaces

Also since 2019 students can choose to defend not a thesis but a startup, there was introduced startup as a diploma program. More information about it is in section 3.2.

TECHNICAL UNIVERSITY OF MUNICH, TUM (GERMANY)

The Technical University of Munich (TUM) set a goal of becoming one of the most successful start-up universities in Europe. They offer a wide range of startup consulting, research and qualification services, funding and network for founders. They have created UnternehmerTUM, the Center for Innovation and Business Creation that is dedicated to start-up consulting and leading entrepreneurs to the market.

TUM startup ecosystem includes^{25,26}:

- TUM Venture Labs. It is a high tech innovation hub. They help in transferring research to product. They offer fully equipped workspaces with extensive infrastructure from IT systems to laboratory equipment, individual consulting, support in soliciting public funding and investments, educational programs, such as entrepreneurial introductory lectures and deep-tech courses, venturing programs focused on start-up (pre-) incubation, access to network of high-profile entrepreneurs, mentors, industry partners and venture capitalists.
- TUMentrepreneurship Research Institute develops methods and tools for founders that are then used in consultancy.

^[23]https://www.imperial.ac.uk/enterprise/business/incubator/

^[24]https://itmo.ru/images/pages_trans/40/ITMO%20University%20Strategy%202027_Eng.pdf

^[25]https://www.tum.de/en/innovation/entrepreneurship/

^[26]https://www.unternehmertum.de/en/services

- Pre-incubation, incubation and acceleration programs.
- Consulting in such areas as developing a business model, drawing up a business plan, applying for grants, coordination with university agencies, building up a business (advice on strategy, finance, organisation, sales, and project development and planning), financing.
- Networking with industry, international innovation hubs, mentors.
- Workshops and training on leadership and human resources, creating a business plan, design thinking, business design, creating user friendly apps, etc.
- Executive MBA in Innovation & Business Creation.
- Exchange program the Erasmus for Young Entrepreneurs.
- Entrepreneurial master thesis (more about that in section 3.2).
- Prototyping grants, (pre-)seed capital, venture capital funds.

To sum it up student startup is supported by different measures depending on the level either country, region or university. In general, at a state government level there are offerings of funding schemes through innovations competitions.

At a regional and city level authorities also create startup competitions. But also provide media coverage, educational opportunities and access to innovation infrastructure. In some places all the innovation activity is united by one organization (like in Kerala) that creates an ecosystem of interconnected startup support actions.

Universities support startup culture and mindset. For that they have educational programs, startup events, co-workings, accelerators, incubators, etc.

1.1.2. Opportunities and limitations to the development of student startups

Business needs competent personnel who can work to diversify the product and service invent and commercialize new products, enter new markets, therefore, line, entrepreneurial competencies are in great demand^{27,28}. Students are not massively highly qualified entrepreneurs, and despite the entrepreneurial training at the university, business is forced to work to improve the professional qualities of students²⁹. The introduction of student start-up into the practice of universities as graduation gualification works (startup) as a diploma) will have a positive impact on the development of entrepreneurship, since it will be in line with traditionally taught subjects and will become part of the practical use of universities. At the same time it can raise the such risks as the practice-orientated work on a startup and insufficient theoretical training of a student can potentially negatively affect his career opportunities if the student decides to change the field of activity from entrepreneurial to another³⁰. Students who have defended a startup as a diploma should not be perceived as having an advantage over students who studied and defended their qualifications according to the classical model, since not all employers need exactly the entrepreneurial skills of employees³¹.

According to an OECD study, startups founded by researchers are more likely to own patents and intellectual property, while those founded by students are more likely to innovate more radical than other startups. At the same time, startups founded by undergraduate students receive less venture funding and are less likely to go to an IPO or takeover, while startups created by researchers are just as successful as their non-academic colleagues³².

It is worth mentioning, that according to a 2018 study, older people are several times more likely to be successful in building a tech startup than younger people under 30, which is due to the deeper and broader professional and life experiences of the former³³, therefor the particular tailed measures for student support are significant to be elaborated and offered to the young startups.

^[27]Grishina O.A. et al. The concept of sustainable development of an educational institution // Bulletin of the Russian University of Economics. G.V. Plekhanov. 2013. No. 3 (57). S. 5-22 // Гришина О.А. и др. Концепция устойчивого развития образовательного учреждения // Вестник Российского экономического университета им. Г.В. Плеханова. 2013. № 3(57). С. 5-22.

^[28]Saginova O.V., Grishina O.A., Shtykhno D.A. Project-Based Education of Students Based on Orders of Small and Medium-Sized Business Structures // Russian Journal of Entrepreneurship. 2017.Vol. 18.No. 3.P. 417-425.// Завьялова Н.Б., Сагинова О.В. Проектная работа студентов: как улучшить результат // Креативная экономика. 2017. Том 11. № 9. С. 943-952. doi: 10.18334/ce.11.9.38328

^[29]Saginova O.V., Grishina O.A., Shtykhno D.A. Project-Based Education of Students Based on Orders of Small and Medium-Sized Business Structures // Russian Journal of Entrepreneurship. 2017.Vol. 18.No. 3.P. 417-425.//Сагинова О.В., Гришина О.А., Штыхно Д.А. Проектное обучение студентов на основе заказов малых и средних предпринимательских структур // Shtykhno D.A., Iskandaryan R.A. Student startups as a tool for developing entrepreneurial skills // Economics: yesterday, today, tomorrow. 2019.Vol. 9.No. 2A. S. 252-262.Российское предпринимательство. 2017. Т. 18. № 3. С. 417-425.

⁽³⁰⁾Shtykhno D.A., Iskandaryan R.A. Student startups as a tool for developing entrepreneurial skills // Economics: yesterday, today, tomorrow. 2019.Vol. 9.No. 2A. S. 252-262.//Штыхно Д.А., Искандарян Р.А. Студенческие стартапы как инструмент развития предпринимательских навыков // Экономика: вчера, сегодня, завтра. 2019. Том 9. № 2А. С. 252-262.

^[31]Shtykhno D.A., Iskandaryan R.A. Student startups as a tool for developing entrepreneurial skills // Economics: yesterday, today, tomorrow. 2019.Vol. 9.No. 2A. S. 252-262.//Штыхно Д.А., Искандарян Р.А. Студенческие стартапы как инструмент развития предпринимательских навыков // Экономика: вчера, сегодня, завтра. 2019. Том 9. № 2А. С. 252-262.

 ^[32]http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=DSTI/CIIE(2018)13/FINAL&docLanguage=En
 ^[33]https://insight.kellogg.northwestern.edu/article/younger-older-tech-entrepreneurs

1.1.3. Legal basis and restrictions on the development of student technology entrepreneurship and startups

Russian legal framework to support student startups³⁴

In January 2019, the Ministry of Science and Higher Education reported that more than 1,000 Russian universities so far accept only traditional graduation theses, but the practice of submitting startups instead of a diploma is already being used in 71 universities.

To a much greater extent, the task of developing entrepreneurial skills, as well as the task of developing cooperation between Russian universities and organizations implementing complex projects to create high-tech production, should have been solved by the creation of small innovative enterprises (SIE) at universities, which was the goal of the Federal Law of 08/02/2009 No. 217-FZ (Federal Law).

Subsequent Federal Laws of October 16, 2010 No. 272-FZ, of November 27, 2010 No. 310-FZ, and of March 1, 2011 No. 22-FZ gave small innovative enterprises the same benefits as Skolkovo³⁵ residents. However, over time, a problem emerged: the results of innovative activities (RIA), which are produced by the university SIE (small innovative enterprises), are generally not in demand by the business. The imperfection of legislation (primarily in terms of the disposal of property and rights to the results of innovative activities, which is a motivational factor), as well as the inertia of local universities and the weak interest of business in innovative developments have led to the fact that only one third of the total number of registered universities SIE are actually working. At the same time, 70% of innovations abroad are introduced precisely through university SIEs and spin-offs. It can be expected that Russian National projects developed in accordance with the Decree of the President of the Russian Federation "On national goals and strategic objectives for the development of the Russian Federation for the period up to 2024" dated May 7, 2018, will contribute to the development of entrepreneurship as a mechanism for achieving national goals. Moreover, the norm that graduate qualification works in universities can be performed in the form of startups is contained in the "Digital **Economy project**^{"36}. That is crucial for student startups development at universities.

According to a press release on the official website of the Ministry of Science and Higher Education of the Russian Federation dated November 20, 2020³⁷, the Startup as a Diploma program is aimed at talent and the growth of the technological entrepreneurship system, as well as helping small and micro-businesses.

The final qualifying work is a real-life business project created by one student or a team (with legal entities and a formed team), or it can be at the idea stage. A student must demonstrate the level of readiness for independent professional activity.

The program Startup as a diploma is based on an annual cycle of events: trainings aimed at developing project and entrepreneurial competencies, soft and hard skills; student accelerator; support in the preparation of applications for competitions to attract funding; consultations of leading experts and constant support of teams at all stages of the project life cycle.

A student of any field of study, specialty and level of education can become participants in

^[34]http://publishing-vak.ru/file/archive-economy-2019-2/22-shtykhno-iskandaryan.pdf

⁽³⁵⁾The Skolkovo Innovation Center is a high technology business area at Mozhaysky District in Moscow// https://sk.ru/ ⁽³⁶⁾https://digital.gov.ru/ru/activity/directions/858/

^[37]https://minobrnauki.gov.ru/press-center/news/?ELEMENT_ID=25900

the Startup as a Diploma program. The main condition is the correspondence between the role in the startup team and the functional responsibilities of the student, confirming the development of the competencies established by the Federal State Educational Standard of Higher Education or Educational Standard of Higher Education. From 2021, it is planned to introduce the practice for graduate qualifications in the form of startups in more than 40 universities, including the Kazan National Research Technological University, Tomsk Polytechnic University, Siberian Federal University, Southern Federal University, Southwestern State University and others. For the first time in a trial mode, the program started in 2017 at the Far Eastern Federal University. In November 2020, an agreement on cooperation between the Ministry of Education and Science of Russia and the Agency for Strategic Initiatives³⁸ (ASI) was signed at the forum. Within the framework of the agreement, it is planned to work together to develop and popularize youth entrepreneurship, as well as to identify and support projects and best practices in this area. During the joint work, it is planned to pay attention to the Startup as a Diploma program, which is one of the key elements of the student entrepreneurship ecosystem.

Support for student startups in Finland

In the fourth supplementary budget for the year 2020, the Finnish government, The Finnish Venture Capital Association (FVCA) have identified a funding package of \in 250 million for start-ups and small companies in the growth phase. This package of measures was adopted in order to help the startups to overcome the consequences of the coronavirus. As with many of the cases described in this report, it is difficult to separate support for startups in general from student startups. Public sector support will be comparable in terms of private sector support. The total funding is projected to reach half a billion over the next two years. Tesi's new Venture Bridge funding package will be available to startups from June 17th³⁹.

Apart from a host of private actors, the government of Finland set up in 2018 its own agency Business Finland to aid in attracting international talent and to foster startups. Business Finland cooperates actively with public and private actors, which together form the Finnish startup ecosystem. Business Finland, ELY Centres (Centre for Economic Development, Transport and the Environment), TEoffices (Employment and Economic Development Offices), Finnvera plc and Finnish Industry Investment Ltd provide public financing, expert and networking services for launching and developing business operations.

Case. Finnish Industry Investment Ltd (Tesi)⁴⁰ is a public sector investment company that invests in venture capital funds, private equity funds, and startups directly.

Working principles:

- Investments are made on the same terms as it is accepted among private investors.
 Tesi expects return on investment and monitors startups performance
- Tesi shares financial risks, helps in international promotion, supports collaboration and an active position of business owners

⁽³⁸⁾A Russian autonomous non-profit organization founded by the Government of Russia. The agency aims to create opportunities for advancing Russia to global position implement through a set of measures in the economic and social spheres, among those to support the personal fulfilment of ambitious leaders of Russia// https://asi.ru/eng/ ⁽³⁹⁾https://paaomasijoittajat.fi/en/new-startup-funding-package-announced-in-finland/ ⁽⁴⁰⁾https://www.tesi.fi/en/

Tesi relies on Finnish knowledge, perseverance and creative enthusiasm to find
 solutions to global problems. As an investor, Tesi finances and participates in the development of sustainable solutions

Tasks / ambitions of the organization (quotes from the official website of the organization):

- **1** Creating the world's next success stories together. We share financial risk and support companies and funds when they develop new solutions and utilising their full potential.
- 2 Making Finland attractive to both companies and investors. Through our partnerships, international companies see growth opportunities in Finland. By fostering active ownership we generate new success.
- **3** Highlighting the societal power of companies. By financing innovative companies, we improve competitiveness and raise Finland to the forefront of impactful economic growth.
- 4 Sharing knowledge and expertise. We develop the venture capital and private equity market also by sharing our knowledge and expertise with companies, funds and decision-makers.

Finland's innovation and startup ecosystem has greatly developed in recent years – for the second year in a row, Finland ranks in top-5 in Europe in terms of venture capital (VC) investments received by startups when measured as a percentage of GDP. Finnish startups have received more investments than their European counterparts also in the long term (2015-2019).

		subject ►	Venture capital investments												
		measure 🕨	USD, d	USD, current prices											
		unit >	US Do	US Dollar, Millions											
		year ►	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Country Development srages		Development srages													
Finland	Total		183 397	221 762	130 059	137 028	121 747	103 488	169 867	163 867	121 347	143 677	156 831	265 468	323 810
	Total	Seed	23 518	13 943	12 796	7 093	4 554	7 823	7 540	11 327	10 240	13 825	18 608	12 919	34 184
		Start-up and other early stage	67 629	94 675	72 529	86 936	73 606	78 887	91 106	102 339	75 333	92 013	93 318	130 844	107 125
		Later venture	92 249	113 145	44 734	43 000	43 585	16 779	71 007	50 201	35 774	37 839	44 906	121 706	182 501
Russia Total		108 300	161 760	123 750	153 300	272 210	314 734	174 918	152 000	145 000	129 000	126 000	160 000	134 597	

Venture capital investments

Source: OECD.Stat⁴¹

Global VC Investment Index

Rank	Countries	Startups	Skill	Entrepreneurshi	Tech Readiness	Economic Growth	Stability	Investment Env.	Total Score
1	Sweden	644	84	71	88	-7	18	79	33
2	Singapore	769	79	64	87	-3	26	88	32
3	Switzerland	701	87	64	79	-6	17	79	32
4	Finland	443	86	64	80	-6	15	81	32
5	Dermark	354	86	68	83	-6	17	81	32
~				42					

Source: Global VC Investment Index⁴²

^[41]https://stats.oecd.org/

^[42]https://www.ko2.co.uk/global-vc-investment-index/

The funding received by startups has more than quadrupled in less than ten years, and now reaches a yearly level of more than half a billion euro, thanks to both domestic and foreign investors. The share of foreign investors of total funding has risen to approximately 60%.

The main funding package is directed at Startups with International Growth Potential and there are two separate funding programs:

First of which is intended for promising early-stage startups and covers approximately 100-150 companies.

2

The second program will benefit about 60 companies that are already in the phase of international growth. For a company to access the funding, a private-sector investor must also participate in the round with a 50% share. The share of private-sector investors thus doubles the amount of crisis funding available.

In practice, tech companies that are seeking international growth and have previously raised at least a seed round from VC investors are the most likely companies to access funding from the program.

The new funding package will also ensure an adequate size of funding rounds. Funding for early-stage startups, with private investors' share included, can range from €500k to €4 million. For companies in the phase of international growth, the initial investment ranges from €3 million to up to €50 million. Tesi's share of these investments is likely to be between €1.5 million and €10 million.

Chapter 2. Overview of Student Startup Development in the University context

2.1. Acceleration and engineering infrastructure for the development of student startups

For the successful development of a student startup, a support infrastructure is needed that will allow access to laboratory equipment and facilities, equipment for prototyping and evaluation of a prototype quality. Various organizations have solved this problem through the formation of databases and digital navigators of equipment and services.

The list of the main functions for navigators and engineering infrastructure databases:

1. Premises and equipment database - a description of available items, existing functions, location, access levels, timetable of a particular object,

- 2. A list of possible services (what can be done with this equipment and premises
- **3.** Schedule for equipment loading and laboratory occupancy.

4. Search and filtering service that allows you to choose the most suitable equipment for research tasks.

- 5. Equipment and laboratory reservation service.
- 6. Effectiveness monitoring and evaluation.
- 7. Ensuring the security of confidential projects and personal data.

Case 1. Aalto University Acceleration System

The official web site of Aalto University says that «Aalto has a deep and wide community of entrepreneurship scholars, students, researchers, practitioners, advisors, funders, coaches and mentors who can help you with any of your entrepreneurship goals. Our processes cover the whole university and connect with the wider Finnish and international society. Up to 100 companies are founded every year in our ecosystem and 50% of Finnish startups that originate from universities come from the Aalto community»⁴³.

Aalto has an extensive ecosystem of support for student startups.

Table. Description of the elements of the innovation infrastructure of Aalto University

^[43]https://aaltopreneur.fi/startupsupport/

Problems that can be solved	Element	Element description
Find a startup idea	University 'Platforms'	The Aalto University Platforms are designed to initiate and coordinate multi- and interdisciplinary research and teaching in thematic areas. They organize annually several thematic meetings which offer possibilities for co-operation and networking. Platforms target increased visibility and enhanced collaboration with external stakeholders, and provide a forum for recently recruited professors to create local networks. The Digi and Energy Platforms have served as pilots to facilitate joint efforts to tackle scientific and societal challenges requiring systemic and integrative approaches beyond the capabilities of an individual department. The other five platforms are Living+ in the field of human-centred living environments, Health Platform in the area of health and wellbeing, Materials Platform in the field of materials research, Experience Platform in the field of human experiences, and the Entrepreneurship Platform gathering Aalto University's support initiatives for entrepreneurship: Digi Platform Experience Platform Health Platform Living+ Materials Platform
	Aalto Sustainability Hub	Founded in 2018, Aalto Sustainability Hub addresses diverse societal challenges by increasing dialogue between different scientific fields and social actors. Our mission is to create a world-class research and learning environment focused on sustainability and circular economy. The aim is to bring new, interdisciplinary understanding of the systemic solutions needed for a sustainable future.

	The European Space Agency's (ESA) Business Incubation Centre	The European Space Agency's (ESA) Business Incubation Centre in Finland was founded in 2017 to support aspiring innovative entrepreneurs and young ambitious start-ups financially and technically to reveal their full space potential.
Mentoring, evaluation of business ideas	SLUSH	During the coldest and darkest season of the year, Slush brings together the leading actors of the global startup and tech scenes to Helsinki for one full week. Starting from modest beginnings of mere hundreds, the event in Helsinki has grown in just a few short years to 20,000 attendees and over 40,000 people at all our gatherings globally. In 2017, over 2,600 startups, 1,600 investors, and 600 journalists from over 130 countries gathered to Slush to drive business, and to experience the phenomenal atmosphere.
	Innovation Agents	Innovation agents belong to department staff. They are part-time volunteers: advising, encouraging and finding research ideas and innovations for commercialization. Research and Innovation services train the agents and innovation advisors co-operate closely with them in each school.
	Innovation Advisors	Innovation Services employs a skilled team including Innovation Advisors with knowledge in intellectual property rights and commercialization as well as domain expertise. The Innovation Advisors evaluate, develop and transfer research project results and inventions to commercial use in close co-operation with researchers. Innovation advisors also support researchers in the preparation and completion of commercialization projects.
	Aalto Ventures Program	Let's presume that after a period of study with one of the mainstream entrepreneurship education arms of the university that you have the kernel of an idea or even something more developed. One of your next steps could be to check out Aalto Ventures Program (AVP). You may already have met some of these guys

		during your studies. Aalto Ventures Program courses cover important aspects of entrepreneurship; leadership, design thinking, finance, innovation, start-ups, prototyping, storytelling and much more. The courses are taught by a wide network of educators: entrepreneurs, angels, VCs, executives and researchers. They will help you to build capabilities for your career and are really practice based.
Tips for starting and growing a business	Grid	A Grid is a startup hub and one of Europe's largest centers for growth companies. As part of the Aalto University campus we work as a gateway to the university's international network of resources, talented students and cutting-edge research and resources. We also serve as a vibrant space for entrepreneurial expertise, services and events. A Grid houses all kinds of startups, accelerators, such as the European Space Agency and Aalto Start-Up Center, as well as partners and established companies, like Fortum
Finding funding	Business, Finland	At Business Finland, we create new growth by supporting companies to go global, as well as funding innovations. Our top experts speed up the identification of business opportunities around the world and help transform them into global success stories. As a fresh organisation, formed through the merger of Tekes and Finpro, we continue to evolve by listening to our customers.
Complex of services	EIT-KIC	The University's EIT Services Team started its work to support Aalto researchers, teachers, entrepreneurs and students to benefit from funding options offered by the European Institute of Innovation and Technology (EIT).The EIT brings together Universities, Research Institutes and Industrial Players to form Knowledge and Innovation Communities (KIC) with the primary task of overcoming some of the greatest challenges of our society such as climate change, energy and raw materials usage, healthy nutrition, digitalization etc. Currently six KICs are

		working to tackle these diverse issues.We integrate education, entrepreneurship and innovation resulting in connected, creative transformation of knowledge and ideas into economically viable products or services that help to mitigate climate change.
Complex of services	Aalto Startup Center ASUC	 20 years experience in incubation & acceleration 2. Combination of design, business and technology know-how 3. Dynamic community based business accelerator 4. Multiple trusted partners involved in business development 5. Part of entrepreneurial ecosystem in the Helsinki metropolitan area Aalto Startup Center operates as a part of Aalto University Research and Innovation services on Otaniemi campus, Espoo, Finland. We have services for two customer groups: innovations originating from Aalto research (especially Business Finland funded TUTLI -cases) and startups seeking for leverage in Aalto University's research and community

Case 2. Startup Sauna. Finland's central hub for student-run entrepreneurial movement⁴⁴

The Startup Sauna co-working space is a focal meeting point in Northern Europe for entrepreneurs and investors alike. It's a 1500 square meter industry hall open for everyone – no membership or previous ties to Startup Sauna are required. It's a regular event space for founder talks, pitching competitions, hackathons and BBQs, hosting nearly 100 events a year related to startups and entrepreneurship.

The Startup Sauna co-working space is a home base for the largest startup community in Europe. An open community full of people who love what they do and empower each other! The cluster is the birthplace of Aaltoes, Startuplifers, Junction, and Kiuas.

Until 2018, Startup Sauna worked as an accelerator for start-ups in Northern Europe and the Baltic region. At the same time, many of the residents were student startups, although the focus was not made on student startups only.

Finnish accelerator Startup Sauna, which has been helping projects from Northern and Eastern Europe for 8 years, announced the closure. Since 2010, more than 240 startups from 27 countries have been trained there.

^[44]https://startupsauna.com/

According to the founders of Startup Sauna, the launch of the charity accelerator was caused by a lack of domestic funding in the region. However, over time, the situation changed, and the authors of the project decided that its mission had been accomplished. At the same time, the Startup Sauna space in Helsinki continues to work as a coworking space, supporting young entrepreneurs.

The accelerator training lasted 6 weeks. During this time, the participants had to improve the business model, gain new knowledge and skills, find potential clients, and especially promising ones received funding. Every autumn and spring, 15 teams came to Finland to pay for travel and accommodation. As a result of the program, the best startups were sent on a trip to Silicon Valley.

To popularize the accelerator, his team conducted warm-ups in different cities of Europe before each set. Several times events from the Finnish team were held in St. Petersburg and Moscow.

Case 3. Imperial College London

Also the university has the White City incubator⁴⁵ for deep science startups. On an incubator territory they have:

- **1** Laboratories. Labs have separate write up areas ranging from 410-1130 square feet. Each Laboratory has adjustable benches, sinks, eyewash stations, gas & electrical supply, ventilation for fume and flow hoods and highspeed telecommunications. There is also a shared laboratory for companies that are at the very beginning of their journey and cannot afford to take on the expense of their own fully equipped laboratory. The shared lab will provide basic equipment and consumables to help these incredibly innovative companies take the first step on their journey.
- 2 Meeting rooms. Five shared meeting rooms capable of accommodating groups of 10 to 15 people equipped with audio-visual equipment and media capabilities. The Incubator also has two large conference rooms which when combined can host up to 100 people.
- **3** Offices. Individual private office suites ranging from 150 to 344 square feet. Style and size varies to suit different clients. All of them have power, telephone and high-speed network points and they are fully furnished with room to grow.

For members incubator can help to establish relationships with suppliers, to negote preferable rates and payment structures, and to connect with the university spin-offs. Depending on a package deal virtual members can get access to meeting rooms at discounted rates, telephone answering service, hot-desking, opportunities to attend seminars and events, and networking.

They also have support and training programs - White City Innovators' Programme and Innovation Academy.

White City Innovators' Programme lasts 6 weeks that you go through with your mentor. During that time participants go through:

^[45]https://www.imperial.ac.uk/enterprise/business/incubator/

Week 1:	Programme intro and getting the basics right
Week 2:	Getting the basics right and customer validation
Week 3:	Business operations and finances
Week 4:	Branding and sales
Week 5:	White City Ecosystem and growth
Week 6:	Next steps, practice pitch and final pitch day

To sign up a company should be less than 1 year old (if registered), raised less than £50,000 in investment (or less than £50,000 in annual sales) and have not participated in an Imperial competition/programme with the same idea in the past.

Innovation Academy – is a series of courses focused on the fundamental knowledge you need to build, grow and exit a spinout company. The courses focus specifically on the formation and management of university spinouts – companies founded based on intellectual property developed at Imperial College London. Courses can attend anyone who has an interest in founding a spinout company.

National cases

Case 1. National equipment database for all UK universities⁴⁶

The platform provides an automated search through an open database of available equipment and laboratory facilities at UK Universities. The principle of "one-stop shop" is used at the national level to provide service for the use of equipment and laboratory facilities. The platform was developed by the University of Southampton with funding from the Engineering and Physical Sciences Research Council (UK). The platform brings together 17,487 pieces of equipment from 58 organizations.

The platform is integrated into a national large-scale open data project and is governed by UK national regulations. The platform provides an opportunity to get acquainted with the register of universities, as well as use an automated search in the equipment base, and a card with a technical description of a specific unit provides contact information for booking the use of equipment, there is no possibility of automatic booking through the platform.

Case 2. OECD Nuclear Energy Agency⁴⁷

The nuclear science R&D database was created as part of the OECD Nuclear Energy Agency's worldwide review of the status of research and test facilities in nuclear science and technology. The information for the database was originally collected from the Internet and other published sources and then verified by independent reviewers. Automated search in the database system is carried out by (several) keywords (full and partial coincidence of words), there is an opportunity to search by keywords to specify certain conditions (status of equipment operation, communication of equipment with programs of the Nuclear Energy Agency, reactor project number, type of equipment capabilities, the organization that owns the equipment, the full name of the equipment, the abbreviation of the name of the equipment, etc.), there is a regional catalog of equipment search. The catalog of R&D objects contains a brief description of the objects, including technical ones, with direct links to the site of the organization that owns the objects, to a subsection directly devoted to the object.

Case 3. Database of research equipment of the Atlantic Canada region⁴⁸

The Atlantic Facilities and Research Equipment Database (AFRED) is an open access, automated searchable database designed to increase the use of dedicated research infrastructure in the Atlantic Canada region through the ratio potential users with facilities where the equipment is located. The database is a tool to facilitate interaction between industry, small and medium-sized enterprises, researchers and other science-oriented and development stakeholders in the region. Thus, the AFRED database serves as a starting point for the development of triple helix cooperation at the regional, national and international levels.

The database includes brief descriptions of the main pieces of research equipment available for use by external researchers, as well as contact information that can be directly connected to the sites that host the equipment. The AFRED database is being developed as an initiative of Science Atlantic (https://scienceatlantic.ca), a charitable association of 16 higher education and research institutions in Atlantic Canada. The Science Atlantic Association is committed to promoting postgraduate science education and research in Atlantic Canada by empowering learners; supporting researchers and educators; development of research cooperation to solve important regional scientific problems.

University cases

Universities form equipment databases with the ability to book a room or a specific piece of equipment to work on their project, but it is difficult to distinguish between using equipment for research purposes or for creating a commercial product for a startup. Such statistics of equipment utilization are not kept.

Case 1. University of Southampton, UK. University equipment database⁴⁹

The University of Southampton is one of the pioneers in the use of navigator equipment and research capabilities. The University of Southampton has developed and launched an innovative open data system with the aim to create an enabling environment for the exchange of research funds and high quality equipment between and within UK universities.

The database is the first of its kind in the UK and aims to make the most of existing facilities and equipment in the region while avoiding unnecessary

^[48]https://www.afred.ca/about/

^[49]https://www.southampton.ac.uk/research/facilities/facilities-equipment-database.page,https://data.southampton.ac.uk/facilities.html

functions duplication. These databases are used when considering grants for the purchase of equipment by national foundations and councils, which makes it possible to follow the principle of equipment distribution/sharing when making a funding decision.

The database provides the ability to search and view the list of available equipment and research opportunities by faculty, departments, buildings, by automated keyword search. Infrastructure description cards include technical description, location, contact information.

The list of functional uses of the database includes:

- Identifying suitable resources that can be included in project work proposals
- Optimizing funding opportunities according to the equipment procurement allocation guidelines
- Fostering a culture of exchange by ensuring improved resource efficiency

Case 2. Kingston University: virtual tours and detailed room descriptions, UK⁵⁰

The uniqueness of the Kingston University (London) case is in providing visitors to the university website with the opportunity to take a virtual tour of the university campus and all its laboratories. The information is transmitted via 360 video with clickable links to short videos with presentations of the main research directions and projects implemented in a particular laboratory, in addition, a textual description of the research capabilities and equipment is provided.

Case 3. University of Cambridge, UK⁵¹

The database was launched in 2015 and at that time contained information about research facilities and expensive equipment (costing more than £ 100,000 per unit), which are available in the faculties of biological sciences, clinical medicine, physical sciences and technology. The next step in the development of the research resources database. They want to add more detailed description including research equipment of the average cost of all the University of Cambridge.

The project is being implemented with support from the Engineering and Physical Sciences Research Council (UK). The Equipment Sharing and Sharing Project is a University of Cambridge initiative to raise awareness of equipment sharing and increase efficiency by maximizing opportunities to collaborate both nationally and internationally. The search capabilities and listings of the University of Cambridge's research resources are only available to university staff and students, external users can search for equipment hosted by the University of Cambridge through the national equipment database of all UK universities. University of Cambridge staff and students can also search over 3,000 titles from the Universities of Cambridge, Oxford, Imperial, University College London and Southampton through the University's Equipment Resource Navigator and Research Opportunities.

^[50]https://www.kingston.ac.uk/virtual-tour/roehampton-vale/

^[51] https://www.research-operations.admin.cam.ac.uk/about-us/bulletin/item/research-facilities-and-equipment-database-launched https://raven.cam.ac.uk/auth/authenticate.html?ver=2&url=http%3A%2F%2F

www.equipment.admin.cam.ac.uk%2F&desc=Research+facilities+and+equipment+at+Cambridge

Case 4. Imperial College London, UK⁵²

The searchable database, open only to Imperial College London representatives, covers a wide range of options, from single pieces of equipment to fully stocked inter-faculty services. The database covers both a technical description of the object and information about its location, the possibility of booking the use of equipment, according to the internal regulations for the equipment sharing. There are several forms of using the research resources of the college, depending on the complexity and / or cost of the equipment:

- Full conduct of research and experimental actions on behalf of the applied researcher
- With expert support of the researcher
- With preliminary training of work on the equipment

Case 5. University of Oxford, UK⁵³

There is an equipment database that offers automatic search by keywords, with the ability to limit the search area only to the University of Oxford or a specific division of the university. There is a view of the full list of equipment categories. The database was developed with the financial support of the Research Council for Engineering and Physical Sciences (UK). The database provides an opportunity for both on-line search and on-line placement of equipment data. The base includes equipment worth over £ 25,000. In addition to the technical description, the contact information and the location map are provided. The map is also associated with an interactive GIS map, the object card contains information about the object's workload, it is indicated whether there is a possibility of online booking. Online reservations are made through the website for either the item of equipment or the laboratory.

Case 6. St. Petersburg State University⁵⁴

At the moment, St. Petersburg State University is forming an interactive on-line base of equipment located at the university. Nowadays SPbSU has an open online infrastructure with a database of equipment from the SPbSU Science Park. This database has an on-line keyword search. The card for a piece of equipment provides detailed information on the technical characteristics of the object, there is no information about the contact or responsible persons or the location. Instead of this information, the department that owns the equipment is indicated. It is possible to view a list of all equipment located in a particular laboratory or research center. The site has a subsection with information about the current equipment workload.

Case 7. MISIS University⁵⁵

MISIS equipment database with automated search both by keywords and by advanced search according to categories: name, purpose, type of measurements, manufacturer, division. The object card includes a technical

^[52]https://www.imperial.ac.uk/research-and-innovation/research-office/support/research-facilities/research-facilities/research-facilities/

^[53]https://www.research-facilities.ox.ac.uk/

^[54]https://spbu.ru/nauka/oborudovanie-spbgu
^[55]http://sci-eq.misis.ru:81/, http://sci-eq.misis.ru:81/Equipment/Detail/?UserKey=---Tegramin---25-#tabs-2

description, affiliation to a subdivision, an indication of a contact person (without providing a contact e-mail box or telephone). Nevertheless, for users registered on the site who have indicated their personal data and the organization they represent, it is possible to order work on a selected piece of equipment.

Conclusions on the basic characteristics of the student startup support opportunities regarding shared infrastructure mainly equipment based on case analysis:

- Open for external users and closed parts with additional access levels depending on the status and functions required by the user. For example, the entire interface is open for the head of a laboratory, and only a part of it for the student.
- Hardware/software catalog with characteristics, owners contact details, use requirements.
- Search engine with filters by characteristics:
 - Technical characteristics of a specific type of equipment or software
 - Location (city, university building)
 - The degree of workload (estimate heavily loaded, moderately loaded, lightly loaded)
 - O Schedule the current workload
 - Areas of research for which this equipment or software is suitable
 - O Access level
 - O Qualification requirements for the use of equipment
- Interface for interaction with the equipment or software owner/operator.
- Interface for generating an application for the use of equipment/software.
- Interface for forming an order for the owner/operator to perform work on this equipment/software.
- Virtual room navigator.

2.2. Startup as an educational tool (educational programs, initiatives and continuing education)

The most basic thing that is essential for startup activity is education. During short courses or education programs students can learn all about startup development. Some educational opportunities were covered in section 3.1. Here we are concentrating on elective courses and degree programs.

Higher School of Economics (HSE), Russia⁵⁶

At the HSE, the Department of Innovation Management has developed a minor "Startup from scratch: the practice of creating your own business." Within the framework of the Startup from Scratch Minor, students get acquainted with various areas of entrepreneurship and go through the educational process, from searching for an idea to their own startup, bringing it to the market and attracting investment.

Minor is focused on the practical component – building a student's startup with the support of practicing teachers who will provide relevant tools and constructive feedback. Based on the results of the minor, it is assumed that students will not only make a startup, but will also be able to receive the first investment.

Imperial College London, UK⁵⁷

Imperial College London has a one-year master of science degree Innovation, Entrepreneurship & Management. There are pre-study modules that are designed to give a basic knowledge of areas which will be covered by the programme throughout the academic year. There are core modules on management such as accounting and corporate reporting analysis, business economics, marketing for entrepreneurship, organisational behaviour and human resource management, strategic management and modules on innovation and entrepreneurship such as business models and intellectual property, design thinking for innovation, entrepreneurship, personal innovation development, technology and innovation management, venture capital and growth finance. And there are elective courses that help students to tailor education to their needs.

In summer there is a Business Applications part. Students can choose between undertaking a Work Placement (secure a job), a Business Startup (working in one's own startup) or a Consulting Project (helping a client to overcome problems).

An opportunity to defend startup instead of thesis is one of instruments of rising student startup activity. There are universities where students are allowed to do so. In some to defend startup students should also attend business related classes. But the ability depends not only on university but also on state law. In section 2.1.3 we revealed Russian law according to which in Russian universities students can choose to defend traditional thesis or startup.

Tomsk Polytechnic University, Russia⁵⁸

First an opportunity to defend startup as a thesis got master students who study at Entrepreneurship in Innovation program back in 2017. Other students got this opportunity in 2019.

^[56]https://electives.hse.ru/minor_startup

^[57]https://www.imperial.ac.uk/business-school/programmes/msc-innovation-entrepreneurship-management/

^[58] https://www.minobrnauki.gov.ru/press-center/news/?ELEMENT_ID=21532

In total, in 2020, 48 students of Tomsk Polytechnic University defended their thesis in the format of startups. As startups were presented such projects as an incubator for newborns, an online cash register, a vending machine with essential goods, the production of healthy lifestyle algae, a filter glass for drinking water purification, a feed pusher robot, a support chair for patient rehabilitation, a robot bartender and many more.

The projects were evaluated by an expert commission of representatives from business, education, government and public organizations. These include the Tomsk Region Business Development Fund, Otkritie Bank, MTS, Opora Rossii and nanotechnology center SIGMA.Tomsk.

Université catholique de Louvain, Belgium⁵⁹

Program Formation Interdisciplinaire en Création d'Entreprise is an opportunity for first-year undergraduates from 30 educational programs to attend additional classes in entrepreneurship and defend a project thesis. These master's programs include areas of training in bioengineering, law, engineering, construction, physical sciences, computer science, chemistry, cell biology and biochemistry, communication, journalism, linguistics, management, psychology.

Lectures are held in the evenings so that students can attend the main classes. The exams are taken by a team. At the end, students defend an interdisciplinary dissertation on a business project. The project team should consist of 3-4 people from different faculties. A project dissertation replaces a faculty dissertation. The diploma received at the end of the course will correspond to the master's program, the annex to the diploma will indicate that the project option has been chosen.

The program consists of compulsory and optional courses. The compulsory courses include:

- Funding and project management
- Entrepreneurship theory
- Legal, economic and managerial aspects of business creation
- Business planning and the main stages of business creation
- In-depth seminar on entrepreneurship

Additional courses (of which you can choose from 1 to 4):

- Enterprise finance
- Regenerative economy
- Innovation classes
- Social and sustainable entrepreneurship
- Startups Strategic management
- International entrepreneurship

In order to enroll in the program, one need to fill out a questionnaire and go through an interview. It is not necessary to have an idea for a business.

^[59]https://uclouvain.be/fr/etudier/cpme/masters-120-offrant-l-acces-a-cpme.html#collapseExample130, https://uclouvain.be/fr/etudier/cpme/cours-et-memoire.html

Ramon Llull University (Spain)60

Within the Master's program Innovation and Entrepreneurship, there are three work options:

1. The project of creating a company (business plan)

2. Intra-corporate business project or its preparation. In the course of professional practice, the student develops a project under the supervision of a company manager and research supervisor

3. Dissertation

In general, the program is aimed at students with a bachelor's degree in economics or management. If a student with a different background is accepted to the program, then he or she needs to pass the Business Integration Path, which consists of 4 online courses and 6 full-time courses (business policy; introduction to finance; introduction to marketing; IT for managers; personnel management; operations and logistics) aimed at obtaining basic knowledge in the field of management.

The program also involves gaining international business experience. In January, there is a weekly study tour that focuses on studying the specifics of business in the region (India, Africa, Asia, Latin America, Israel) or highly specialized courses (at universities in the USA and England).

Despite the possibility of creating your own startup, an internship at the enterprise is mandatory. In doing so, students team up with graduate students from the Universitat Politècnica de Catalunya BarcelonaTech (Universitat Politècnica de Catalunya BarcelonaTech) to find innovative solutions to real-life business problems. In the partner company, the student is provided with a mentor who evaluates his work. The final assessment of the internship is given by the supervisor, while relying on the report on the practice (75% of the assessment) and the opinion of the mentor (25%).

University of Mannheim (Germany)⁶¹

Bachelors and graduates of all disciplines have the option of choosing to defend the final work 'Inside the Venture' on the basis of a university accelerator. Startups are selected at the university accelerator, and a Final Qualification Work can be written according to the approved ones. Students who do not have an idea of their own choose from a list of those they can join. In this case, the thesis consists of 2 parts:

- **1.** Startup project:
 - a a report on the state of the startup with financial documents attached
 - b management report (may contain theory and academic articles that have proven useful to the startup)
- **1.** Academic part (it may not be related to the first part):
 - a theoretical basis
 - b contributions to theory or practice
 - **c** qualitative research (5-10 interviews)

^[60]https://www.esade.edu/en/programmes/masters/msc-programmes/our-programmes/innovation-entrepreneurship/academics/curriculum https://www.esade.edu/itemsweb/wi/MIE.pdf

https://www.esade.edu/en/programmes/masters/msc-programmes/our-programmes/innovation-entrepreneurship

https://www.esade.edu/en/programmes/masters/msc-programmes/our-programmes/innovation-entrepreneurship/academics/curriculum

^[61]https://www.mcei.de/startup-support/mcei-support/theses-inside-the-venture

Technical University of Munich (Germany)⁶²

Master students have an opportunity to choose between three impact-driven master theses:

1. Start-up Creation Track. Master thesis on a topic related to a start-up idea.

2. Entrepreneurship Support Track. Research that contributes to the improvement of the start-up infrastructure and support system of TUM.

3. Tech Venture Challenge Track. An interdisciplinary team work with other master students to find sustainable solutions for complex challenges of society.

Students receive personal supervision by doctoral candidates of TUM, particularly at TUM ERI, and/or one supervisor of your faculty.

If student chooses to write an impact-driven thesis they will have:

- two focus seminars each semester on topics such as academic writing and scientific methods as well as personal development and entrepreneurship
- bi-weekly stand-up with all participants for discussions, reviews, and coaching
- close exchange and mutual support among the participants
- access to our entrepreneurial ecosystem
- admission to MakerSpace and TUM incubator co-working spaces
- project budget upon application
- access to entrepreneurship support services of TUM and UnternehmerTUM

To sum it all up, education is an important part of creating a successful startup. Universities should not just create amount of educational programs for those who are sure they want to launch a startup, but also give an opportunity for others to try it on during a course, for example on minors.

Having an opportunity to defend startups instead of traditional thesis gives students more time to work on their startup idea. And because at the universities with this opportunity there are different ways of supporting student startups among them are mentorship and additional entrepreneurial courses, startups have more capacities to be thought through. Besides these measures give a chance for non-business students to try themselves in business.

^[62]https://www.unternehmertum.de/en/services/tum-entrepreneurial-masterclass

2.3. Forms of interaction with industrial partners, corporations and SMEs in the context of the development of startups among students

The chapter discusses options for organizing work with startups from the point of view of cooperation between universities and industrial partners within a common ecosystem. The aim of the chapter is to demonstrate potentially useful practices from different countries for implementation in the region of cross-border cooperation. There were selected several cases based on the criteria: 1) the strategic orientation of the university towards the development of an entrepreneurial culture and the stimulation of start-ups; 2) a wide network of industrial partners. In 2020 the contribution of the Asia-Pacific region to the startup ecosystem exceeded the indicators of the EU. The Asia-Pacific region is the fastest growing and developing region⁶³ in these terms that is the reason that some cases demonstrate practices of the Asia-Pacific region.





RWTH Aachen⁶⁵

RWTH anchored entrepreneurship as the goal of its current University of Excellence strategy and fosters an entrepreneurial culture by providing comprehensive student support. The Center for Innovative Entrepreneurship RWTH⁶⁶ serves as a main gathering point for those interested in starting their own businesses and investors, offering a wide range of services including consulting, training and workshops. In addition, the Center provides participants with access to specialized technology incubators for startups and an extensive network of partners. The RWTH Center for Innovative Entrepreneurship is the result of a collaboration between RWTH Innovation GmbH and the School of Business and Economics⁶⁷.

RWTH INNOVATION

RWTH Innovation supports researchers and inventors from RWTH Aachen University and the Uniklinik der RWTH (RWTH Aachen University Hospital) in a variety of ways from idea birth to market launch. The Objectives of RWTH Innovation are:

^[63]https://startupgenome.com/article/rankings-top-40

^[64]http://www.startupgenome.com

^[65] RWTH Aachen University or Rheinisch-Westfälische Technische Hochschule Aachen is a public research university located in Aachen, North Rhine-Westphalia, Germany// https://www.rwth-aachen.de/go/id/a/?lidx=1

^[66]https://www.rwth-innovation.de/en/

^[67] https://www.wiwi.rwth-aachen.de/go/id/hzj/?lidx=1

1. Support of the researchers and inventors from RWTH Aachen University throughout the entire innovation process from idea development to marketing promotion.

2. Consulting the students and scientists of RWTH Aachen University in the creation of their startups.

3. Providing companies with direct access to research and innovation at RWTH Aachen University.

Industry representatives get access to all existing opportunities of RWTH Innovation, coordination of activities for creating a partner network, initiating projects is carried out by a dedicated specialist. The RWTH Innovation partnership configuration is shown in the figure⁶⁸.



Services provided to partner companies to access startups:

- RWTH Aachen Startup Landscape Navigator
- Screening startups based on company needs and end-to-end data processing to collaborate and identify investment opportunities
- Organization and holding of joint pitch events
- Possibility to include the company's own startups in the RWTH Innovation programs
- Attendance at our national and international events

Services provided to partner companies to access startups:

• technology scouting, information on research activities in the RWTH ecosystem

^[68]https://www.rwth-innovation.de/en/

- innovative seminars with our institutes on specific topics
- selection of suitable project partners and communication with experts
- the possibility of conducting joint research and development projects funded by the state
- providing support for activities and access to research funding programs at universities
- access to innovative RWTH-IP projects and the possibility of RWTH-IP licensing
- support in the administration of projects and funding programs, advice on legal issues and intellectual property issues

HR services for partner companies:

- ample opportunities for employer branding
- participation in events to familiarize with RWTH Aachen University students and their developments (Techathons[®], hackathons, case studies, etc.)
- supporting student technical and social initiatives in the area of corporate social responsibility (CSR)
- office spaces and exhibition grounds on the innovative platform RWTH Aachen University - one of the largest technology incubators in Europe

German start-up ecosystem parthnership

RWTH Innovation GmbH and German Entrepreneurship GmbH form a strategic partnership to strengthen the German startup ecosystem in Germany and internationally. Combining RWTH Innovation's technology expertise and German Entrepreneurship GmbH's expertise in accelerating and expanding startups, an initiative was created that spans a variety of technology areas.

One area of cooperation is focused on accelerating and internationalizing startups through joint programs in the early stages, for example, through joint activities under the RWTH incubation program. In addition, an international network of business and science experts is being organized, available to high-tech startups in Germany. Young entrepreneurs receive communication tools with seasoned entrepreneurs, technicians, academics, and seasoned industry experts.

SIEMENS CENTER OF KNOWLEDGE INTERCHANGE (CKI)

In 2003, Siemens created the CENTER OF KNOWLEDGE INTERCHANGE (CKI) at the RWTH of the University of Aachen – one of the world's eight centers of knowledge exchange – as a partner platform for cooperation with the university. CKI's goal is to bring employees from all Siemens divisions together with partnership members and students at RWTH Aachen University. The center carries out several formats of interaction with participants, for example:

- CKI Conference held every year and aimed at improving interaction between community members, companies and startups
- Innovation day Siemens⁶⁹

^[69]https://new.siemens.com/cn/en/company/fairs-events/innovation-day.html

- excursions to enterprises and production sites
- open innovation events
- meetings with experts

The collaboration between Siemens and RWTH Aachen University is also moving into its own collaborative research centers such as the "Future Train 2025+" project to develop a new generation of rail vehicles. One of the partner projects is Siemens MindSphere Lounge⁷⁰ at RWTH. Siemens' newest IoT platform, MindSphere, will be integrated into the research and curriculum to enable collaborative research in Industry 4.0.

Ford University Alliance⁷¹

RWTH University is the only European university to become a "strategic alliance partner" with MIT, Stanford University and Michigan University.

Ford funds strategic alliance partners that enable universities to plan research projects focused on complex problems that are important to the automotive industry in the long term, with interdisciplinary projects being a priority.

Research project objectives are defined jointly by Ford Research Center and university departments. The involvement of the central leadership of the university is necessary, since the alliance is a mechanism of inter-university cooperation that is not limited to specific institutes or faculties.

École polytechnique fédérale de Lausanne

EPFL is a cosmopolitan technical university in Europe, where students, professors and staff of over 120 nationalities study and work. EPFL has both a Swiss and an international vocation and focuses on three missions: teaching, research and innovation. EPFL works with an extensive network of partners, including other universities and colleges, schools, industry, political circles and the public, to make a real impact on society and its development.

A unique launch pad Launchpad⁷² has been created inside the university, aimed at the development of startups in the field of high technologies. The services⁷³ of the site provide various types of support for projects at different stages of readiness that entrepreneurs need to bring innovative technologies to the market.

- 1 Design and Prototype. It helps bring users closer to your technology. Benefit from collaborating with talented designers, developers and engineers to take a project to the next level.
- 2 De-risk your project. For a medtech or life science project to succeed, de-risking is a fundamental step. De-risking takes many forms. It currently funds projects such as preliminary clinical validation, material biocompatibility or toxicity studies, and regulatory assessments. It can contribute up to CHF 30K towards these projects.
- 3 Build your team. We finance interns from different backgrounds to join startup projects incubated at EPFL labs. Benefit from extra resources, and more importantly, an outsider's perspective and expertise on your budding idea.

^[70]https://cki.rwth-aachen.de/en/collaborative-research-centres/MindSphereLounge

^[71]https://www.rwth-aachen.de/go/id/duyk?lidx=1

^[72]https://www.epfl.ch/innovation/startup/

^[73]https://www.epfl.ch/innovation/startup/services/

- 4 Get market insights. Understanding the market is one of the key factors in the success of a startup, unique opportunities to access analytical marketing data along with experts and best practices will help determine the most effective strategy.
- 5 Secure your pre-seed funding. The work with a participant to define what non-dilutive funding the need to reach your short- and mid-term goals. After the identification the opportunities for a startup development, it is guided through grant applications, sharing learnings and pitfalls.

The EPFL⁷⁴ ecosystem helps its entrepreneurs with a variety of tools and mechanisms. The entrepreneurial ecosystem is not limited to the university, however, and the support is extremely extensive.

1. Advice. Counseling includes general training, that is, classes in entrepreneurship, innovation or technology transfer, as well as more specific and targeted support such as coaching and mentoring.

2. Grants. We offer funding to help transform ideas into companies of tomorrow. We offer two funding schemes to help entrepreneurs aspiring to realize their ideas outside the EPFL lab to unleash their true potential.

- a. Grant programs from government agencies:
 - Bridge⁷⁵ a joint program between the Swiss National Science Foundation (SNSF) and Innosuisse, the Swiss Innovation Agency. It offers new funding opportunities at the intersection of fundamental research and scientific innovation.
 - Innosuisse⁷⁶ Researchers who have an idea for an innovative project, but who do not have an industrial partner to implement it, can still apply for funding from InnoSuisse.
 - Robotics Spin Fund⁷⁷ is dedicated to supporting entrepreneurship, and as a result we offer our members the opportunity to apply for our spin fund if they have an exciting idea that they wish to take to market.
 - ESA Business Incubation Center (BIC⁷⁸) is a 2-year program for start-ups that are younger than 5 years, registered in Switzerland, which have or can come up with a space connection. The incubated start-ups receive 200'000 € in non-dilutive funding and access to a broad network offering business and technical support. Start-ups from all over Switzerland are welcome to apply. Selection rounds take place twice a year.

3. Investments - funds from individuals and commercial funds allocated for the development of projects. Through LaunchPad, members can receive funding from business angels, seed investors, investment platforms, and venture capital funds.

Interaction with the industry

EPFL actively promotes collaboration and partnerships between leading companies and EPFL teams and industry (small and medium enterprises and large companies).

^[74]https://www.epfl.ch/innovation/startup/community/ecosystem/

^[75]https://www.bridge.ch/en/

^[76]https://www.innosuisse.ch/inno/en/home/start-your-innovation-project/projekte-ohne-umsetzungspartner.html

^[77] https://nccr-robotics.ch/industry/spin-fund-grant/

^[78]https://www.esabic.ch/

Companies and corporations gain access to the EPFL Startup Center at the Innovation Park, which has over 150 startups. A separate area of work is the licensing of developed technologies, including patents and software.

National University of Singapore

The University of Singapore⁷⁹ singles out entrepreneurship as one of its development priorities, and NUS Enterprise, an entrepreneurial unit of the National University of Singapore (NUS), has been created as part of the priority, which plays a key role in promoting innovation and entrepreneurship in NUS and beyond. It actively promotes entrepreneurship and cultivates a global outlook and talent through the synergy of entrepreneurship education, active industry partnerships, experiential holistic entrepreneurship support, and catalytic outreach to entrepreneurship. The university's initiatives and global connections support a number of initiatives and help build an ecosystem in new markets. These initiatives complement the University's academic programs and serve as a unique bridge to industry far beyond Singapore.

The main tasks of NUS Enterprise⁸⁰:

- **1.** Implementation of the corporate aspect in training and research
- 2. Creating an environment for the development of entrepreneurial talent
- **3.** Encouraging a spirit of innovation through programs and activities.

To achieve these goals, a number of tools and services for promoting startups in the Asia-Pacific region have been created.

Marketplace

NUS Enterprise provides support in the field of recruiting for startups by organizing stands at NUS job fairs for their incubator companies in order to attract new employees. NUS Job Fairs are a great platform for startups to find the talent they need. There are usually three job fairs each calendar year; one is hosted by the Graduate Future Center and two by the NUS Computer School.

In addition to job fairs, we created Marketplace as a one-stop hub that not only serves the hiring needs of businesses, but also provides job opportunities for those looking to gain valuable experience in real-world startups.

It is also organized open days at N-House⁸¹, to show the residence of entrepreneurs, as another tool for companies in the incubator to showcase their business and meet potential employees.

Mentor consultation

Entrepreneurship beginners can greatly benefit from the NUS Enterprise mentors to help them move in the right direction. The mentors offer general business advice, go-to-market strategies, business growth strategies, industry knowledge, and more. For startups-participants, a targeted selection of a mentor is carried out to develop an idea and business. A simplified consultation can be provided not only to representatives of companies participating in the incubator, but also to external users.

^[79]https://www.nus.edu.sg/about

^[80]https://enterprise.nus.edu.sg/supporting-entrepreneurs/nus-start-up-runway/growth-stage/support-services/ ^[81]https://enterprise.nus.edu.sg/education-programmes/nus-overseas-colleges/nhouse/

Professional support

Growing a company involves more than just developing the business and generating revenue. There are tasks on the backend that require increased attention from startup team.

As part of the dedicated support it is provided to members, NUS Enterprise engages professionals to provide one year of free corporate secretary and basic accounting / tax services. In addition, there is a help for startup with marketing communications.

Accounting

NUS Enterprise provides free accounting services to member companies in the first fiscal year through the designated financial services advisor. The incubator companies can then benefit from subsidized rates for such services. As part of the free service, incubator companies can count on the scope of work listed below during their first financial year:

- Consulting on financial accounting includes general accounting, preparation and control of processes, etc.
- Setting up a proper accounting system chart of accounts, petty cashier, etc.
- Provide and implement an accounting software system that meets the needs of start-up companies.
- Prepare semi-annual / quarterly financial statements (based on volume) trial balance, P&L and balance sheet, general ledger lists, cash flow statements, bank reconciliation reports, trade receivables and payables lists, etc.
- Preparation of unaudited annual financial statements (one financial year) for submission at the AGM in accordance with the requirements of the Companies Act for filing with ACRA and tax reporting with IRAS.
- Prepare tax calculations and tax tables for ECI in IRAS and Form C filing.
- Accounting and bookkeeping services (less than 45 transactions per month or 540 transactions in the current fiscal year) to prepare and submit reports for the current fiscal year and annual accounts.

Legal and corporate secretary

NUS Enterprise provides free legal and corporate secretary services to member companies in their first year of incubation through a dedicated legal advisor. The incubator companies can then benefit from subsidized rates.

Marketing communications

NUS Enterprise provides public relations and marketing support to its customer care professionals and incubator companies to help them establish themselves in the market or make announcements about their products and services.

Hotdeskers support is offered on an individual basis, depending on the type and nature of the ads. For incubator companies, NUS do its best to help them move forward through various types of support, such as:

- Recommendations on a PR approach that are relevant to the needs of the company
- Compilation and distribution of press releases (up to 3 per year)

- Publication of company-related stories in the media as needed.
- Anti-crisis communications, if necessary
- Raise visibility and awareness in the community, for example, by profiling the startup company on posters to be posted around NUS, photo sessions about company founders and / or products, articles on company achievements in NUS Enterprise newsletters, website and other relevant channels

Networking

Building a business network of contacts is an important aspect of a company's growth. NUS Enterprise provides opportunities to form a business network through numerous networking events. Industry experts, business angels, venture capitalists and mentors are open to dialogue and can help members take their startup to the next level.

At the same time, members can communicate, interact and learn from the experiences of other startups in the NUS Enterprise ecosystem. NUS community offers resource sharing.

Expansion abroad

For a startup, going abroad and launching sales in the international market can be extremely challenging. To facilitate it, it is needed the right selection of partners who will help a startup gain the necessary experience. The tools and capabilities of NUS-Enterprise will help startups scale and expand in the marketplace.

Market analysis

Startups planning to expand into the global market can take advantage of the Start-Ups Go Global program⁸², which provides startups with a grant of up to S \$ 15,000 each to enter international markets, meet with potential clients or partners, and attend industry events to showcase products developed and services.

Overseas launch platforms

At NUS Enterprise, a network of local and overseas partners has enabled us to establish business centers in markets such as China, USA and ASEAN to help startups gain access to those markets. Startups can use our incubation services such as mentoring, networking sessions, hot table services, and more to kickstart their expansion plans.

Offices BLOCK71⁸³

NUS Enterprise initiative based on collaboration and strategic partnerships with renowned corporations and government agencies. It is a technology-driven ecosystem builder and global connector that catalyzes and connects the startup community, spearheads new initiatives, and provides opportunities for mentoring and growth in local and global markets. BLOCK71 embodies the spirit of entrepreneurship, collaboration and partnership, optimizing each organization's unique expertise, university research capabilities and technology, and partners' investment and business acumen to support entrepreneurs.

On the basis of startup support projects, NUS has established industry partnerships with leading representatives of various markets:

^[82]https://www.enterprisesg.gov.sg/keepgrowing/go-global ^[83]www.block71.co

- PIER71⁸⁴ is a program for the development of new solutions in the field of shipping, maritime logistics and solutions for shipbuilding. By combining the possibilities of new technologies, digitalization, capital, ideas and innovations, they create the necessary conditions for young entrepreneurs to enter the market.
- ICE71⁸⁵ (Innovation Cybersecurity Ecosystem at Block71 (ICE71)) is a hub for entrepreneurs in cybersecurity. ICE71, based in Singapore, is a partnership between Singtel Innov8, the venture capital arm of Singtel Group, and the National University of Singapore (NUS) through its NUS Enterprise division. ICE71 strengthens the growing cybersecurity ecosystem in the region by leveraging and developing competencies and deep technologies to help mitigate rapidly growing cybersecurity risks in the region. With the support of the Singapore Cybersecurity Agency (CSA) and the Information and Communication Media Development Authority (IMDA), ICE71 is launching a range of programs designed to support individuals and startups involved in cybersecurity, from developing an idea to creating, accelerating and scaling a cybersecurity kick-off. ICE71's regional knowledge and ecosystem provide entrepreneurs and startups with the support and market entry to scale a successful cybersecurity business in the region.
- **3** DSTA@71⁸⁶ is an open dynamic collaborative innovation laboratory created by the Defense Science and Technology Authority of Singapore (DSTA). Connected to clusters of tech startups, the lab aims to accelerate the creation of local startups by working with them to rapidly advance technology to strengthen the defense and security of Singapore.
- Tencent-NUS Cloud Startup Program is a startup support program created in collaboration between NUS and Tencent Corporation. Competitive startups will have access to corporate cloud products, technical support, online and offline training on Tencent Cloud products and services, marketing support for speaking at Tencent events, and access to support from the Tencent ecosystem.
- **5** Ocean of Opportunities⁸⁷ technology competition for solving business problems in the field of maritime shipping. Within the framework of the competition, there are two tracks of participation:

a. Al.

b. General track.

Participants have the opportunity to present their ideas to a wide range of companies in the market, complete additional free training, get a mentor from the industry representatives and win large cash prizes. Teams also get the opportunity to test the developed solutions at test benches, proving grounds and production sites in real ports.

PIER71

PIER71 designs and implements programs to unlock opportunities in the maritime industry. Bringing together a community of stakeholders, an ecosystem of innovative thinkers, experts in maritime science, technology, entrepreneurial know-how and investment opportunities that seek to digitalize and create a new wave of maritime innovation, they are designed to provide access to markets, demand factors, technology providers, investors and much more.

^[84]https://www.pier71.sg/

^[85] https://ice71.sg/
[86] https://www.dsta.gov.sg/71

^[87]http://ooo.sg/

The project aims to transform Singapore into a vibrant marine ecosystem that is a world-class innovation leader through 3 key areas.

1. Attracting world-class technology enterprises for the digital transformation of the maritime industry

2. Creating a self-sufficient environment that facilitates collaboration for market access, finance, technology and talent

3. Accelerating time-to-market and implementation of innovative and deep technologies in the industry

PIER71 is based on the annual Smart Port Challenge. Every year, we partner with maritime corporations to turn their business challenges into innovation questions and challenges, then collect the best ideas from startups around the world and translate them into PIER71 Accelerate, the fast track to market-ready and sustainable product.

PIER71 Accelerate. The first of its kind in Singapore, is a market validation and customer sourcing program based on world-class entrepreneurship training from NUS Enterprise and specifically designed for the maritime industry. Typically a six-week program exclusively for Smart Port Challenge finalists, workshops and workshops are delivered by industry veterans and subject matter experts. Startups team up with a mentor and connect to maritime corporations, investors, venture capitalists, serial entrepreneurs, and PIER71 resource networks.

ICE71

The Innovation Cybersecurity Ecosystem at Block71 is a hub for cybersecurity entrepreneurs. ICE71, based in Singapore, is a partnership between Singtel Innov8, the venture capital arm of Singtel Group, and the National University of Singapore (NUS) through its NUS Enterprise division. ICE71 strengthens the growing cybersecurity ecosystem in the region by leveraging and developing competencies and deep technologies to help mitigate rapidly growing cybersecurity risks in the region.

With the support of the Singapore Cybersecurity Agency (CSA) and the Information and Communication Media Development Authority (IMDA), ICE71 is launching a range of programs designed to support individuals and startups involved in cybersecurity, from developing an idea to creating, accelerating and scaling a cybersecurity kick-off. -UPS. ICE71's regional knowledge and ecosystem provide entrepreneurs and startups with the support and market entry to scale a successful cybersecurity business in the region.

Key components of the ICE71 platform:

1 ICE71 Scale is designed to help international and local startups grow their businesses in Singapore and the Asia Pacific region. As part of our program, members will reside at ICE71, opening up operations in the Asia Pacific region. Every startup will have access to office space and space, the ability to leverage long-term support and expertise through mentoring, networking events, workshops, and access to enterprise-grade go-to-market and cybersecurity resources such as cybersecurity. -range to test and demonstrate your solutions.

Singtel Innov8 Corporate Venture Capital Fund provides startups with opportunities to leverage a global network of investors, corporations and mentors while gaining access to markets in the region through the ICE71 community, connections through

NUS and other government and corporate partners. As the first hub for cybersecurity startups in Singapore and a region with a global presence, we see ourselves as a natural launching pad for startups looking to enter the Asia Pacific market. As the leading hub for cybersecurity innovation for startups in the Asia Pacific region, we pride ourselves on offering key connections for our startups. By connecting to our ecosystem, each startup will have the opportunity to receive long-term support in the form of networking and workshops in the ICE71 community.

- 2 ICE71 Inspire Seeks out talented cybersecurity professionals. The main objective is to inspire people to further improve their cybersecurity skills, as well as provide a framework for those who want to research problems and come up with ideas and solutions related to cybersecurity entrepreneurship.
- **3** ICE71 Community Connect, learn and grow with like-minded people interested in cybersecurity. Members of the ICE71 community gain access to a variety of development opportunities in the ecosystem: knowledge sharing events, networking, opportunities to demonstrate their cybersecurity skills and others.

The differences in the organization of work with industrial partners are striking from country to country and from region to region.

The focus of the EU member states is the internationalization of startups, in other words, the attraction of teams from outside for the technological development of the European Union region, with the involvement of the largest industry representatives to sponsor projects, search for talent and promote university scientific developments.

In the Asia-Pacific region, the development of its own startup teams with subsequent scaling to international markets is considered a priority, while cooperation with business is implemented in the form of attracting funding, identifying technology bottlenecks in practice, forming industrial tasks to be solved by startups and young teams of entrepreneurs.

Industry partners in the Asia-Pacific region act more as consumers of solutions and new ideas, in the EU, on the contrary, as consumers of technologies and personnel.

The regional experience of the Asia-Pacific region in terms of organizing communities on a sectoral basis, aimed at solving specific problems of the industry with the help of startups, looks promising and can be a tool for organizing cross-border cooperation between Russia and Finland.

Chapter 3.

Analysis of the development of student startups in the border region of Russia and Finland

Overview of the Finnish startup ecosystem in 2020⁸⁸

According to research by the StartupBlink Ecosystem Report, Finland is among the top 20 countries in the world with the highest rates of startup activity.

Finland is ranked second in Scandinavia after Sweden, but remains in the top 20 destinations for startups (13 in the world in 2020). Helsinki, which saw a slight decrease in activity, is now 39th in the world, 11th in Europe and 8th in the EU. Tampere swapped places with Oulu in a year and now ranks 2nd in the country and 325th in the world. Meanwhile, Oulu dropped 106 positions to 343. Turku moved up 119 positions in 2020 and took 395th place.

National Rank	City	Global Rank	Rank Change	Total Score
1	Helsinki	39	-3	8.349
2	Tampere	325	+22	0.526
3	Oulu	343	-106	0.471
4	Turku	395	+119	0.385

Picture. Key cities in Finland by start-up activity, StartupBlink 2020 rating

In addition, Finnish startups attract the most venture funding.



VC investments into European startups(source⁸⁹)

^[88]Startup Ecosystem Rankings 2020

^[89]https://paaomasijoittajat.fi/en/finnish-startups-attract-the-most-venture-capital-investments-in-europe/

Overview of the start-up ecosystem in Russia in 2020⁹⁰

Russia is ranked 17th in the world ranking after falling by 2 positions since 2019, but Moscow in 2020 rose by 1 position and is ranked 9th. In the European region, Russia ranks 11th, and Moscow is in the top 3 cities. Growth trends were not observed in other regions: St. Petersburg fell by 68 points and left the top 100. Other significant falls include Kazan and Novosibirsk. The authors of the rating note that small Russian cities have significantly grown their ecosystems - this applies to Ulyanovsk, Ufa, Perm, Samara, Taganrog and Kaliningrad. This is a positive trend showing that entrepreneurial initiative and start-up activity is spreading to lesser-known regions of the country. Russian ecosystem developers should make an effort to maintain their position as a world leader, as well as make sure other cities in the country join it as soon as possible.

National Rank	City	Global Rank	Rank Change	Total Score
1	Moscow	9	+1	22.055
2	Saint Petersburg	147	-68	1.919
3	Kazan	341	-111	0.477
4	Novosibirsk	366	-135	0.423
5	Chelyabinsk	526	-26	0.225
6	Yekaterinburg	542	-41	0.214

Picture. Key Russian cities by start-up activity, StartupBlink 2020 rating

According to RBC⁹¹, the number of young entrepreneurs has been growing in Russia over the past five years. So, from 2014 to 2019, more than three times - from 4.4 to 14.5%, entrepreneurial activity increased in the age group from 18 to 24 years, and almost doubled - from 9.8 to 19% - in aged 25 to 34, according to the Global Entrepreneurship Monitor (GEM) of the Graduate School of Management, St. Petersburg State University and Sberbank.

In Moscow, for example, 13,000 private entrepreneurs have not yet reached the age of 25. Another 50 thousand residents of the capital under the age of 25 are founders and the same number are heads of companies, says Alexei Fursin, the Head of the department of entrepreneurship and innovative development of the city of Moscow.

Early entrepreneurial activity is facilitated by the transition of the economy to the online, says Alexander Gapon, manager of the strategic and operational consulting practice of KPMG in Russia and the CIS. The Internet penetration rate in Russia is 81%, while the world average is 59%. Young people are better aware of the latest technologies, trends and new ideas, so they show more enthusiasm, says Sergei Katyrin, President of the Russian Chamber of Commerce and Industry (CCI).

According to the Center for Youth Initiatives of the ASI, 88% of high school students and students want to develop a business or are already doing it.

It is no coincidence that in July of this year, the minimum age threshold for registering as self-employed was lowered from 18 to 16 years old.

Moreover, Russian statistics are contrary to foreign ones. As noted in KPMG, in the United States, the share of youth in entrepreneurship over the past 25 years has fallen 2.5 times (from 10 to 4%), in the EU it is also decreasing: over the past ten years - from 2.7 million to 2.5 million human.

However, more than 50% of young people surveyed by ASI are afraid to start their own business due to lack of knowledge and lack of business skills. Startup courses and degree programs help with that. Also there is an opportunity for students to try themselves in business while getting a non business related degree such as defending a startup. In section 2.1.3 we revealed Russian law according to which in Russian universities students can choose to defend orthodox thesis or startup.

ITMO University (Russia)⁹²

From 2019 students can defend their startups instead of thesis. Startup team should consist of several ITMO students to be suitable for that. Each startup has a thesis supervisor(s) and mentor.

To defend startup students should make a presentation, fill up a verification list (assessment of business idea by experts) and prepare a degree specific part. In the verification list expert council sums up opinions of reviewers feedback on startup's technology, intellectual property, market, investment appeal. Startup team presents the startup all together. Each has 10-15 minutes to talk. The commission assesses students individually.

Experts from council give master classes on their competence field and assess startups at the end. They also help ITMO University to develop conditions for technological and social startups flourishment.

Case. HELSEED student startup programme⁹³

HELSEED is a student startup programme encouraging students to entrepreneurial path. Programme also aims to support and provide information to startup teams at different stages. Helsinki University Funds will make €10,000 - €50,000 seed investments to most promising startups. The programme is organised by the University of Helsinki and Helsinki Think Company. The programme is open to teams with at least one attending undergraduate or postgraduate student at the University of Helsinki.

The University of Helsinki Funds makes seed investments in the most interesting startups. The programme is ideal for teams that have an interesting idea, but have not yet established a company, as well as for teams who have already founded a company. The first HELSEED programme was organised in 2020. More than 20 teams participated in the programme, which also generated a great deal of interest among various stakeholders. So far, the University of Helsinki Funds has invested in two companies, €30,000 each. These companies are Evergreen Viherseinät Oy and Evexia Oy. The HELSEED endowment fund was established in early 2021, and the aim is to increase its capital through donations and return on investment. The first anchor donor was Tradeka

^[92]https://drive.google.com/file/d/10MVYqqVK2aRjPm1eSaluCmQWjptvBf9t/view ^[93]https://www.helsinki.fi/en/about-us/strategy-economy-and-quality/university-finance/helseed

Foundation with a donation of €50,000.

In the HELSEED student startup programme, students work on their business ideas or existing startups to develop a business plan. The Think Company team support the process, by organising HELSEED workshops that provide information and tools from refining an original idea and selecting a business model to developing a business plan and negotiating with investors. Participants can choose a suitable workshop or attend all of the workshops. The workshops are voluntary and open to all those interested in entrepreneurial skills, and do not require participation in the funding application process organised by the University of Helsinki Funds. Teams are welcome to work on their ideas, business plans and pitches in the Helsinki Think Company facilities when they are open. Helsinki Think Company has facilities at all University of Helsinki campuses. Due to the closure of premises as a result of the Covid-19 pandemic, please check the Helsinki Think Company website for facility opening hours.

The University of Helsinki Funds will invest €10,000-€50,000 seed funding in the most promising startups. The terms of funding will be agreed separately.

Case. Haaga-Helia StartUp School⁹⁴

Haaga-Helia StartUp School was founded in Helsinki in 2012 to support student entrepreneurship. StartUp School combines entrepreneurship studies with learning through experimenting and coaching – and getting results by doing. StartUp School provides an innovative concept to develop entrepreneurship education, new ways of learning and enhance entrepreneurial culture within organizations. The approach supports students in learning skills required in future work life and the ability to establish new businesses and develop existing ones.

Collaborative networks reaching from one continent to another and the latest entrepreneurship research is available for students through several research and development projects, as well as partner organizations. The StartUp School model as a university-linked business incubator gathers interest around the world, and is one of the spearheads of Finnish education export.

They offer hands-on assistance, courses and events that support students in finding their passion, establishing new business or developing an on-going business while earning credits at the same time. The StartUp School operates across all five campuses and collaborates with all Haaga-Helia study programs. A student can start studying at StartUp School any time of the year.

Case. Minor of the HSE University. Startup from scratch: the practice of creating your own business⁹⁵

Available in the cities: Moscow, St. Petersburg, Nizhny Novgorod, Perm

Within the framework of the Startup from Scratch Minor, students get acquainted with various areas of entrepreneurship and go from searching for an idea to their own startup, bringing it to the market and attracting investments.

Minor is focused on a lot of practical work. All assignments are steps to create a startup so that the student gradually builds his business with the support of practicing teachers who will provide relevant tools and constructive feedback.

^[94]https://startupschool.fi/for-students/

^[95]https://electives.hse.ru/minor_startup/

Based on the results of the minor, the creators expect that the student will not only make his own startup from scratch, but will also receive investments for its development.

Minor Startup from scratch is practice-oriented and consists of 4 disciplines:

- Idea for a startup, gathering a team, testing an idea, creating a minimum viable product.
- In the second learn how to promote your product and go out to sales.
- In the third, choose investors and prepare your startup for investment.
- In the fourth, set up business processes and scale your business.

Case. The first all-Russian accelerator for students, graduate students, researchers of institutes and universities from "Sberbank"⁹⁶

The accelerator program was developed by the Stanford Professional Development Center. The accelerator will be held in three stages from March 1 to August 31, 2021, and you can take part in it absolutely free.

The SberStudent accelerator for Russian students is an opportunity, under the guidance of mentors from Stanford Online, to learn to think like an entrepreneur, to learn from the invaluable experience of organizing and developing a business from the best entrepreneurs and professors of Silicon Valley. The program will allow participants to master innovative thinking skills, learn how to assess the potential of turning a business idea into a full-fledged business, analyze product-market fit, build an architecture of business models, formulate goals, turn them into metrics and plans, assess the necessary resources, including financial ones, in order to achieve them, find large customers, partners and get the first investments for development, and most importantly, implement a working startup product and monetize it.

The best teams will receive additional resources for the development of their project and the support of mentors from Stanford Online, as well as the opportunity to present the project to more than 60 companies of the Sber ecosystem, the largest Russian and international corporations and investors at the final demode at SberUniversity.

Case. Venture Investment Fund of the Republic of Karelia⁹⁷

The fund creates conditions for the development of innovative projects and technology companies in Karelia and contributes to the digitalization of the republic's economy. Anyone who has an innovative idea and a desire to implement it can contact us.

The fund provides financial and information and consulting support to innovative startups at all stages from the design of an idea into a project to scaling up the business. The goal is to develop innovative companies in the republic through financing, consulting and other forms of support. We strive to become the most efficient regional venture capital fund in Russia.

To achieve the goal, the Foundation:

 Provides financial support to subjects of activity in the field of innovations implementing projects in the field of innovation, scientific and technical activities in the territory of the Republic of Karelia

^[96]https://sberstudent.sberclass.ru/

^[97]https://startup.karelia.ru/o-fonde

- Provides information and consulting support to subjects of activity in the field of innovation
- Creates conditions for effective interaction between innovation actors, commercial and non-commercial organizations, state authorities and local governments in the interests of developing innovative activities in the Republic of Karelia
- Carries out the selection of projects and programs in the field of innovations, scientific and technical activities, including technical, economic, financial, investment, legal, marketing and organizational and managerial expertise, to provide financial and other support measures in accordance with the legislation of the Russian Federation and the Republic of Karelia
- Provides control and monitoring of the implementation of projects in the field of innovation, scientific and technical activities, which are provided with financial support
- Attracts venture capital in projects that meet the priorities of the innovation policy of the Republic of Karelia
- Provides financial support for innovative projects
- Assists in the implementation of investment projects in the Republic of Karelia

The border region of Russia and Finland is a fertile ground for the development of student startups. A large number of universities, the activity of public authorities, development projects allow building a long-term strategy of interaction between interested actors in the region, which will increase the density of startups, related services and the overall flow of investments.

Outcomes on the pilot survey on Students Technology Entrepreneurship

As part of the preparation of this analysis we conducted a pilot survey of students about entrepreneurial technological projects including startups during their studies. We gathered 52 answers from Russia, Finland, Latvia, Lithuania and Germany.

The purpose of this block of work was to outline the general trends of student entrepreneurship, which were further covered in more detail in this report through case studies and analysis of best practices. In addition, the pilot survey allows us to get an opinion on student entrepreneurship and startups on first-hand base - the students themselves, who are the target audience for entrepreneurship support services.

Are you interested in technological enterpreneurship?



Do you have experience in technological enterpreneurship?



Most of the respondents rated their entrepreneurial experience 3-4 on a 5-point scale, but almost 1/5 rated this experience very low - from 0 to 2, and only one person from the University of Turku noted that the experience can be assessed at the maximum point.



Have you participared in accelerator/pre-accelerator with a project?

One respondent noted that he was in the accelerator in the first semester of the first year. It was a bad experience, there is nothing to do without competencies or ideas.

Do you participate in activities that promote entrepreneurial thinking (for example, lectures or seminars from business experts, summer schools, etc.)?



Most of the respondents rated their participation in entrepreneurial activities at 4 points. Lots of maximum rates were from students from Kaunas University of Technology, also some students from ITMO University and Higher School of Economics from Russia rated their experience at 5.

Have you ever participated in student entrepreneurial initiatives/clubs?



Do you think the University (where you study) has the infrastructure and technical capabilities to develop technology entrepreneurship and/or startups?



Do you use prototyping centers, manufacturing laboratories, engineering centers at the university, if necessary?



With regard to the assessment of the quality of entrepreneurial services and opportunities at the university where the respondents study, the answers were mostly positive. Most of the ratings were 4 or 5 out of 5 possible.

Chapter 4.

Recommendations in the field of support and development of startups by students in the perspective of economic growth and international cooperation between Russia and Finland

The most interesting ideas from support measures highlighted in the analysis can be taken as a basement to make recommendations.

Supporting research commercialization opportunities, reporting success stories in media advertising

Universities educational initiatives:

- Universities should not just create amount of startup and entrepreneurial educational programs for those who are sure they want to create a startup, but also give an opportunity for others to try it on during a course, for example on minors.
- Having an opportunity to defend startups instead of traditional thesis gives students more time to work on their idea. And because in universities with this opportunity there are different ways of support as mentors and special courses, startups will be more thought through. And it gives a chance for non-business students to try themselves in business and get a specialization degree
- **3** To overcome limitations of existing management approaches to the development of student startups:
 - Business needs competent personnel who can work to diversify the product and service line, invent and commercialize new products, enter new markets, so entrepreneurial competencies are in great demand^{98,99}. Students are not en masse as highly qualified entrepreneurs, and despite the entrepreneurial training at the university, business is forced to work to improve the professional qualities of students¹⁰⁰, however, a similar situation occurs in the market of any competence. Students developing a startup instead of classic thesis get a double benefit. In case of a successful entrepreneurial initiative, they become successful business owners, in case of failure, they gain experience that is so demanded in industries.
 - The introduction of student start-up credits into the practice of universities as final qualifying works will have a positive impact on the development of entrepreneurship, since it will become familiar as other classically taught subjects and will become part of the practical use of universities. It will cause greater trust and encouragement for entrepreneurship from society as a whole.

^[98]Grishina O.A. et al. The concept of sustainable development of an educational institution // Bulletin of the Russian University of Economics. G.V. Plekhanov. 2013. No. 3 (57). S. 5-22.

¹⁹Zavyalova N.B., Saginova O.V. Project work of students: how to improve the result // Creative Economy. 2017.Vol. 11.No. 9.P. 943-952. doi: 10.18334 / ce.11.9.38328

^[100]Saginova O.V., Grishina O.A., Shtykhno D.A. Project-Based Education of Students Based on Orders of Small and Medium-Sized Business Structures // Russian Journal of Entrepreneurship. 2017.Vol. 18.No. 3.P. 417-425.

- Since the implementation of an entrepreneurial project requires the investment of not only time, intellectual resources, but at some point financial resources, especially when we talk about a technology start-up, the key measure of support is infrastructure development - access to equipment and specialized software, shared use and governance. It is the infrastructure costs that are the most burdensome, especially at the stage of creating a minimum viable product.
- Risks of students startup-building activities:
 - O The practical orientation of work on a startup and insufficient theoretical training of a student can potentially negatively affect his career opportunities if the student decides to change the field of activity from entrepreneurial to another¹⁰¹.
 - O Students who have developed a startup as a diploma instead of classical scientific thesis, should not be perceived as having an advantage over students who studied in a more scientific-based, theoretical level and got their qualifications according to the classical model. Not all employers need exactly the entrepreneurial skills of employees¹⁰².
 - According to an OECD study, startups founded by researchers are more likely to own patents and intellectual property, while those founded by students are more likely to innovate more radically than other startups. At the same time, startups founded by undergraduate students receive less venture funding and are less likely to go to an IPO or takeover, while startups created by researchers are just as successful as their non-academic counterparts¹⁰³.
 - According to a 2018 study, older people are several times more likely to be successful in building a tech startup than younger people under 30, which is due to the deeper and broader professional and life experiences of the former¹⁰⁴.

^[101]Shtykhno D.A., Iskandaryan R.A. Student startups as a tool for developing entrepreneurial skills // Economics: yesterday, today, tomorrow. 2019.Vol. 9.No. 2A. S. 252-262.

^{102]}Shtykhno D.A., Iskandaryan R.A. Student startups as a tool for developing entrepreneurial skills // Economics: yesterday, today, tomorrow. 2019.Vol. 9.No. 2A. S. 252–262. ^[103]http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=DSTI/CIIE(2018)13/FINAL&docLanguage=En

^[104]https://insight.kellogg.northwestern.edu/article/younger-older-tech-entrepreneurs

Conclusion

The business environment is changing rapidly all over the modern world, mid-sized and large companies shape the demand for agility, and startups provide the right marketing agility, agility, and an innovation-friendly culture. This culture allows to quickly learn and quickly develop new business models. Therefore, businesses are creating a request for startup entrepreneurship as a skill. For this reason, businesses are creating a request for startup entrepreneurship as a skill. Accordingly, there is a need to establish training programs, a startup format as a diploma and modern methods of entrepreneurship (working with clients, business canvas, lean startup, and so on). Following this systematic approach, start-up entrepreneurship itself is an ongoing process of learning to deal with new trends, patterns and changing contexts.

The developed countries foster knowledge and innovation-based economy and bring support measures for student start-ups. In XX century most innovations came from the large corporations that had R&D departments and had collaborations with universities' labs. Support measures for student startups at the regional and city level are aimed at encouraging, inspiring and funding student startups. There are elements of a startup ecosystem in cities such as accelerators, incubators, technoparks, etc, that provide more hands-on support but they are in general for entrepreneurs and not only for students so they will not be reviewed here. Student start-up are supported at the university level. Universities as innovative hubs with an access to a handful of researchers, modern equipment, creative innovators, wide range of partners have a unique opportunity to be a motherland of startups. Student startup is supported by different measures depending on the level either country, region or university. At a state government level there are offerings of funding schemes through innovations competitions. At a regional and city level authorities also create startup competitions. But also provide media coverage, educational opportunities and access to innovation infrastructure. In some places all the innovation activity is united by one organization (like in Kerala) that creates an ecosystem of interconnected startup support actions. Universities support startup culture and mindset. For that they have educational programs, startup events, co-workings, accelerators, incubators, etc.

For the successful development of a student startup, a support infrastructure is needed that will allow access to laboratory equipment and facilities, equipment for prototyping and evaluation of a prototype quality. Various organizations have solved this problem through the formation of databases and digital navigators of equipment and services. Cooperation between universities and industrial partners within a common ecosystem creates opportunities for students' startups. For that university should define the strategic orientation of towards the development of an entrepreneurial culture and the stimulation of start-ups. A wide network with industrial partners give universities possibility to boost startups offering them to obtain funds, expertise and infrastructure. In 2020 the contribution of the Asia-Pacific region to the startup ecosystem exceeded the indicators of the EU. The Asia-Pacific region is the fastest growing and developing region¹⁰⁵ in these terms that is the reason that some cases demonstrate practices of the Asia-Pacific region. The focus of the EU member states is the internationalization of startups, in other words, the attraction of teams from outside for the technological

^[105]Shtykhno D.A., Iskandaryan R.A. Student startups as a tool for developing entrepreneurial skills // Economics: yesterday, today, tomorrow. 2019.Vol. 9.No. 2A. S. 252-262.

development of the European Union region, with the involvement of the largest industry representatives to sponsor projects, search for talent and promote university scientific developments. In the Asia-Pacific region, the development of its own startup teams with subsequent scaling to international markets is considered a priority, while cooperation with business is implemented in the form of attracting funding, identifying technology bottlenecks in practice, forming industrial tasks to be solved by startups and young teams of entrepreneurs. Industry partners in the Asia-Pacific region act more as consumers of solutions and new ideas, in the EU, on the contrary, as consumers of technologies and personnel. The regional experience of the Asia-Pacific region in terms of organizing communities on a sectoral basis, aimed at solving specific problems of the industry with the help of startups, looks promising and can be taken as an example for organizing cross-border cooperation between Russia and Finland.

The border region of Russia and Finland is a fertile ground for the development of student startups. A large number of universities, the activity of public authorities, development projects allow building a long-term strategy of interaction between interested actors in the region, which will increase the density of student startups, related services and the overall flow of investments.

References

1. Grishina O.A. et al. The concept of sustainable development of an educational institution // Bulletin of the Russian University of Economics. G.V. Plekhanov. 2013. No. 3 (57). S. 5-22

2. PUBLIC RESEARCH AND INNOVATIVE ENTREPRENEURSHIP Preliminary cross-country evidence from micro-data

http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=DSTI/CIIE(2018)13/FINAL&d ocLanguage=En

3. Saginova O.V., Grishina O.A., Shtykhno D.A. Project-Based Education of Students Based on Orders of Small and Medium-Sized Business Structures // Russian Journal of Entrepreneurship. 2017.Vol. 18.No. 3.P. 417-425.

4. Shtykhno D.A., Iskandaryan R.A. Student startups as a tool for developing entrepreneurial skills // Economics: yesterday, today, tomorrow. 2019.Vol. 9.No. 2A. S. 252-262. Российское предпринимательство. 2017. Т. 18. № 3. С. 417-425.

5. Shtykhno D.A., Iskandaryan R.A. Student startups as a tool for developing entrepreneurial skills // Economics: yesterday, today, tomorrow. 2019.Vol. 9.No. 2A. S. 252-262.// https://digital.gov.ru/ru/activity/directions/858/

6. Eric Rees. Business from scratch. Lean Startup Method for Rapid Testing of Ideas and Choosing a Business Model = The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses. - M .: Alpina Publisher, 2014 .-- 256 p. - ISBN 978-5-9614-4628-9.

7. http://ooo.sg/

8. http://publishing-vak.ru/file/archive-economy-2019-2/22-shtykhno-iskandaryan.pdf

9. http://sci-eq.misis.ru:81/,

http://sci-eq.misis.ru:81/Equipment/Detail/?UserKey=---Tegramin---25-#tabs-2

10. http://www.morpheuscup.com/

11. http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=DSTI/CIIE(2018)13/FINAL & docLanguage=En

12. http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=DSTI/CIIE(2018)13/FINAL & docLanguage=En

13. http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=DSTI/CIIE(2018)13/FINAL & docLanguage=En

- 14. http://www.startupgenome.com/
- 15. https://cki.rwth-aachen.de/en/collaborative-research-centres/MindSphereLounge
- 16. https://data.southampton.ac.uk/facilities.html
- 17. https://electives.hse.ru/minor_startup

18. https://enterprise.nus.edu.sg/education-programmes/nus-overseas-colleges/nhouse/

19. https://enterprise.nus.edu.sg/supporting-entrepreneurs/nus-start-up-runway/growth-stage/support-services/

20. https://ice71.sg/

21. https://insight.kellogg.northwestern.edu/article/younger-older-tech-entrepreneurs
 22.https://minobrnauki.gov.ru/press-center/news/?ELEMENT_ID=25900https://paaomasijoittajat.fi/en/new-startup-funding-package-announced-in-finland/

23. https://nccr-robotics.ch/industry/spin-fund-grant/

24. https://new.siemens.com/cn/en/company/fairs-events/innovation-day.html

25. https://raven.cam.ac.uk/auth/authenticate.html?ver=2&url=http%3A%2F%2F www.equipment.admin.cam.ac.uk%2F&desc=Research+facilities+and+equipment+at+Cambridge

26. https://sk.ru/

27. https://spbu.ru/nauka/oborudovanie-spbgu

28. https://steveblank.com/2010/01/25/whats-a-startup-first-principles/

29.https://uclouvain.be/fr/etudier/cpme/cours-et-memoire.htmlhttps://www.esade.edu/en/programme s/masters/msc-programmes/our-programmes/innovation-entrepreneurship/academics/curriculum

30. https://uclouvain.be/fr/etudier/cpme/masters-120-offrant-l-acces-a-cpme.html#collapseExample1

- 31. https://www.afred.ca/about/
- 32. https://www.bridge.ch/en/
- 33. https://www.dsta.gov.sg/71
- 34. https://www.enterprisesg.gov.sg/keepgrowing/go-global
- 35. https://www.epfl.ch/innovation/startup/
- **36.** https://www.epfl.ch/innovation/startup/community/ecosystem/
- 37. https://www.epfl.ch/innovation/startup/services/
- 38. https://www.esabic.ch/

39.https://www.esade.edu/en/programmes/masters/msc-programmes/our-programmes/innovation-e ntrepreneurship

40. https://www.esade.edu/en/programmes/masters/msc-programmes/our-programmes/innovation-e ntrepreneurship/academics/curriculum

- 41. https://www.esade.edu/itemsweb/wi/MIE.pdf
- 42. https://www.eu-startups.com/
- 43. https://www.eu-startups.com/become-a-sponsor/

44. https://www.eventbrite.de/e/eu-startups-summit-tickets-63330019794 https://startupmission.kerala.gov.in/student-schemes

45. https://www.exist.de/EN/Programme/EXIST-Business-Startup-Grant/content.html

46. https://www.forbes.com/sites/adigaskell/2016/04/05/how-can-student-entrepreneurship-be-encour aged/?sh=4ae234fc30d0 https://www.morpheuscup.com/about

47. https://www.forskningsradet.no/en/call-for-proposals/2020/student-entrepreneurship/ https://stip.oecd.org/assets/TKKT/CaseStudies/12.pdf

48.https://www.imperial.ac.uk/business-school/programmes/msc-innovation-entrepreneurship-management/

49. https://www.imperial.ac.uk/research-and-innovation/research-office/support/research-facilities/rese arch-facilities-directory/

50.https://www.innosuisse.ch/inno/en/home/start-your-innovation-project/projekte-ohne-umsetzungs partner.html

51.https://www.kingston.ac.uk/virtual-tour/roehampton-vale/

52. https://www.ko2.co.uk/global-vc-investment-index/ https://startupsauna.com/https://www.imperial.ac.uk/enterprise/business/incubator/ http://www.oecd-nea.org/rtfdb/public/search

53. https://www.mcei.de/startup-support/mcei-support/theses-inside-the-venture https://www.unternehmertum.de/en/services/tum-entrepreneurial-masterclass https://startupgenome.com/article/rankings-top-40

54. https://raven.cam.ac.uk/auth/authenticate.html?ver=2&url=http%3A%2F%2F www.equipment.admin.cam.ac.uk%2F&desc=Research+facilities+and+equipment+at+Cambridge

55. https://www.nus.edu.sg/about

56.https://www.oecd-ilibrary.org/sites/9789264292048-en/index.html?itemId=/content/publication/978 9264292048-en&_csp_=61270420bee1db46d1538aa54ae33023&itemIGO=oecd&itemContentType=book#fr01

57. https://www.pier71.sg/

58.https://www.research-facilities.ox.ac.uk/

59.https://www.research-operations.admin.cam.ac.uk/about-us/bulletin/item/research-facilities-and-eq uipment-database-launched

- 60. https://www.rwth-aachen.de/go/id/a/?lidx=1
- 61. https://www.rwth-aachen.de/go/id/duyk?lidx=1
- 62. https://www.rwth-innovation.de/en/
- 63. https://www.rwth-innovation.de/en/
- 64. https://www.southampton.ac.uk/research/facilities/facilities-equipment-database.page

65.https://www.startupindia.gov.in/content/dam/invest-india/Templates/public/Kerala%20Startup%20 Ecosystem%20Report%202019.pdf

https://www.startupindia.gov.in/content/dam/invest-india/Templates/public/Kerala%20Startup%20Poll cy%202017.pdf

https://itmo.ru/images/pages_trans/40/ITMO%20University%20Strategy%202027_Eng.pdf

- 66. https://www.tesi.fi/en/ https://stats.oecd.org/
- 67. https://www.tum.de/en/innovation/entrepreneurship/
- 68.https://www.unternehmertum.de/en/services
- 69.https://www.vedomosti.ru/technology/articles/2020/12/09/850144-tehnologicheskie-startapi
- 70. https://www.wiwi.rwth-aachen.de/go/id/hzj/?lidx=1
- **71.** www.block71.co