Talent Acquisition Model
Identifying the right talent for the right jobs
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About MY-GATEWAY
Startup Europe initiative which aims to strengthen the capacities of high-tech startups and innovative SMEs in the Central and Eastern European region to become better connected, gain higher market exposure and have improved, streamlined access to funding opportunities and talent.

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Rapid changing social and business environments are visible in every aspects of life influenced by the new innovative age. On industry level, technology today is creating diverse and novel jobs, and next generations will have to be equipped with different skills and talents in order to efficiently adapt to the new age. One of the key pillars of the future work ecosystem will also be to identify the right talent needed for the right work positions. Based on the (Racounter, 2017) report, the biggest challenge for digital technology businesses and future of work will be the access to talent.

As future of work becomes more virtual, diverse and culturally different, the need for better ways and skills to manage time, people and resources will be crucial.

Since the new industrial changes are moving faster than ever predicted, the learning and teaching curves in universities have to be redesigned to go side by side with the digital era. Higher educational institutions, as the pillars of educational system, have the crucial challenge to reduce the gap between the demand for new talent on the work market while enabling opportunities for students to become skillful entrepreneurs. As startups are recognized as the growing trend of the last decade, future of work will include many young entrepreneurs trying to found a startup in their local and global ecosystem.

Right motivation, soft skills, hard skills and having an active startup culture can offer an answer for the future challenges of universities and overall better work performance. Today’s business leaders are also recognizing the significance of 21-century skills. Soft, 21-century skills can represent the missing link between disruptive innovative systems, startups, future of work and people. Having all these facts in mind, development of talent should be more strategically integrated in the curriculum of educational institutions. Higher educational institutions have to recognize and design the curriculums which create innovative, empathic, creative problem solvers to confront increasingly complex global problems by founding a startup or having the skills and entrepreneurial mindset required to adapt to the new digital age.
In order to provide the necessary information for talent model development this Model includes different fields that range from startup ecosystems, university entrepreneurial environments, individual motivations, skills and different knowledge resources.

This Model is designed to include the following sections: university entrepreneurial environment and ecosystem stakeholders, emerging skills, future trends, entrepreneurial skills – soft, hard (technical), digital and financial and online learning platforms. Each university within its faculties usually has strategic goals for entrepreneurship development. The only difference is which level of development universities are currently developed (by different categories), and in what kind of local market and ecosystem universities coexist in. Furthermore, the Talent Acquisition Model identifies the entrepreneurial pillars of universities and gives information on possibilities, strengths and environments that a university startup ecosystem currently possesses according to the students’ perspective.

The Talent Acquisition Model\(^1\) document is designed in two parts (Figure 1). The first part, represents literature, research and findings about startup university ecosystems, entrepreneurial environments, skills and future learning and technology trends. The first part is used as a base for the Model design and it includes chapters as the pillars of the Model.

The second part of the document represents the structure of research and testing of the Model. The primary goal of this Model is to identify different points of possible talent development in the university setting. As for data collection, a structured Survey was disseminated to the students to identify the four different pillars of talent development in different countries. Based on the literature review and all the information gathered from interviews made with different stakeholders, it was decided to investigate the entrepreneurial possibilities and motivations of universities from the students’ perspective. From the student responses of the Survey each university has been analyzed, and strengths, upgrades in different pillars of the model were identified.

\(^1\) Within this version of Talent Acquisition Model research on literature and findings are presented in a shorter version pointing out key parts of the Model. The detailed version of the Model is available at mygatewayproject.eu/results/reports
1. The goals of Talent Acquisition Model

The Talent Acquisition Model is designed to provide an answer on how to identify key pillars, components and stakeholders of talent development with a focus on entrepreneurship at the university. Talent development in this model consists of different kinds of entrepreneurial, business components and ultimately is connected to the startup ecosystem of the university itself. Therefore, the goals of this Talent Model represent a set of parameters which construct a meaningful matrix used to evaluate the university startup ecosystem from the aspect of the students. It includes the following goals:

- Identifying strength and suggesting upgrades to university entrepreneurial ecosystems.
- Creating a space for increasing the entrepreneurial-related themes in curriculum and faculty setting/environment.
- Enabling the university to create more a sophisticated entrepreneurial structure.
- Taking concrete actions towards talent awareness and development.
- Serving as a platform for students and young innovators, startups and companies, by identifying and realizing the need for diverse set of skills in the startup setting.

This version of the Talent Acquisition Model is designed from the practitioners’ point of view. As such, the intention is to present steps on how to practically use the Model. The first part represents the theoretical background (first five chapters) from which the Model was designed. The second part are the chapters on research and survey design, data collection, model implementation and end result examples from the Talent Acquisition Model, including the scoreboard, detailed analysis and the Survey for data collection.
The development of sophisticated technology trends resulted in a gap of industry requirements and skills lectured by higher educational institutions (HEI). A growing body of evidence recognizes the importance of soft skills in predicting long-term life outcomes, including labor market outcomes as well as social and health behavior (Kautz et al., 2014). **Hard and soft skills are directly connected with higher work performances**, and as such, should be more valued through the process of education, especially in university curriculums. The role of different kind of talents, traits, skills become even more important in understanding future concepts influenced by technology, global movements, new educational trends and available open resources. Individuals, now more than ever in human history, have access to different kind of online learning methods to improve or discover the new soft or hard skills.

Higher educational institutions face the challenge to adopt the novel trends of transferring and teaching skills at the institutions’ curriculums in order to co-design new subjects and skills around a future movement. A successful entrepreneurial university ecosystem will need partnerships and contributions from all stakeholders within and outside the university (Greene PG, 2010). The entrepreneurship ecosystem of active HEI includes collaborations and initiatives amongst startups, scale-ups, student organizations, hubs and accelerators, local and government institutions, the NGO sector, alumni networks, corporations and other HEI. Transfer of knowledge is a constant process taking place in any kind of mentioned collaborations and it can be introduced as the most important factor of the collaborations.

Providing the students focus and topics of interest, offering them a new kind of peer to peer or specific know-how transfer from all the stakeholders of the system, is an integral element of collaboration. Ultimately, we can conclude that an active HEI ecosystem offers the possibility of discovering and building on different kinds of talents and skills for students, researchers and professors.
3. University Entrepreneurial Environment

‘The way we do things around here’ (Lundy O. and Cowling, 1996 p.21) is probably the most-known definition of organizational culture which can be easily used in environmental and cultural setting of universities. The courses, programs, initiatives, activities around entrepreneurship and innovation including high-level diversity can define an entrepreneurial environment. All high education institutions (HEI) use some of the innovative, entrepreneurial, cooperative or practical formats to build their environment, their ecosystem.

University courses curriculums often do not focus on creating a clear link to students between their actions and real-life outcomes, although it would be possible (Rombach et al., 2008) discipline is also important on the level of individual development activities. A major challenge for teaching disciplined software development is to enable students to experience the benefits of discipline and to overcome the gap between real professional scenarios and scenarios used in software engineering university courses. Students often do not have the chance to internalize what disciplined software development means at both the individual and collaborative level. Therefore, students often feel overwhelmed by the complexity of disciplined development and later on tend to avoid applying the underlying principles. The Personal Software Process (PSP). The question that takes priority in providing the real-life and marketable education is what kind of available activities, courses, online or offline educational interaction HEI create in order to have a successful environment. The entrepreneurial ecosystem is made of a set of individual elements — such as ‘leadership, culture, capital markets, and open-minded customers — that combine in complex ways’ (Isenberg, 2010). An entrepreneurial university is a natural incubator that, by adopting a coordinated strategy across critical activities (e.g., teaching, research and entrepreneurship), tries to establish an inspirational learning culture in which the university community can explore, evaluate and exploit ideas transformed into social and economic entrepreneurial initiatives (Kirby, Guerrero and Urbano, 2011).

The Internal environment can be defined as set of different activities within curriculum and university collaborations that enable students, but do not exclude any players in the ecosystem, to gain new skills in the entrepreneurship field. Meaning not all students will found a startup, but the goal is to design an environment where all stakeholders will have novel, structured ways of gaining skills and real hands-on experience of today's startup, digital era world.

The intention of the internal environment is to enable students to apply their advanced skills to deliver meaningful results for their customers (Fagerholm et al., 2018). On that note, universities should have a learning entrepreneurial environment that can enable learning principles, not just for today's work place but, given the advanced technology trends, equip them for the future prospects.
The OECD developed A Guiding Framework for Entrepreneurial Universities as a possible strategic document of incorporating entrepreneurship in the curriculums and making autonomous ecosystems ('A Guiding Framework for Entrepreneurial Universities', 2012). The Guidelines note that in order to develop as an entrepreneurial organization, with an entrepreneurial culture, the entrepreneurial activities should be established in the strategy. It is also stated the universities should have an entrepreneurial structure in place which co-ordinates activities within the institution and with other stakeholders within the local entrepreneurship ecosystem.

Entrepreneurial universities could have an impact on economic concepts connected to human capital, referring to the competencies, knowledge and skills gained in entrepreneurial environment (Gustomo and Ghina, 2017). Therefore, the generation, attraction and retention of talented human capital and entrepreneurs could be considered as an economic impact of entrepreneurial universities (Guerrero, Cunningham and Urbano, 2015). Skills, capacities and knowledgeable generation should be the result of the developed entrepreneurial university focused on creating a sustainable ecosystem.

In their work, (Gustomo and Ghina, 2017) proposed a systematic framework which covers three important key stakeholders within the university ecosystem: student, lecturer and institution. This framework provides a deeper analysis and detailed structure of roles and responsibilities of the key stakeholders in the framework. In this systematic framework, all key stakeholders have their own role and responsibility regarding the three core activities within the university: teaching activities, research activities and third-stream activities.

One of the most successful entrepreneurial ecosystems in the world (i.e. The Babson Entrepreneurship Ecosystem Project) stated that at the heart of the entrepreneurship ecosystem strategy are the factors comprising the entrepreneurship ecosystem and how it evolves. This entrepreneurship ecosystem consists of a dozen or so elements although they are ‘idiosyncratic because they interact in very complex ways, are always present if entrepreneurship is self-sustaining’ (Isenberg, 2011 p.6). So although the combinations are always unique, in order for there to be ‘self-sustaining entrepreneurship, you need conducive policy, markets, capital, human skills, culture and supports’ (Isenberg, 2011 p.6).
This diagram is beneficial in part because “it reflects the world as it impinges on the entrepreneur’s perceptions, and this how it impacts the entrepreneur’s decisions and success” (Isenberg, 2011 p.11). The diagram reflects on already developed system and perception, but the featured domains can be highly valuable while strategizing and incorporating new entrepreneurial structures in the University environment.
4. Emerging Skills and Competencies

In order to stop and reduce the scenario where technological change/trends are accompanied by talent shortages and mass unemployment, it is critical that first universities and governments take an active role in supporting existing education and workforce concepts through reskilling and upskilling new talents. This fact also puts an emphasis on individuals “to take a proactive approach to their own lifelong learning and that governments create an enabling environment, rapidly and creatively, to assist in these efforts” (World Economic Forum, 2018b).

The new concepts of individual lifelong learning are also recognized as one of the basic new components of learning in 21st century, “the inevitability of lifelong learning in knowledge-oriented societies implies that school systems should have different objectives and characteristics than if education were considered to have been completed when a student leaves initial education” (OECD/CERI, 2008). The ecosystem should ideally provide the continuing support for individual proactive learning and the possibility of upgrading or learning new skills, in the local, international and finally virtual environment. Universities with new curriculums, should also be able to recognize the new trends on the market and work on the trend requirements of new skill development from startups to corporate industry requirements. An overview of the crucial skills needed for the future work posts from four different sources including 21 Century Skills book by (Trilling and Fadel, 2009) are presented on the next figure.

Figure 4. Comparison of the Four Resources (Top Rated Skills).

**Emerging skills (WEF)**
- Creativity, originality and initiative
- Analytical thinking and innovation
- Active learning and learning strategies
- Technology design and programming
- Emotional intelligence, Critical thinking and analysis
- Leadership and social influence
- Complex problem-solving, Systems analysis and evaluation
- Reasoning, problem-solving and ideation

**Soft Skills Companies need (LinkedIn)**
- Leadership
- Communication
- Collaboration
- Time management

**CEO perspective on most important skills (PwC)**
- Problem solving
- Leadership
- Emotional intelligence
- Adaptability
- Creativity and innovation

**21st Century Skills**
- Learning and innovation skills (Critical thinking and problem solving, Communications and collaboration, Creativity and innovation)
- Information media and Technology skills (Information literacy, Media literacy, Information and communication technologies (ICT) literacy)
- Life and career skills (Flexibility and adaptability, Initiative and self-direction, social and cross-cultural interaction, productivity and accountability, leadership and responsibility)
All the mentioned skills from different sources can be grouped mainly as **soft skills and competencies**. Soft skills are skills often referred to as interpersonal, cognitive, human, people, or behavioral skills, and have a strong focus on personal behavior and managing relationships between people.

Many authors also connect soft skills with the term of 21 century skills. The reason why the connections are made is the fact that the new technology age will inevitably create more new, different jobs and along with novel work posts, a new set of skills will be required. Jobs that require routine, manual and thinking skills will be replaced by jobs that involve higher levels of knowledge and applied skills like expert thinking and complex communication (Trilling and Fadel, 2009), which along with other skills such as **flexibility and adaptability, social and cross-cultural interaction form 21 century skills**.

The past decade strongly proved the importance of soft skills and their influence on the workplace. As soft skills and competencies are progressing exponentially with importance and growth in the future period, the next figure shows how the demand for top 10 skills is changing, and according to these predictions by WEF, soft skill will be in even higher demand then the technical skills.

What is interesting to note is that, as a trend, it is good to have a **combination of different hard and soft skills** as an asset. By sole definition of diverse occupations and skills (hard and soft), the person is more likely to have a more creative mind-set, and creativity is one of the highly valued skills of current and future workplace. While technical skills are always necessary, new generations are especially interested in building interpersonal skills, confidence and ethical behavior in Industry 4.0 (‘Deloitte Millennial Survey’, 2018). Meaning that current and future employees are interested in having diversified skill sets which make them aware of added value interpersonal skills and adaptability have on the job market. This fact is aligned with the lifelong learning concept mentioned in the first section.

Going back to the university entrepreneurial ecosystems, the win-win situation for the educators will be to have an active system that allows students to have just the right balance of soft and technical skills. And sometimes it is not all in

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**Figure 5. Comparing skills demand, 2018 vs. 2022, top ten (WEF 2018).**

<table>
<thead>
<tr>
<th>Today, 2018</th>
<th>Trending, 2022</th>
<th>Declining, 2022</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Analytical thinking and innovation</td>
<td>• Analytical thinking and innovation</td>
<td>• Manual dexterity, endurance and precision</td>
</tr>
<tr>
<td>• Complex problem-solving</td>
<td>• Active learning and learning strategies</td>
<td>• Memory, verbal, auditory and spatial abilities</td>
</tr>
<tr>
<td>• Critical thinking and analysis</td>
<td>• Creativity, originality and initiative</td>
<td>• Management of financial, material resources</td>
</tr>
<tr>
<td>• Active learning and learning strategies</td>
<td>• Technology design and programming</td>
<td>• Technology installation and maintenance</td>
</tr>
<tr>
<td>• Creativity, originality and initiative</td>
<td>• Critical thinking and analysis</td>
<td>• Reading, writing, math and active listening</td>
</tr>
<tr>
<td>• Attention to detail, trustworthiness</td>
<td>• Complex problem-solving</td>
<td>• Management of personnel</td>
</tr>
<tr>
<td>• Emotional intelligence</td>
<td>• Leadership and social influence</td>
<td>• Quality control and safety awareness</td>
</tr>
<tr>
<td>• Reasoning, problem-solving and ideation</td>
<td>• Emotional intelligence</td>
<td>• Coordination and time management</td>
</tr>
<tr>
<td>• Leadership and social influence</td>
<td>• Reasoning, problem-solving and ideation</td>
<td>• Visual, auditory and speech abilities</td>
</tr>
<tr>
<td>• Coordination and time management</td>
<td>• Systems analysis and evaluation</td>
<td>• Technology use, monitoring and control</td>
</tr>
</tbody>
</table>
the curriculum, novel learning/teaching styles and concepts are also leaning towards inspiring the lifelong personal growth and learning. Suggesting the HEI are the backbone of knowledge, transfers not just as enablers of knowledge, but also as motivators, and in such cases can utilize different tools to transfer knowledge using on-line courses or different kinds of collaborations. Collaborations with the business and startup sector, enabling hubs or accelerators on the campus hence making a vibrant community not just for the purpose of creating startups, but also to connect all that aligns with the process will contribute to having students learning entrepreneurial skills.

4.1. Entrepreneurial skills

Today’s work market and ecosystem highly value any kind of entrepreneurial experiences a person has. To startup ecosystems, having entrepreneurial skills is a base upon which everything else is built on. In this context, we identify entrepreneurial skills and competencies as fundamental to have, and as such, skills are highly connected to startup development opportunities within high educational institutions.

Entrepreneurship skills are intrinsically connected to competence in the process of opportunity identification, the ability to capitalize on identified opportunities and a range of skills associated with developing and implementing business plans and startup opportunities (BIS Entrepreneurship Skills, 2015). Within this Model entrepreneurship skills will be presented as skills consisting of different subgroups including hard – technical skills, financial, digital and soft skills and competencies. The purpose of grouping these skills is providing a skills overview of the Talent Acquisition Model in which the entrepreneurial skills framework is one of the components of the model. Second reason is the sole nature of entrepreneurship skills, as an interconnected group linking quite diverse skill sets, from soft, 21st century skills to competencies and practical, technical and financial skills.

4.2. Soft skills and competences

Talent management perspective, skills and competences (with behaviors) make the fundaments of the model. Skills and competencies have similarities but are two different concepts. Learned activities define skills, which range widely in terms of complexity and can give information on the question “what” an individual possesses from the abilities. But skills do not answer “how” does an individual perform a specific task. Competencies provide knowledge by translating skills into practical behaviors that demonstrate the ability to
perform the work requirements competently. Competencies incorporate a dynamic combination of abilities, attitudes, and behaviors, as well as knowledge that is fundamental to the use of a skill aligned to a learning outcome. With the concepts of what and how, this model will present the skills and competencies together because these two concepts, although different, are very much aligned and usually presented as one set or framework. It is more a matter of how to identify and utilize 21st century skills and competencies in the startup environment, rather than what the different aspects of the two concepts are.

There is a growing emphasis in literature on the importance of ‘soft’ skills which are now seen not just as complementary to hard skills, but as important and hard as technical skills. The literature and practice also suggest that there is a lack of emphasis placed on the development of soft skills by many tertiary education providers (Hodges and Burchell, 2003). All aspects considered, there is no doubt in the importance of both, soft and hard skills, when providing a learning environment for developing individual talents.

Next figure presents the soft skills and competence framework developed from the aspects of today’s workplace necessities, need of practical knowledge in startups, and entrepreneurship education in digital era.

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4.3. Digital skills

Digital technologies now underpin effective participation across many aspects of everyday life and work. In addition to technology access, “the skills and competencies needed to make use of digital technology and benefit from its growing power and functionality have never been more essential” (UNESCO, 2017). **Communication in digital era is hardly done without the use of digital channels.** Both the digital environment and the 21st century demand for a different kind of skill set where digital skills and competencies are introduced as a result of using different technologies in various contexts. Such skills and individual needs will depend on their work, sector, level of education, career trajectory, and lots of other factors. One set of competencies is not appropriate
for all environments and individuals. To be specific, the set of digital skills won’t be the same for a programmer and a sales person. It is possible to identify generic digital skills for a diverse set of people, but for the purpose of this Model, identification of digital skills was more focused on digital skills matching work environment demand and university settings. NESTA\(^2\) has given an overview of different digital skills framework types for some sectors and specifically for the education sector. The framework for Digital Capabilities by JISC – is designed to be ‘used by staff in any role and by students in any educational setting’.

Pearson and Nesta have made a research on Future of Skills for 2030\(^3\), based on a novel methodology for predicting the demand for work and skills in the US and UK economies in 2030. This methodology combines the expertise of humans with the power of machine learning. In addition, the skills, knowledge types, and abilities which will most likely experience growth and decline are identified in the research.

The top-rated skills show a multidisciplinary subject leaning more towards the combination of psychology aspects, skillfulness and technology orientations. From this report we can also identify the trend of digital and soft skills importance in predictions for the future of work.

4.4. Technical skills

Hard skills are defined as technical skills, usually connected to programs or any kind of industry/machine work. Hard skills are also described as the specific knowledge and abilities required by a workplace.

In order to get the relevant technical skills demanded on the market, a research was conducted on the most resourceful platforms for today’s work recruiting and learning platforms as GitHub, Linux, LinkedIn and Udemy academy’s.

Reviewing the demand on hard skills based on the information from the platforms and other resources, demand for hard skills dominates in the occupations mainly from Computer Science and ICT sector, but also include Marketing, Management, Design and Business Intelligence fields. Identified skills announce the future demand and growth of interconnectivity between skills of different types of technology, for example connecting ICT skills with Electrical Engineering.

One more important note is the interconnectivity between the soft and hard skills presented from mostly all researchers on this matter. Soft and hard skills are combined as one necessity of equal importance for future work posts in all industries, from startup to corporate.

\(^2\) [www.nesta.org.uk/blog/four-steps-to-define-digital-skills/](www.nesta.org.uk/blog/four-steps-to-define-digital-skills/)

\(^3\) [Futureskills.pearson.com/research](Futureskills.pearson.com/research)
4.5. Financial skills

Financial literacy is listed as one of the critical managerial competencies in SMEs firm and development (Spinelli, S., Timmons, J. A., & Adams, 2011). Financial literacy can be also defined on personal level, meaning the individual literacy is important determination of managerial competencies and overall development. From this aspect, financial literacy and skills connected to developing financial construction of startups are weighted as highly important skills from the start of the founding process.

Within this Model, financial skills have been presented from the basic needed skills of founding a first startup. Since the Model will be introduced to a student community of diverse background, the intent is to explore the basic financial knowledge needed for the first stage of startup, as usually incubators, mentoring and entrepreneurship programs offer at universities. Through the model, students were asked to rank their knowledge of the following subjects: creating a budget for a specific project, creating and analyzing cash flow, sales forecasting, breakeven analysis, profit & loss analysis and sources and uses of investment funds.
5. Online learning platforms and technology trends

5.1. Online learning platforms

When analyzing the different frameworks proposed by scholars and organizations in the previous chapter, one of the perceived consistencies is a different combination of online learning tools (from platforms to forums) used by students, researchers and founders in order to produce and receive knowledge. Over the past few years, the practices of e-learning have undergone a number of initiatives, particularly with regard to the openness of the learning environment (Hew and Cheung, 2014).

Within this Model, the focus was more on open source learning available on different platforms, as it is used by universities and students. The intent of this research was to identify the most frequent resources students use, either to get new knowledge, or complement the received content on compulsory courses.

Considering the technology, trends imply high development of online communities, platforms and different kinds of points for shared knowledge transfer (from YouTube channels, to MOOC and online courses on platforms as Udemy, edX etc.). Within this model, digital learning platforms, communities and different forms of online learning courses are included as an added factor of gaining knowledge on entrepreneurial universities. The students were asked to identify the online learning platform tools, channels and forums they use and how frequent the usage of online individual learning is.

5.2. Technology Trends

Internet, mobile technologies, artificial intelligence, big data, robotics, nanotechnology, and other disruptive technological phenomena are potentially causing profound changes in organizations and society (Brem and Voigt, 2009). The phenomenon of disruptive technology trends is getting even more developed introducing new trends on a yearly basis. From this point, it is crucial to look at new technology development and connect new tech with startup ecosystems. It is inevitable that future startups made either on university ground or any other incubator or accelerator will include some point of new technology in their value proposition.

In the WEF Report for Future of Jobs, a projection is made for the technologies which companies are likely to adopt by 2022. According to the global employers surveyed for this report, four specific technological advances will lead the new
tech era, high-speed mobile internet, artificial intelligence, widespread adoption of big data analytics and cloud technology as drivers positively affecting business growth.

Following this prediction, skilled talent will need to learn or create different kinds of skills for entering the job and business market. It is essential that future talent has a strong knowledge basis of the new technology, because new technologies can drive business growth, job creation and demand for specialist skills but they can also displace entire roles when certain tasks become obsolete or automated (World Economic Forum, 2018a).

Preparing the future talent with the right set of skills can solve two emerging problems: skill gaps present both among workers and among the leadership of organizations. With new skill knowledge problem solving on all levels will be easier, from creating new services to understanding how technology can speed up growth and trends towards automation in many fields.

While creating this talent model, several interviews with IT specialists working in startups and companies in the Lisbon area were conducted. The main goal of the interviews was to determine skills and technologies practitioners currently use, and participants were also asked to give their view on emerging skills and the technology needed for the future. Based on the literature resources and interviews made with practitioners, questions in domain of business awareness, skills and technology trends were established for the Survey of this Talent Model.
For the purpose of developing the Talent Acquisition Model in a university setting focused on startup culture and skills, the chapters above the key pillars of the Model have been presented. In order to fully recognize all stakeholders involved with the university environment, the talent model is presented with key stakeholders as influencers of the talent development.

Entrepreneurship as a subject can usually be found in the curriculum of faculties, since there is a high probability to have entrepreneurship (or similar courses such as economics, business etc.) as a course during the studies. Adding on to this concept, there are many other inputs within the curriculum and faculty activities that can further develop an entrepreneurial mindset and skills to students (from special courses to events). Facilities within the campus that can serve as a one-stop-shop for idea development are also an important factor identified in many cases.

The development of skills and competencies also emerges during connected entrepreneurial activities such as hackathons, pitching events and different programs for startup development. All the events/programs and entrepreneurial context usually offer opportunities for learning soft, technical and financial skills with practical, hands-on experience.

**It is important to identify the entrepreneurial skills as a sum of soft and hard/technical skills combined with digital and financial skills.** These skills can make a significant impact towards creation of 21st century skills framework for entrepreneurship and startup development.

Why aim for 21st century skills? Having in mind the trends of the future digital age, more interconnected skills are emerging as important and necessary. To be able to think with complexity, have different social skills and innovate with fluency of ideas, will be highly demanded in the startup world, industry setting or any future workplace. All students probably won’t be startup founders, but having an entrepreneurial mind-set and developing skills needed for the future workplace is an inevitable fact of every personal growth, not just in university setting but generally.

That being said, the learning curves are changing as well. Contextually speaking, knowledge is now available online more the ever in the history of learning opportunities. Online learning platforms are providing substantial bases of different subjects/knowledge, including entrepreneurship, digital trends, specific programs and other themes. For this reason, online learning platforms, community platforms and forums are also considered to be part of the Model as providers of easy, cost free, available knowledge. During the research on online learning platforms, it is also noted that most of the leading platforms are up to date with all themes and important subjects in today’s market. The courses
on different kinds of startup development themes, blockchain, AI, internet of things, industry 4.0 are indeed available to learn on platforms as Edx, Coursera, Udemy, Lynda (LinkedIn) and others.

With all mentioned pillars, the Talent Model is created to provide inputs on the entrepreneurial ecosystem, environment, business opportunities, skills and online learning platforms from the perspective of the students.

Figure 7. MY-GATEWAY Talent Acquisition Model for Universities.

6.1. Research design

Based on the literature review and industry findings, research will be focused on the parts of talent model acquisition presented in the following table along with chapter points in the Talent Acquisition Model, and output sections of the Model. (Complete document with chapters is available at mygatewayproject.eu/results/reports).

Research was designed referencing the framework of the Entrepreneurial University Framework (Ghina, Simatupang and Gustomo, 2015) stating out the important roles of institution and access to different entrepreneurial contexts in the entire university Ecosystem. The framework laid the basis for research in the subjects of possible startup/business awareness at the university, quality of different kind of entrepreneurial services and individual motivation towards founding or working in a startup.
This research has combined the findings and concepts of previous frameworks and added more components within the scope of research. Following this model, skills framework of the Talent model was designed with the reference of current market needs of skills and abilities (from industries to workplace referencing report findings, articles and practitioners' experience) while connecting the future needs and demands within entrepreneurial and work sector of Central and Eastern European (CEE) Countries and global trends.

The usage of external resources as the last component of the research has a goal to explore the frequency and the different sources of on-line learning resources students use.

<table>
<thead>
<tr>
<th>Name of the component</th>
<th>Chapters in the Document</th>
<th>Outputs</th>
<th>Questions reference in the Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understanding of startup ecosystem opportunities (from facilities to idea development)</td>
<td>2, 3</td>
<td>Awareness of entrepreneurial</td>
<td>6, 10</td>
</tr>
<tr>
<td>Understanding of individual opportunities, business awareness, and motivations for founding a startup</td>
<td>2, 3, 4</td>
<td>Awareness of entrepreneurial opportunities</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Motivation towards entrepreneurship</td>
<td>7, 8, 9, 11</td>
</tr>
<tr>
<td>Entrepreneurial skills and competencies development (soft, technical, digital and financial)</td>
<td>4</td>
<td>Skills</td>
<td>12, 13, 14</td>
</tr>
<tr>
<td>Future technologies trend awareness and Utilization (with frequency) of online learning platforms</td>
<td>4, 5</td>
<td>Usage of external resources</td>
<td>15, 16, 17</td>
</tr>
</tbody>
</table>
From the information obtained through the research and literature work, a Survey was created in order to examine the ecosystem, skills, courses, environment, motivations and startup aspirations of the students in CEE universities. To gain the full understanding of the startup ecosystems, students were asked to give their positions on the mentioned subjects and this way the Model can identify the following outputs from students’ perspective on university startup ecosystems.

The outputs of the Model correspond to the outputs of the Survey components and have been categorized in four groups as presented on the TM Output Model scheme. The grouping of the outputs was designed in order to show the current situation from students’ aspects of different entrepreneurial components in the university. The four categories are motivation, business opportunities, skills and usage of external resources.

6.2. Survey Design

The Survey consisted of Likert-type scale questions, multiple choice questions and several demographic questions. In regard to the skills section, the skills and competency questions framework were adapted (Rainsbury et al., 2002). The data for new technologies introduced in the Survey were adapted from WEF Future of Jobs report (World Economic Forum, 2018) and for the data on technical skills, a research was conducted on the most resourceful platforms for today’s work recruiting and learning platforms as LinkedIn⁴, Udemy platform⁵, learntocodewith.me⁶, GitHub⁷ and Hired.com.

The Survey was designed with 15 questions (from 4 output groups). The first section of the Survey consisted of general demographic items. These included gender, age, university, field of study and type of study.

The second section consisted of multiple-choice questions and some questions had 5 levels of options in order to allow students to give more focused feedback on the asked context of the question.

The third section of the Survey consisted of 3 groups of Likert-type items designed to assess students’ overall confidence on three groups of skills: soft, technical and financial. These items used a five-point response scale (1=Not Confident to 5=Extremely Confident) and prompted students to indicate the degree to which they agreed with each skill and ability.

⁵ Business.udemy.com/blog/10-hot-it-skills-2018/
⁶ Learntocodewith.me/posts/tech-skills-in-demand/
⁷ Blog.github.com/2018-02-08-open-source-project-trends-for-2018/#new-skills
The fourth section included Likert-type questions on the adaption of new technology designed to assess awareness of selected new technologies (five-point response scale from 1=Not Aware of it; to 5=I am very passionate in using this technology and have become an expert user). The last section included multiple-choice questions on the usage frequency of external resources and different types of online learning platforms. The Survey was disseminated via Google forms open source and the total time needed for participation ranged between 7 to 10 minutes.

6.3. Data Collection Methodology

The goal of the Survey was to show the current situation and different stages of strengths or needed upgrades from different entrepreneurial/startup university context. The data was analyzed in order to get summed averages weighted by the scale from 1 to 5.

The questions were created to give clear distinction of every answer (from 5 being the best option and 1 being the least favorable option), the data could be analyzed by taking the weighed averaged sum of each question.

Figure 10. Example of one Question from the Survey.

7. Please indicate how do you identify the quality of the following entrepreneurship activities in your University:

**Entrepreneurship courses:**
- □ Level 1 - No course exists
- □ Level 2 - Basic lectures course
- □ Level 3 – Lectures with some additional materials but lacking practical experience or exercises
- □ Level 4 - High quality lectures with practical experience
- □ Level 5 - High quality with real success of startup coming out of the program
- □ I cannot comment since I am not aware

Some questions were also given an option “I cannot comment since I am not aware” for two reasons. The first reason was to reduce uninformed response, since it assures respondents that they do not need to feel compelled to answer every Survey item, especially the ones that they are not familiar with. Secondly, if the mentioned activities exist and students are not aware of it, this signals an unawareness of the activities, which can serve as information for the university as well.
The Survey data for each university was processed and analyzed with the same method. At the end, with summed weighted data, outputs of four categories of Talent Model could be used to compare universities based on the same points. With all four categories of output (motivation, business opportunities, skills and usage of external resources) a “Scoreboard” of Talent Model was developed for every university giving information on all four output categories based on the students’ perception of entrepreneurial availabilities and resources on the campus. The scoreboard documents were sent to every university that participated in the research, along with the method analysis of the scoreboard and identified results from the research.

6.4. Limitations

For the purpose of this analysis in which the Model needed to deliver average results, the statistical method used was the mean score and can pose a limitation. The average values were used to identify the main points of all components, although the answers were weighted on 1 to 5 scale. Another limitation is that the participants number per university varies from 35 to 240 responses, but for the purpose of this Model and time constrains of the research, all results over 35 were analyzed. Establishing a successful entrepreneurial university ecosystem requires collaboration and contribution from different stakeholders and methods of making a startup culture, and the aim of this research was to better understand different entrepreneurial ecosystems in universities and countries from the students’ perspective, in order to have input for further enhancement of talent development.
In this Model, every university with over 35 survey responses has been analyzed and compared by the four outputs.

The next figure presents results of universities with all mean scores of the outputs for main categories (outputs) and sub-categories, followed by short overall analysis of all universities.

Detailed results will be presented for one university with the scoreboard and analysis of each University.

All other details on each university is available at mygatewayproject.eu/results/reports.
### 7. Talent Model Survey Results

**Figure 11. Talent Model Survey Results.**

<table>
<thead>
<tr>
<th>Country</th>
<th>Romania</th>
<th>Czech Republic</th>
<th>Slovenia</th>
<th>Spain</th>
<th>Israel</th>
<th>Portugal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output / University</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alexandru Ioan Cuza University (UAIC)</td>
<td>4.46</td>
<td>5.12</td>
<td>4.80</td>
<td>5.49</td>
<td>4.83</td>
<td></td>
</tr>
<tr>
<td>Babes-Bolyai University (UBB)</td>
<td>5.08</td>
<td>5.21</td>
<td>5.49</td>
<td>5.70</td>
<td>5.33</td>
<td></td>
</tr>
<tr>
<td>West University of Timisoara (UVT)</td>
<td>4.54</td>
<td>6.68</td>
<td>6.04</td>
<td>7.03</td>
<td>5.33</td>
<td></td>
</tr>
<tr>
<td>Technic University (UTCN)</td>
<td>5.14</td>
<td>6.68</td>
<td>6.68</td>
<td>7.03</td>
<td>5.33</td>
<td></td>
</tr>
<tr>
<td>University of Economics, Prague</td>
<td>5.12</td>
<td>6.46</td>
<td>6.04</td>
<td>7.30</td>
<td>7.30</td>
<td></td>
</tr>
<tr>
<td>University of Maribor</td>
<td>5.21</td>
<td>5.27</td>
<td>5.66</td>
<td>5.70</td>
<td>7.84</td>
<td></td>
</tr>
<tr>
<td>University of Salamanca</td>
<td>4.80</td>
<td>5.27</td>
<td>5.66</td>
<td>5.70</td>
<td>7.84</td>
<td></td>
</tr>
<tr>
<td>University of Bar Ilan</td>
<td>5.49</td>
<td>5.27</td>
<td>5.66</td>
<td>5.70</td>
<td>7.84</td>
<td></td>
</tr>
<tr>
<td>University of Nova Lisbon</td>
<td>4.83</td>
<td>5.27</td>
<td>5.66</td>
<td>5.70</td>
<td>7.84</td>
<td></td>
</tr>
</tbody>
</table>

**1. Motivation**

<table>
<thead>
<tr>
<th>Question</th>
<th>Romania</th>
<th>Czech Republic</th>
<th>Slovenia</th>
<th>Spain</th>
<th>Israel</th>
<th>Portugal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.a. Please indicate your level of involvement in University entrepreneurship activity</td>
<td>2.49</td>
<td>3.38</td>
<td>3.74</td>
<td>3.55</td>
<td>3.94</td>
<td>4.33</td>
</tr>
<tr>
<td>1.b. How interested are you towards working or creating your own startup?</td>
<td>6.43</td>
<td>6.66</td>
<td>6.68</td>
<td>6.04</td>
<td>7.03</td>
<td>5.33</td>
</tr>
</tbody>
</table>

**2. Awareness of entrepreneurial opportunities on University**

<table>
<thead>
<tr>
<th>Question</th>
<th>Romania</th>
<th>Czech Republic</th>
<th>Slovenia</th>
<th>Spain</th>
<th>Israel</th>
<th>Portugal</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.a. Please indicate how do you identify the quality of the activities in entrepreneurship courses at your University</td>
<td>5.80</td>
<td>5.40</td>
<td>6.84</td>
<td>5.46</td>
<td>5.43</td>
<td>7.30</td>
</tr>
<tr>
<td>2.b. Please indicate how do you identify the quality of the entrepreneurship activities of Startup contests as Hackathons, Pitch events organised at your University?</td>
<td>6.14</td>
<td>6.00</td>
<td>5.84</td>
<td>6.68</td>
<td>5.70</td>
<td>8.05</td>
</tr>
<tr>
<td>2.c. What kind of services are provided by your University, other than entrepreneurship courses and entrepreneurship/startup events?</td>
<td>4.84</td>
<td>4.08</td>
<td>5.78</td>
<td>5.41</td>
<td>4.15</td>
<td>5.84</td>
</tr>
<tr>
<td>2.d. How involved are your university student organizations in entrepreneurship activities?</td>
<td>6.55</td>
<td>5.84</td>
<td>6.31</td>
<td>6.96</td>
<td>6.52</td>
<td>4.22</td>
</tr>
</tbody>
</table>

**3. Skills Set**

<table>
<thead>
<tr>
<th>Question</th>
<th>Romania</th>
<th>Czech Republic</th>
<th>Slovenia</th>
<th>Spain</th>
<th>Israel</th>
<th>Portugal</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.a. Soft skills</td>
<td>5.63</td>
<td>5.19</td>
<td>5.99</td>
<td>6.01</td>
<td>5.61</td>
<td>7.09</td>
</tr>
<tr>
<td>3.b. Financial Skills</td>
<td>6.59</td>
<td>7.30</td>
<td>6.25</td>
<td>6.95</td>
<td>7.03</td>
<td>8.26</td>
</tr>
<tr>
<td>3.c. Technical Skills</td>
<td>5.10</td>
<td>4.57</td>
<td>5.61</td>
<td>5.56</td>
<td>5.51</td>
<td>6.43</td>
</tr>
</tbody>
</table>

**4. Usage of external learning resources**

<table>
<thead>
<tr>
<th>Question</th>
<th>Romania</th>
<th>Czech Republic</th>
<th>Slovenia</th>
<th>Spain</th>
<th>Israel</th>
<th>Portugal</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.a. Future Trends</td>
<td>5.84</td>
<td>6.21</td>
<td>5.31</td>
<td>6.67</td>
<td>5.75</td>
<td>6.11</td>
</tr>
<tr>
<td>4.b. Usage of web resources</td>
<td>4.85</td>
<td>4.77</td>
<td>4.03</td>
<td>4.86</td>
<td>5.08</td>
<td>5.49</td>
</tr>
</tbody>
</table>

**SUM:**

<table>
<thead>
<tr>
<th></th>
<th>Romania</th>
<th>Czech Republic</th>
<th>Slovenia</th>
<th>Spain</th>
<th>Israel</th>
<th>Portugal</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUM:</td>
<td>21.73</td>
<td>22.67</td>
<td>20.96</td>
<td>22.66</td>
<td>23.65</td>
<td>23.35</td>
</tr>
</tbody>
</table>
As presented on the following figure of Talent Model Comparison for all universities, the first component for all universities, Motivation towards Entrepreneurship, can be identified as moderate, scoring from 4.46 to 5.49 (on the 10-point scale).

For the second component Awareness of entrepreneurial opportunities on University, the Universities scored from 5.80 to 7.30, noticeably a higher score than the previous component. The levels of perception for each 4 sub-components are even more important information for universities, since perception and awareness of different activities can indicate the students’ view on activities regarding the strategic goals or programs universities are working on. The sub-component Quality of the entrepreneurship activities of Startup contests had the highest scoring involving the higher quality of startup events and contests (6.14-8.05) in which NOVA University has the highest scoring.

An interesting example of diversity in ecosystem can be identified in Technic University (Romania), were students have rated moderately high the Quality of the entrepreneurship activities of Startup contests as Hackathons, Pitch events (6.00) and Student organizations in entrepreneurship activities (6.96) highlighting the importance of these activities for the ecosystem. Another example is University Nova Lisbon (Portugal), with the highest overall score of the evaluation model was for this component – Awareness of opportunities (7.30), in which the lowest score was given to the component of Services provided by the university other than entrepreneurship courses and entrepreneurship/startup event (5.84).

A skill set component was designed in order to identify students’ level of confidence in skills and the abilities they possess. At the University of Bar-Ilan (Israel), students perceive themselves confident in soft, technical and financial skills, with the highest score among all the universities (7.09). From the perspective of the ecosystem, this can be recognized as an environment which has activities which develope the identified skill sets, scoring higher in the area of soft skills (8.26) and lower in financial skills (6.43).

Usage of external learning resources component varied from 5.31 to 6.12 scores between the universities. Nevertheless, the average level of scoring suggests an active use of e-learning through different platforms of open-source opportunities, scoring highest at Romanian universities (6.59-7.65).

From this analysis we can conclude the universities are mostly on the moderate level in providing entrepreneurial services and environment to the students. The space where content is further enhanced and new knowledge is delivered can be identified in mainly all components, but especially in the component of Motivation towards Entrepreneurship and Future trends and Usage of external learning resources, since the overall scoring for these components were the lowest. However, the noticeable fact is the variety of entrepreneurial programs and activities is moderate to high level for most universities, especially in Entrepreneurial Awareness and Skill sets components.
7. Talent Model Survey Results

7.1. ScoreBoard Example

Talent Acquisition Model
Talent Acquisition Model is designed to identify entrepreneurial and start-up development in University start-up ecosystem from the aspect of students.

Talent Model Outputs*
Based on survey responses results are calculated within 4 areas and presented on the scale from 1 to 10:

<table>
<thead>
<tr>
<th>Area</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motivation</td>
<td>5,12</td>
</tr>
<tr>
<td>Entrepreneurial Opportunities</td>
<td>6,84</td>
</tr>
<tr>
<td>Skill Set</td>
<td>5,65</td>
</tr>
<tr>
<td>Soft Skills</td>
<td>7,02</td>
</tr>
<tr>
<td>Financial Skills</td>
<td>8,80</td>
</tr>
<tr>
<td>Technical Skills</td>
<td>5,43</td>
</tr>
<tr>
<td>Usage of external resources</td>
<td>5,66</td>
</tr>
</tbody>
</table>

Top 5 Online learning resources

<table>
<thead>
<tr>
<th>Resource</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>YouTube</td>
<td>143</td>
</tr>
<tr>
<td>Social Media Groups</td>
<td>107</td>
</tr>
<tr>
<td>Specialized Online Communities</td>
<td>137</td>
</tr>
<tr>
<td>Open learning Platform</td>
<td>28</td>
</tr>
<tr>
<td>Khan Academy</td>
<td>24</td>
</tr>
</tbody>
</table>

Academic Program of Respondents
85% are studying Economics and Management

Survey Responses: 77 male / 93 female
Business Awareness as a skill had the highest rate of 3,9 (on 1 to 5 scale) with the respondents
51% are not aware of Startup contests organized at University

* Detailed results and statistical method is explained in the Data Analysis document
7.2. Detailed results Example

The Talent Model was designed to identify the selected points of entrepreneurial and startup ecosystem at the university from the perspective of students. Selected points include: individual motivation for startups, awareness of entrepreneurial opportunities (including different startup opportunities on university and entrepreneurial courses), skills set (soft, technical and financial), future trends and usage of external online learning platforms.

From 17 questions of the Survey, 4 outputs were created, summing some questions into one output (for example, awareness of entrepreneurial opportunities is compiled with 4 questions). In front of each output of the question, overall summed scored for the output is presented, followed by detailed results for every question. Questions are presented within 5-level answers, 10-point scale or number of responses per answer.

The data was analysed in order to get summed averages weighted on the scale from 1 to 5, as a mean score. The mean or average score of a certain set of data is equal to the sum of all the values in the data set divided by the total number of values. In the following document, for each question a mean score was calculated and presented. The questions were created to give a clear distinction of every answer (from 5 being the best option and 1 being the least favourable option), so the data could be analysed by taking the weighted average sum of each question.

The total data analysed from all of the responses are presented in this document: demographic data as first section, and other data (all 17 questions) are presented as components of outputs in the four following sections.
7.2.1. Motivation towards Entrepreneurship

The output of motivation towards entrepreneurship is based on two questions of the Survey (number 6 and 10): level of involvement in entrepreneurial activity and individual interest towards startup activities.

1a. Level of involvement in university entrepreneurship activities

Q: Please indicate your level of involvement in university entrepreneurship activity:

<table>
<thead>
<tr>
<th>Level of Involvement</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never participated</td>
<td>102</td>
</tr>
<tr>
<td>Taken an entrepreneurship course</td>
<td>44</td>
</tr>
<tr>
<td>Actively participated in contests</td>
<td>8</td>
</tr>
<tr>
<td>Through my involvement in University programs</td>
<td>7</td>
</tr>
<tr>
<td>I already have a startup</td>
<td>9</td>
</tr>
</tbody>
</table>

Mean Score: 3.37

1b. Interested towards working or creating startup

Q: How interested are you towards working or creating your own startup?

<table>
<thead>
<tr>
<th>Interest Level</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not interested at all, neither in working or creating</td>
<td>11</td>
</tr>
<tr>
<td>Interested in working but not creating</td>
<td>27</td>
</tr>
<tr>
<td>Interested in working, and in later stage starting my own startup</td>
<td>51</td>
</tr>
<tr>
<td>Would like to connect with other people so we can build a startup together</td>
<td>39</td>
</tr>
<tr>
<td>I am passionate about building my own startup</td>
<td>42</td>
</tr>
</tbody>
</table>

Mean Score: 6.87

Over 60% of respondents have never participated in any entrepreneurial activity so far, but on another side, respondents have highly indicated the interest in working for a startup, founding their own or connecting to other people in order to cofound or try some entrepreneurial activity.
7.2.2. Awareness of entrepreneurial opportunities at the university

The output of awareness of entrepreneurial opportunities at the university is based on four questions of the Survey (number 7, 8, 9 and 11) and include: quality of the activities in entrepreneurship courses, quality of the entrepreneurship activities of startup contests such as hackathons, pitch events and individual interest towards startup activities, types of services provided by your university, other than entrepreneurship courses and entrepreneurship/startup events and involvement of student organizations in entrepreneurship activities.

2a. Quality of the activities in entrepreneurship courses

Q: Please indicate how do you identify the quality of the activities in entrepreneurship courses at your university:

<table>
<thead>
<tr>
<th>Mean Score</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
<th>Level 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.37</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.87</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.41</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.21</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.21</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.52</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.02</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.56</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.45</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.86</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.87</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2b. Quality of the entrepreneurship activities of startup contests

Q: Please indicate how do you identify the quality of the entrepreneurship activities of startup contests as hackathons, pitch events organized at your university?
2c. Services provided by university other than entrepreneurship courses and entrepreneurship/startup events.

Q: What kind of services are provided by your university, other than entrepreneurship courses and entrepreneurship/startup events?

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
<th>Mean Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>There is no service for the further development of business ideas</td>
<td>3.37</td>
</tr>
<tr>
<td>2</td>
<td>There are some facilities in the University which can provide mentorship</td>
<td>6.87</td>
</tr>
<tr>
<td>3</td>
<td>I can be provided for the further development of business ideas</td>
<td>7.41</td>
</tr>
<tr>
<td>4</td>
<td>University provides me access to external funding through companies,</td>
<td>7.21</td>
</tr>
<tr>
<td></td>
<td>governments and other investors</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>University has its own fund to invest in my start-up</td>
<td>6.21</td>
</tr>
<tr>
<td></td>
<td>I cannot comment since I am not aware</td>
<td>6.52</td>
</tr>
</tbody>
</table>

2d. Involvement of student organizations

Q: How involved are your university student organizations in entrepreneurship activities?

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
<th>Mean Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>We do not have any student organizations involved in entrepreneurship</td>
<td>4.86</td>
</tr>
<tr>
<td>2</td>
<td>We previously had student organizations but no further initiatives</td>
<td>6.21</td>
</tr>
<tr>
<td>3</td>
<td>The student organizations have no further initiatives</td>
<td>7</td>
</tr>
<tr>
<td>4</td>
<td>The student organizations organize yearly initiatives</td>
<td>97</td>
</tr>
<tr>
<td>5</td>
<td>The student organizations organize yearly initiatives</td>
<td>97</td>
</tr>
<tr>
<td></td>
<td>I cannot comment since I am not aware</td>
<td></td>
</tr>
</tbody>
</table>

To all questions in this output an option I cannot comment since I am not aware was given as a variable of the answer. The reason was filtering the respondents who did not have any activity or awareness and having an option of observing results without this variable in order to have a more exact overview. This information can be relevant in two ways. Firstly, if the activities exist and students are not aware, this could mean that there’s a need to focus more on promoting the activities or further development of awareness activities. Secondly, if the activities are not in development phase (usually the situation is different from faculty to faculty on the University and please be advised to take a look at the structure of academic disciplines of this Survey) this can signalize need for further advancement of the entrepreneurial activities and raising the stage of entrepreneurship activity.
For all four questions of this output, the variable *I cannot comment since I am not aware is high* (around 40%), signalizing the respondents *low to medium level of awareness* (different from question to question). After taking out this variable, and observing the rest of the results, respondent have mainly chosen levels 2, 3 and 4 (medium to high level) on quality of entrepreneurial courses and entrepreneurship activities of startup contests as hackathons, pitch events. In the area of other services provided by university, respondents are mostly aware of incubators which can provide mentorship support and financial support from different funds. Respondents have indicated (again with high percentage of unawareness), that student organization have weekly organized entrepreneurial activities with the highest response rate from all possible answers.

### 7.2.3. Skills Set

The output of skill set is based on three questions of the Survey (number 12, 13 and 14) and include: soft/21st century skills, financial and technical skills. The questions consisted of 3 groups of Likert-type items designed to assess students’ overall confidence on soft, technical and financial skills. These items had a five-point response scale (1=Not Confident to 5=Extremely Confident) and prompted students to indicate the degree to which they individually agree (feel confident) with each skill and ability. The three figures of skills will be presented on the scale from 0 to 10.

#### 3a. Soft skills

**Q:** Please indicate your level of confidence in the following soft skills and competences on the scale from Not Confident to Extremely Confident.
Empathy, teamwork and self-awareness have been selected from the respondents as the skills with which they feel mostly confident, and public speaking and business awareness as the least confident ones.

3b. Financial skills

Q. Please identify your confidence in ability to execute the following financial skills on scale from Not Confident to Extremely Confident.

The highest overall rate selected by the respondents from the financial skills are creating a budget and analysing the cash flow while sales forecasting had the lowest response rate.

3c. Technical skills

Q: Please identify your awareness and ability to execute the following technical skills and themes on the scale from Not Aware to Expert user.

The highest overall rate selected by the respondents on technical skills are social media management and digital marketing whereas application development are mostly selected as experienced skills among respondents, and cybersecurity and user experience design and user interface design as the lowest rated in awareness and experience by the respondents.
7.2.4. Usage of external learning resources

The output of usage of external learning resources is based on three questions of the Survey (number 15, 16 and 17). This output included Likert-type questions on Likert-type items of adaption to new technology designed to assess awareness of selected new technologies (five-point response scale from 1=Not Aware of it; to 5=I am very passionate in using this technology and have become an expert user). Last two questions included multiple choice questions on frequency of external resources usage and different types of on-line learning platforms.

4a. Future Trends

Q: Please identify your awareness and knowledge of the following topics on the scale from Not Aware of it to Expert user.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Mean Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Robot and drone industry</td>
<td>4.99</td>
</tr>
<tr>
<td>Quantum computing</td>
<td>3.87</td>
</tr>
<tr>
<td>Autonomous transport</td>
<td>4.62</td>
</tr>
<tr>
<td>Distributed ledger</td>
<td>4.22</td>
</tr>
<tr>
<td>Wearable electronics</td>
<td>5.22</td>
</tr>
<tr>
<td>3D printing</td>
<td>5.09</td>
</tr>
<tr>
<td>Augmented and virtual reality</td>
<td>5.26</td>
</tr>
<tr>
<td>Internet of things</td>
<td>6.01</td>
</tr>
<tr>
<td>Big data analytics and Artificial Intelligence</td>
<td>4.66</td>
</tr>
</tbody>
</table>

Respondents are mostly experienced or practiced new technologies and trends in the areas and internet of things, augmented and virtual reality and wearable electronics, and least knowledgeable in blockchain and quantum computing.

4b. Usage of web resources

Q: How actively do you use web resources to gain new knowledge?

<table>
<thead>
<tr>
<th>Activity</th>
<th>Response Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>I actively take other online courses on new topics to develop new skills</td>
<td>22</td>
</tr>
<tr>
<td>that are not part of my courses or lectured at my University</td>
<td></td>
</tr>
<tr>
<td>I am often curious about new topics, skills, knowledge connected to</td>
<td>62</td>
</tr>
<tr>
<td>my area of studying</td>
<td></td>
</tr>
<tr>
<td>I like to compliment the courses i have on University with other online</td>
<td>33</td>
</tr>
<tr>
<td>resources</td>
<td></td>
</tr>
<tr>
<td>I search new resources when particular assignment need to be completed</td>
<td>40</td>
</tr>
<tr>
<td>I just use sources provided by University during courses</td>
<td>13</td>
</tr>
</tbody>
</table>

High response rate of students indicates an curiosity and will to update the knowledge connected to their study area, and as well use online courses to develop new skills and topics not connected to the curriculum.
Q: What kind of online learning platforms do you use to gain new knowledge:

The most used learning platform is YouTube followed by social media groups and specialized online communities.
8. References


Dear students,
This Questionnaire is created in order to identify startup and entrepreneurial activities, skills and opportunities you have at your University.

**So what's in it for you?**
By going through the Questionnaire you get to evaluate yourself and map out some strength, skills and motivations you have. Also, you might identify some areas where you can upgrade your skills.

Based on your valuable responses, we will provide the University with all of your constructive feedback in order to identify strengths and give recommendations to develop new entrepreneurial opportunities.

Your involvement will help create an advanced entrepreneurial environment in your University!

This questioner is short and easy, you will only need 7 – 10 minutes.

Thank you!

**Demographic data**

1. Please select you age group:
   - □ Less than 18 years’ old
   - □ 18-24 years’ old
   - □ 25-30 years’ old
   - □ 31-45 years’ old
   - □ More than 45 years’ old

2. To which gender identity do you identify with:
   - □ Female
   - □ Male
   - □ Other: ____________
3. Please indicate the University you are currently having your studies:

**Czech Republic**
- [ ] The Czech Technical University in Prague (CTU)
- [ ] University of Economics Prague
- [ ] Czech University of Life sciences Prague

**Slovenia**
- [ ] University of Ljubljana
- [ ] University of Maribor
- [ ] University of Primorska

**Romania**
- [ ] Babes-Bolyai University (UBB)
- [ ] Technic University (UTCN)
- [ ] West University of Timisoara (UVT)
- [ ] “Alexandru Ioan Cuza” University (UAIC)
- [ ] Bucharest University (UB) or SNSPA

**Spain**
- [ ] University of Salamanca

**Portugal**
- [ ] University on NOVA Lisboa

**Israel**
- [ ] University of Bar-Ilan

**Other**
- [ ] Please specify: ___________________________________________

4. Please Indicate your field of study:
- [ ] Economics and Management
- [ ] Engineering and Technology
- [ ] Medicine and Health
- [ ] Natural science
- [ ] Formal Science (Mathematics and Statistics)
- [ ] Humanities
- [ ] Social sciences
- [ ] Applied Science and Professions
- [ ] Other: ___________________________________________
5. Please indicate your current program/level of studying:
   □ Bachelor
   □ Master
   □ Doctoral / PhD
   □ Post-Doctoral

6. Please indicate your level of involvement in University entrepreneurship activity:
   □ I have never participated in any activity
   □ I have taken an entrepreneurship course
   □ In addition to above, I have actively participated in contests as hackathons, pitching events etc.
   □ Through my involvement in University programs, I am working on my own startup
   □ I already have a startup

7. Please indicate how do you identify the quality of the following entrepreneurship activities in your University:

   **Entrepreneurship courses:**
   □ Level 1 - No course exists
   □ Level 2 - Basic lectures course
   □ Level 3 – Lectures with some additional materials but lacking practical experience or exercises
   □ Level 4 - High quality lectures with practical experience
   □ Level 5 - High quality with real success of startup coming out of the program
   □ I cannot comment since I am not aware

   **Startup contests as Hackathons, Boot-camps, Pitch events etc.:**
   □ Level 1 - No events exist
   □ Level 2 - Provided only with theoretical examples
   □ Level 3 - Provided with some practical processes of ideation and experimentation
   □ Level 4 - Provided with real/practical used cases
   □ Level 5 - High quality event with real solution being developed
   □ I cannot comment since I am not aware
8. What kind of services are provided by your University, other than entrepreneurship courses and entrepreneurship/startup events:
   □ Level 1 - There is no service for further development of business ideas
   □ Level 2 - There are some facilities in University which can provide mentorship for idea development
   □ Level 3 - I can be provided for access to working space or university business incubator
   □ Level 4 - University provides me access to external funding through companies, governments and other interested investors
   □ Level 5 - University has its own fund to invest in my startup
   □ I cannot comment since I am not aware

9. How interested are you towards working or creating your own startup?
   □ Not interested at all, neither in working or creating
   □ Interested in working, but not creating
   □ Interested in working, and in later stage starting my own
   □ I would like to connect with other people so we can build a startup together
   □ I am passionate about building my own start up

10. How active are your university student organizations in entrepreneurship initiatives?
    □ Level 1 - We do not have any active student organization involved with entrepreneurship initiatives
    □ Level 2 - The student organizations organize from time to time talks on different entrepreneurship themes
    □ Level 3 - The student organizations are involved in organizing events as Job Fests and other activities for carrier development
    □ Level 4 - The student organizations are actively organizing entrepreneurship activities as Hackathon's, Boot-camps, Idea development, and other startup events
    □ Level 5 - We have an active alumni network that can connect us to corporates and investors
    □ I cannot comment since I am not aware

Skills development

11. Soft skills and competences

   Please indicate your level of confidence in your soft skill and competences on the 5-point scale from Not Confident to Extremely Confident. Below each skill is a practical definition of what is the ability that you have while possessing a certain skill.
<table>
<thead>
<tr>
<th>Skill</th>
<th>Description</th>
<th>Not Confident</th>
<th>Slightly Confident</th>
<th>Moderately Confident</th>
<th>Very Confident</th>
<th>Extremely Confident</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Speaking</td>
<td>I can easily present and speak publicly and make a talk/speech to various audiences.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effective listening and communication</td>
<td>While talking to others, I am able to concentrate and listen with understanding of people's perspectives and provide a constructive feedback.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Problem solving</td>
<td>I am able to identify problems, conduct appropriate analyses in seek of best solutions and involve others in seeking focused solutions.</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Creativity</td>
<td>I am able to use my knowledge and imagination to create innovative concepts and ideas.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leadership</td>
<td>I have the ability to inspire and bring people around idea and set goals and values for the team.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teamwork</td>
<td>I am able to work and collaborate productively in diverse teams with different cultural backgrounds/mindsets, and effectively negotiate differences.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business awareness</td>
<td>I have the ability to discover and recognize the opportunities in business landscape and transform them in sustainable model.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-Awareness</td>
<td>I am able to recognize and understand my emotions, feeling, behaviors and make continues self-improvement.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Empathy</td>
<td>I am able to understand how people around me feel and how to effectively respond to their emotions.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motivation</td>
<td>I am able to motivate myself to accomplish the tasks and goals that I have set for myself.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stress tolerance</td>
<td>I am able to keep my stress levels under control in a difficult control while I seek for a solution.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flexibility</td>
<td>I am open-minded and have ability to quickly adapt my ideas to make use of emerging opportunities.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Design Thinking</td>
<td>I am able to understand different sides of the problem, challenge assumptions to identify alternatives, ideate and test solutions that might not be instantly apparent.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ecosystem thinking</td>
<td>I can consciously make actions considering all stakeholders in the system including environmental and cultural factors to accomplish a meaningful outcome.</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Self-Confidence</td>
<td>I trust myself that I have the ability to ultimately achieve my set goals.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
12. Financial skills

Please identify your confidence in ability to execute the following financial skills on the 5-point scale from Not Confident to Extremely Confident.

<table>
<thead>
<tr>
<th>Financial skill</th>
<th>Not Confident</th>
<th>Slightly Confident</th>
<th>Moderately Confident</th>
<th>Very Confident</th>
<th>Extremely Confident</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creating a budget for specific project</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Creating and analyzing Cash flow</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sales forecasting</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Breakeven analysis, Profit &amp; Loss Analysis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sources and uses of investment funds</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

13. Technical skills

The following table consist of technical skills and technologies. Please identify your awareness and ability to execute the following technical skills and themes on the 5-point scale from Not Aware to Expert user.

<table>
<thead>
<tr>
<th>Technical skill</th>
<th>Not Aware of it</th>
<th>Have heard of it, but don't know how it's used</th>
<th>I am aware and know of some used cases</th>
<th>I have some experience and have been involved in some used cases</th>
<th>I am very passionate in using this technology and have become an expert user</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobile applications development</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Web and software application development</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social Media management</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital Marketing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cybersecurity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data analysis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data presentation and visualization</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>User Experience Design and User Interface Design (UX/UI)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business intelligence tools</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

14. Adaptation of new technologies

The following list consist of the used cases of new technologies in digital era. Please identify your awareness and knowledge of the topics on the 5-point scale from Not Aware of it to Expert user.
15. How actively do you use web resources to gain new knowledge?

- I just use sources provided by University during courses
- I search new resources when particular assignment needs to be completed
- I like to supplement the courses I have on University with other online resources
- I am often curious about new topics, skills, knowledge connected to my area of studying
- I actively take other online courses on new topics to develop new skills that are not part of my courses or lectured at my University

16. What kind of online learning platforms do you use:

- Social media groups
- Forums
- Specialized Online Communities
- Coursera
- EdX
- Udemy
- Udacity
- Open learning
- Khan Academy
- YouTube channels
- Other: ________________________________
- None