



BE 21
SKILLED

Regional Skill Councils Blueprint

Building an
Ecosystem
for 21st Century Skills
Education in STEM



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EXECUTIVE SUMMARY



- A stakeholder theory explains why collaboration between higher education institutions and external stakeholders such as industry representatives is important. By engaging with external stakeholders, higher education institutions can increase their institutional effectiveness, foster culture of continuous improvement, enhance reputation, and contribute to a better 21st century skills development.
- The following approaches for stakeholder engagement in higher education can be distinguished in the scientific literature: ‘the voice of customer or the voice of stakeholder’; ‘continuous improvement based on stakeholders’ needs’, ‘creating shared value’, ‘open innovation’ and ‘compliance to the labour market demands’.
- In Latvia, STEM sector engages in higher education through various channels: through direct partnerships between employers, their associations and higher education institutions, and by participation in sectoral expert councils. There are seven sectoral expert councils which are relevant for STEM fields. They develop sectoral qualification frameworks, agree on occupational standards, participate in planning educational offer, quality assurance and evaluation of learning outcomes. Employers and sectoral associations participate in all phases of higher education starting with planning an offer and developing study programmes and finishing with final examinations and thesis defence. Associations act as the intermediaries and are active promoters of cooperation between higher education and employers. The main challenge that employers seek to address through co-operation, is the lack of qualified specialists as too few young people choose to study STEM fields and too few graduate.
- In Serbia, the main mechanisms to integrate 21st century skills in higher education curriculum are the council of employers in higher education institutions, dual model of studies and sectoral skills councils. All these mechanisms were implemented in Serbian higher education system in recent years. The councils of employers are the advisory boards to higher educational institutions which provide the information on modern trends and needs in the labour market, facilitate the continuous improvement of study programmes and provide extracurricular support to students. Dual-model studies can be implemented as a stand-alone study program or as a module within the study program. Sectoral skills councils analyses the labour market demand, identifies qualifications, decides on the qualification standards and promotes the dialogue between the world of work and education.
- A blueprint for stakeholder engagement, or in other words, a model for co-operation between higher education institutions and employers, was elaborated based on the literature review and interviews with the industry representatives. It provides a list of cooperation areas in all main phases of higher education, and the division of responsibilities between stakeholders involved. It can be used as a ‘menu-offer’ for establishing or advancing co-operation between higher education institutions and industry representatives for better development of 21st century skills.

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INTRODUCTION

The rapid change of technology, growing globalisation and internationalisation, in addition to the shift from industrial to knowledge-based economies, has accelerated the need for 21st century skills. Well-rounded 21st century skills are vital in battling an uncertain future and aiding Europe in being more resilient and responding better to looming threats. Science, technology, engineering, and mathematics (STEM) graduates are often reported to lack 21st century skills by employers, which in turn prevents them from innovating, developing, and adapting in uncertain, volatile times.

The **Be21Skilled project** argues that the introduction of 21st century skills and their integration into existing curricula has the potential impacts of firstly, creating more competent, job-ready STEM graduates, and secondly, fostering a support system and by extension increasing retention rates of at-risk female STEM students. Therefore, there is a clear need in fostering 21st century skills by upskilling both STEM teachers and students. The objectives of the project are to:

- Facilitate the understanding and identification of 21st century skills in region-specific and labour-market relevant contexts through multi-stakeholder collaborative efforts.
- Foster the HEI teachers' abilities to instil 21st century skills in their students via training and feedback loops.
- Enhance the skills among students to increase their employability and capitalise on their innovative potential.
- Improve the understanding of non-female STEM actors (students, teachers, employers, etc.) on the need to support female STEM students and instil 21st century skills in them.
- Innovate the curricula by embedding tools targeted at developing particular skills in students.



The **Regional Skill Councils Blueprint report** aims to facilitate the understanding and identification and development of 21st century skills in region-specific and labour-market relevant contexts through multi-stakeholder collaborative efforts. The report details the modalities and aspects of setting up a successful diverse multi-stakeholder constellation tasked with assessing and developing the 21st century skills guided by the labour market needs, technology trends and any differences stemming from gender.

The report consists of the following main chapters:

- The first chapter describes criteria for engaged and entrepreneurial universities as a favourable environment for 21st century skills development.
- The second chapter describes the theoretical framework for various stakeholder engagement strategies and approaches, based on the scientific literature review.
- The third chapter describes the existing national experience and mechanisms for stakeholder engagement in Latvia and Serbia - the countries in which the results of the project will be piloted. It also summarises the conclusions from the stakeholder interviews, including on suggested improvements.
- A proposal for stakeholder engagement blueprint, detailing the stakeholder engagement model, main mechanisms and responsibilities, is described in the fourth chapter.
- The main conclusions, references and annexes are added at the end of the report, but the executive summary – in the beginning of the report.

The project team:



ENGAGED AND ENTREPRENEURIAL UNIVERSITIES AS ENGINE FOR 21ST CENTURY SKILLS



01

01 | ENGAGED AND ENTREPRENEURIAL UNIVERSITIES AS ENGINE FOR 21ST CENTURY SKILLS

In the 21st century, the skills needed to succeed in the workforce have evolved significantly, and this is likely to be *modus operandi* in the future as well. To support the development of 21st-century skills, the European Skills Agenda (2020) emphasizes the importance of entrepreneurship education and training, as well as digital skills development. As a result, universities have recognized the need to develop curricula that equip students with the skills and competencies necessary to thrive in the modern workplace. With the emergence of various happenings in the world (pandemics, wars, climate change etc.) by extension, the world of work has become highly volatile, uncertain and unpredictable. In the face of various adversities and changes, the presence of skills that help cope with these unpredictable moments are often more important than hard skills. These skills, often referred to as 21st century skills, include empathy, critical thinking, communication, collaboration, digital literacy, and emotional intelligence and similar. These have been increasingly recognised as needed by the labour market, and universities in particular play a crucial role in harnessing these. Preparing graduates to become comfortable with change, flexible in mindset and creative in finding solutions has been a critical task of universities and one that cannot be achieved with obsolete, traditional and rigid curricula that are often solely focused on hard skills.

Entrepreneurial and engaged universities are those that actively promote entrepreneurship, societal-engagement and innovation among their students and faculty. As defined by ACEEU (Accreditation Council for Entrepreneurial and Engaged Universities) engaged and entrepreneurial universities are those that among others, have a clear and captured commitment towards being entrepreneurial/engaged. These university embed the spirit of entrepreneurship and engagement into their DNA by making it part of various structures, processes and decisions. These universities recognize the importance of equipping students with the skills and competencies needed to succeed in a rapidly changing world. They encourage students to develop their entrepreneurial mindset, creativity, and problem-solving abilities, which can lead to the development of new products, services, and businesses.

To support the development of 21st-century skills, universities often offer courses and programs that focus on topics such as innovation, design thinking, and entrepreneurship. They can also provide opportunities for students to work on real-world projects, engage with industry experts, and participate in internships and other experiential learning opportunities. Additionally, universities can offer funding and support for student-led start-ups, which can help students to gain practical experience and develop their entrepreneurial skills. Further support can involve providing students with access to mentors and advisors who can offer guidance and support, as well as fostering a culture of respect and collaboration among students. All of these are a fertile ground to honing 21st century skills, by applying them and bring them to the real-life setting through learning institutions.

In order to effectively develop 21st century skills, universities should focus on creating a supportive and inclusive learning environment, on their path to becoming more entrepreneurial and engaged.



STRATEGIES AND APPROACHES FOR STAKEHOLDER ENGAGEMENT: THEROETICAL FRAMEWORK





02 | STRATEGIES AND APPROACHES FOR STAKEHOLDER ENGAGEMENT: THEROETICAL FRAMEWORK

Stakeholder theory is a management approach that was first developed by Freeman in 1984. The theory proposes that organizations should consider the interests of all their stakeholders when making strategic decisions, not just the interests of shareholders or owners. Only when the interests of all stakeholders are considered, the organisation can achieve the success (Rowley, 1997; Li et al., 2018; Flammer & Bansal, 2017; Freeman et al., 2021; Carayannis et al., 2018; De Freitas Langrafe et al., 2020). According to the stakeholder theory, bringing together various interested parties to achieve common goals (Donaldson & Preston, 1995) adds value to development and prioritizes sustainable stakeholder relationships over maximizing returns to capital owners, representing a departure from traditional business understanding (Freeman et al., 2021). A stakeholder-based approach to strategic management can help organizations to achieve long-term success by creating value for all stakeholders, building trust and legitimacy, and promoting sustainability and resilience. Interested parties cooperate not only to obtain financial benefits now but think in terms of sustainable development (Xu & Zhou, 2022).

Stakeholders are defined as individuals or groups who have an interest or concern in the activities of the organization, and who can be affected by its decisions or actions (Mainardes et al.; 2010; Waligo et al., 2013). Stakeholders can include employees, customers, suppliers, partners, and the broader community in which the organization operates.

Stakeholder theory may be useful in higher education to help explain the attention paid to the various communities in the environment and the relationships between a university and its communities (Jongbloed et al., 2008). It also explains why collaboration between HEIs and external stakeholders is important. By engaging with external stakeholders, HEIs can enhance their reputation, build strong partnerships, and create

value for their stakeholders. This can lead to long-term success for the institution and its stakeholders. By engaging with internal stakeholders, HEIs can create a positive work and learning environment, foster a culture of continuous improvement, and enhance stakeholder satisfaction and commitment. Such efforts lead to increased institutional effectiveness, productivity and success resulting in better equipped students with the skills and knowledge needed to succeed in the job market and drive economic growth. Many researchers (Jongbloed et al., 2008; Mainardes et al., 2010; Marić, 2013; Degtjarjova et al., 2018; De Freitas Langrafe et al., 2020; Nikitina & Lapiņa, 2019) agree that cooperation with external stakeholders provide HEIs the competitive advantage and sustainability.

Burrow (1999) divided higher education stakeholders into two groups:

01 internal stakeholders

▶ Students, HEIs staff, board members

02 external stakeholders

▶ Graduates, employers, parents, advisory boards, government institutions, non – governmental institutions, industry associations and industry partnerships.


The ability to maintain strong relationships with both groups determine the success of HEIs (Kettunen, 2014). Waligo et al. (2013) also suggests to define primary and secondary stakeholders, as well as to identify cooperation factors and the areas of responsibility.


As a first step to establish the cooperation, the key stakeholders, their needs, goals and expectations should be identified. Having a clear understanding of who the stakeholders are and what their expectations and interests are, is crucial for HEIs to create effective strategies and make informed decisions that will benefit both the organization and its stakeholders. The second step is setting up the means to meet their goals to their utmost satisfaction concurrently accomplishing the organizational mission (Marić, 2013). Meeting the needs of these individuals or groups is an important competitive factor for higher education institutions (Mainardes, 2010).


Nowadays stakeholder needs analysis is used to manage modern HEIs in a changing environment, it helps to understand the importance of cooperation in the education system and its impact on the competitiveness of students and HEIs. The main criterion that determines stakeholders' influential power is expected benefits. Depending on the stakeholders, it can be career opportunities, remuneration, status, reputation, income, quality of education, municipal teaching staff, welfare and competitiveness, stability, etc. (Degtjarjova, Lapina & Freidenfelds, 2018; Barokas & Santos, 2018).

According to Li (2018) stakeholders also represent important sources of external knowledge for development of organization (Li et al., 2018). The **continuous improvement theory** is based on the idea that organizations should continually strive to improve their processes and services in order to meet the evolving needs and expectations of their stakeholders. A concept of “learning organisation” was first introduced by Senge (1999) and it means ‘(...) organizations where people continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning to see the whole together’ (Senge, 1990, 3). Developing organisations engage in continuous process of self-review and development in the pursuit of “total quality” in all aspects of their work (Oldroyd, 1993). A self-learning” system or “developing” model can help to cope with constant changes. In education, changes are not linear, but rather interconnected dynamically complex processes (Fullan, 1999). According to Fullan (1999), developing organisations consider change as a normal part of their work and accept them not as another imposed novelty but as a lifestyle. Learning organisations do not ignore the external environment, but admit that there are much more ideas outside the organisation than inside. They also perceive the forces of change as inevitable and necessary for learning and growth (Fullan, 1999). Adapting a learning organisation model is particularly relevant for HEIs as they play a critical role in developing the skills and knowledge of the next generation of leaders and innovators.

According to the research, HEIs should focus on several key requirements to ensure continuous improvement:

- 01**  **Improving organizational processes:** HEIs should strive to continually improve the efficiency and effectiveness of their processes, from student admissions to curriculum design and delivery, in order to provide high-quality education and support services to their students (Jongbloed et al., 2008; Lindner et al., 2021b; Marić, 2013; Jose, 2016; De Freitas Langrafe et al., 2020; Carayannis et al., 2018).

- 02**  **Creating added value:** HEIs should focus on creating value for their students, faculty, staff, and other stakeholders. This can include offering innovative programs and services, providing opportunities for personal and professional development, and fostering a supportive and inclusive campus culture (Kettunen, 2014; Bettiol et al., 2016; Nikitina & Lapiņa, 2019; De Freitas Langrafe et al., 2020).

- 03**  **Achieving stakeholder satisfaction:** HEIs should prioritize the needs and expectations of their stakeholders, including students, faculty, staff, graduates, investors and social partners. This requires regular communication, feedback, and engagement to ensure that the institution is meeting the diverse needs of its stakeholders (Degtjarjova, Lapina & Freidenfelds, 2018; Barokas & Santos, 2018).

The role of stakeholders in the learning organisation model is closely linked with the idea of **‘the voice of customer’ approach**, widely used in the corporate world. It is based on the principle that information by stakeholders on their experiences and expectations is an integral part of the quality management processes of an organisation (Griffin & Hauser, 1993). There are many practical techniques to gather such information, including customer interviews, surveys, chats, calls, public communication, gathering net promoter score, focus groups, emails, feedback forms (Sharma, 2022).

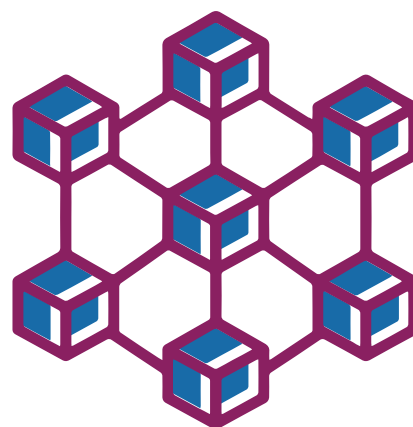
In recent years, there has been increasing pressure on HEIs to shift from focusing primarily on teaching and performing research, to encompass a broader scope of activities to ensure contribution to society, labelled as the Third Mission. Compagnucci and Spigarelli (2020) describe the Third Mission of the HEIs as the sum of all activities concerned with the generation, use, application and exploitation of HEI knowledge, capabilities and resources, outside of the academic environment. This collaboration between academic and society seek to contribute to the social, cultural and economic development of communities. As part of this expansion, HEIs actively engage in providing services to their communities and establishing partnerships with stakeholders in the surrounding areas (Jongbloed et al., 2008). This indicates the importance of knowledge transfer in creating effective stakeholder relationships between universities, businesses, and the wider community. According to McAdam et al., (2012), knowledge transfer can take various forms, such as joint research projects, collaborations, training programs, or technology transfer agreements. Research conducted by HEIs can lead to breakthroughs and innovations that can benefit industry and society in numerous ways (Jose, 2016) to facilitate commercial development, including the creation of innovative products and technologies that have practical applications in the market, benefiting both HEIs and industry (Ozoliņš et al., 2018).



The role of stakeholders in the knowledge transfer from higher education is closely linked to **the open innovation theory** which examines the role of networks in developing the necessary capabilities for organizations to remain competitive and how they fill knowledge gaps and develop technological, marketing, management, and ICT capabilities (Bettioli et al., 2016). The term ‘open innovation’ was coined by Chesbrough (2003) who defined it as follows: “a paradigm that assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as the firms look to advance their technology.” The theory of open innovation is based on the idea that not all good ideas are developed within the own company, and not all ideas should necessarily be further developed within the own firm’s boundaries. Instead, the involvement of other parties when developing new products and technologies can be of great added value (van de Vrande et al., n.d.).

According to the research summarised above, the following principles and mechanisms of stakeholder engagement create the value for HEIs:

- 1 Identification of stakeholders and exchange of information about stakeholders’ needs;
- 2 Development of a relationship of mutual trust between stakeholders and the organization;
- 3 Inclusion of stakeholders in the strategic planning process;
- 4 Involvement of stakeholders in the decision-making process;
- 5 Considering the stakeholder feedback in the process of continuous improvement;
- 6 Ensuring transfer of knowledge to benefit economic and social development.



The following approaches for stakeholder engagement in higher education can be distinguished in the scientific literature (Table 2.1).

Approaches	The main idea	Authors
Voice of customer or voice of stakeholder	Gathering information regarding what stakeholders think and feel about their experiences to learn about their expectations and experience regarding services provided, as part of the quality management process.	Griffin & Hauser, 1993
	Opinions of the higher education stakeholders and students as the voice of customers in higher education and a factor to assess the performance and quality of higher education.	Degtjarjova, Lapina, & Freidenfelds, 2018
	Stakeholder participation in decision-making as significant component of Corporate Social Responsibility.	Edinger-Schons et al., 2020
Continuous improvement based on stakeholders' needs	Stakeholder needs analysis is integral part of modern HEI management and a good starting point for the improvement.	Marić, 2013.
Creating shared value	The relationships between HEIs and their stakeholders can be improved based on the principles of stakeholder theory.	De Freitas Langrafe et al., 2020
	The changing approaches to the role of business in society they can become the initiator of change.	Jose, 2016
	For cooperation to be successful, identification of the interests of partners is crucial.	Rowley, 1997
	Stakeholder synergy creates new value opportunities by increasing value for multiple groups without reducing value for any one group.	Tantalo & Priem, 2016



Approaches	The Main Idea	Authors
Open innovation	Open Innovation combines internal and external ideas into architectures and systems whose requirements are defined by a business model. Involving other parties when developing new products and technologies can be of great added value.	Chesbrough, 2003
	Participation of an organisation in networks can facilitate the development of the necessary capabilities to remain competitive, including fill the knowledge gaps and develop technological, marketing, management, and ICT capabilities.	Bettiol et al., 2016
	Cooperation with stakeholders is important in building ecosystems for innovation.	Carayannis et al., 2018
	The principles of openness, transparency and stakeholder involvement in international standardization align with the concepts of open and responsible innovation, and the standardization process can be characterized by the inbound, outbound, and interaction processes.	Pīlēna et al., 2021
Compliance to the labour market demands	By creating collaborations between different partners, an ecosystem is formed that enhances the necessary skills of students in the labour market.	Nikitina et al., 2020
	By incorporating entrepreneurship education into their curricula, HEIs can enhance their students' competitiveness in the job market and contribute to the lasting impact of entrepreneurship education in universities worldwide.	Nikitina et al., 2022

Table 2.1. Approaches and principles for stakeholder engagement in higher education

Although the research suggests clear benefits to stakeholder engagement in higher education, day-to-day practice show that HEIs mostly engage in interactions with their traditional stakeholders, such as students, fellow researchers, funding organizations, research sponsors, et cetera. Jongbloed, Enders and Salerno (2008) have identified three main barriers that prevent HEIs from the wider type of community engagement, including working with industry:

1



The determination of the research agenda and the educational offerings of universities: the public research agenda and the supply of educational programs may be very different from the demands expressed by the private sector.

2



The internal reward structure of universities: funding parameters that determine the public budget often do not include rewards for regional engagement or community interaction, the research assessment criteria do not take into account engagement with non-academic communities.

3



The lack of an entrepreneurial culture in universities: the defining identity of academic staff characterised by independence of thought and action and reluctance to be driven by external demands in the sense of consulting or contract opportunities.

All this means that the undertaking of the active stakeholder engagement is still obstructed by many institutional barriers, implying that the acceptance of a third mission of HEIs is not a straightforward action. Thus, a theoretical model for stakeholders' engagement in higher education can provide a clear roadmap of engagement opportunities and potential action for all involved higher education and business stakeholders. Promoting awareness and developing incentives to overcome the barriers is further recommended in order to implement the engagement model in practice.



NATIONAL EXPERIENCE AND MECHANISMS FOR STAKEHOLDER ENGAGEMENT



03 | NATIONAL EXPERIENCE AND MECHANISMS FOR STAKEHOLDER ENGAGEMENT

3.1. Stakeholder engagement mechanisms in Latvia

System for stakeholder consultation and engagement in higher education

Consultation mechanisms on the national level


The National Tripartite Council is the main tripartite consultation mechanism between the government and the social partners in Latvia. It has one sub-council that is devoted to the education and employment issues: The Vocational Education and Employment Sub-Council (in Latvian – *Profesionālās izglītības un nodarbinātības trīspusējā sadarbības apakšpadome*, hereinafter – PINTSA). The PINTSA has been established to promote the cooperation of the government, employers and trade unions in the field of development and implementation of national policy and strategic human resources development, education and employment. Employers' representatives are nominated by the Employers' Confederation of Latvia (LDDK), employees' representatives - by the Free Trade Confederation of Latvia (LBAS), and state representatives are nominated by the ministries specified in the PINTSA regulation.

PINTSA is responsible for establishment and monitoring the operation of the Sectorial Expert Councils (SECs) which are the tripartite consultative boards dealing with human resource development in particular sectors. PINTSA is also responsible for adopting sectoral qualification frameworks, occupational standards; it decides on the number of learners to be financed by the state budget in vocational education. In these decisions, PINTSA relies on the recommendations of SECs. The Secretariat of PINTSA is based in the Ministry of Education and Science.

In addition, the Ministry of Education and Science has also established various other decision-making or advisory working groups on specific issues. For example, there is an Adult Education Management Board which (Izglītības un zinātnes ministrija, 2020):

- ensures inter-institutional cooperation and information exchange in the field of adult education,
- determines and approves the goals and objectives of adult education,
- provides proposals for the development of normative acts and policy planning documents and for the necessary improvements of the adult education system,
- decides on the principles of distribution of funding intended for adult education; - provides proposals for improving the offer of adult education,
- carries out a regular assessment of the results and effectiveness of the implementation of adult education, including the implemented EU projects,
- approves quality criteria for adult educators.





Representatives from various ministries and state administration institutions, municipalities, trade confederation, as well as representatives of national employers' organizations are involved in the Adult Education Management Council.

Organizations of social partners, including LDDK, are also involved in various working groups established by ministries to solve specific issues, develop regulatory acts or their amendments, and monitor the implementation of public projects. Social partners also have the right to participate in the official process of harmonization of regulatory acts by submitting objections and coordinating them with the responsible ministries.

Consultation mechanisms at the sectoral level

In 2022, there were 13 SECs established in Latvia. According to Professional Education Law (1999), the aim of SECs is to promote the compliance of sectoral VET with the requirements of the labour market, increase its efficiency and quality and to promote the cooperation among all stakeholders. The main responsibilities of SECs as defined by the Professional Education Law (1999) are and other normative acts are:



- Development of the sectoral qualification frameworks.
- Considering the elaborated occupational standards and professional qualification requirements, including proposing partial qualifications included in professional qualifications to facilitate lifelong learning. SECs also decide about the need to update professional qualification requirements and delegate experts to elaborate or update professional qualification requirements.
- Participating in the planning of the network of VET institutions and VET programme offer. SECs elaborate proposals for the admission plans of VET institutions. SECs are also consulted about the number of state-financed places in higher education.
- Delegating experts for licensing and accreditation procedures and for qualification exams. In Latvia, all expert panels of higher education study fields accreditation procedures have to include employer representative, which is delegated by the LDDK in consultation with the SECs. At least half of the qualification examination commission must be representatives of employers. SECs have the right to nominate their independent examination experts. As of 2022, the Professional Education Law provides for the right to establish independent sectoral examination institutions, but none is operational yet. In regulated occupations, which are regulated by specific regulations, however, sectoral certification institutions exist and are well established.
- Facilitating cooperation between employers and VET institutions in organising work-based learning and traineeships.
- Addressing any issues related to employment, demand and supply in the labour market of the relevant sector.

Thus, the SECs in Latvia have the legitimate basis to define the labour market demands for education in their specific sector.

The SECs established in Latvia representing STEM fields are the following:



- 01 ▶ Chemical and Environmental SEC

- 02 ▶ Construction SEC

- 03 ▶ Timber industry SEC

- 04 ▶ Energy SEC

- 05 ▶ Metalworking, machine building, mechanical engineering SEC

- 06 ▶ Manufacturing of electronic and optical equipment, ICT SEC

- 07 ▶ Transport and Logistics SEC

SECs are tripartite, representatives of employers and professional organizations, representatives of employees and the state participate in them with voting rights. Representatives of employers and professional organizations must make up at least half of the composition of the SEC. The SECs meet at least 4 times a year and has the right to form sub-councils and working groups. LDDK is the national coordinator of the SECs in Latvia, and it supports the work of 11 SECs.

SECs involve all of the main organisations that have both expertise on the industry situation and motivation to deal with

education development issues. 173 organizations and 238 voting experts, as well as additional invited observers, participated in eleven SECs coordinated by LDDK in 2022 (LDDK, 2023). Considering that experts involved in SECs represent sectoral or professional organisations, the SECs legitimately speak on behalf of the sectors and the representativeness and sustainability of decisions is ensured. Thus, experts involved in SECs are in the best position in Latvia to formulate the needs for qualified workforce, considering their expertise of the industries and labour, while simultaneously understanding the education system.

Sometimes sectoral associations are also engaged in cooperation with individual educational institutions, e.g., by participating in the governing bodies or being consulted about the programme development issues.



Cooperation and consultation mechanisms for universities with individual employers

Cooperation between higher education institutions and employers largely depends on the interest of both parties and the specifics of the study program. Higher education institutions should develop cooperation with various institutions and employers to ensure better achievement of the aims and learning outcomes of the study field and the relevant study programmes. The cooperation partners should be selected in view of the specific features of the study field and the relevant study programmes.

In certain higher education processes in Latvia, in particular in case of professional study programmes, the participation of employers is mandatory, for example in provision of traineeships, in professional qualification examination commissions, as well as in collecting and providing feedback. The effectiveness of employer engagement is evaluated during the accreditation of study fields at the respective higher education institution (AIKA, 2021). Employers are active participants of the accreditation procedure, both as members of the accreditation commissions and are also in the interviews.

Usually, higher education institutions involve employer representatives in the management of the university, for example, in the Faculty Council, in the planning of study programmes and their implementation, including by inviting industry representatives to become guest lecturers, by concluding cooperation agreements on traineeship provision, by involving them in formulating topics for final thesis or even in development of the final thesis, as well as by inviting them to participate in thesis defence and in professional qualification examination commissions. In examination commissions, at least half of examination experts should be employer representatives. The traineeships and professional qualification examinations are mandatory only in case of professional study programmes, not in case of academic study programmes. The most active higher education institutions also organize other events in cooperation with employers, such as hackathons, projects to ensure technology transfer and develop innovative products, provide industry mentors, and others.



Summary of interviews with STEM employers about their involvement in higher education in Latvia

Seven interviews with Latvian STEM employer representatives were conducted to learn about their involvement in higher education, main challenges and successful aspects in industry – higher education cooperation, as well as their suggestions to improve development of 21st century skills. Six STEM sectors were covered by the interviews:

1. **Energy sector** (an expert involved in all types of stakeholder organisations: individual employer, sectoral association and SEC);
2. **Information communication technologies sector (ICT)** (a representative of individual employer);
3. **Metalworking and mechanical engineering industry** (a representative of both, sectoral association and SEC);
4. **Chemical industry** (a group of representatives of individual employer and a representative of both, individual employer and sectoral association);
5. **Production of electronics and electrical engineering industry** (a representative of sectoral association and SEC);
6. **Wood industry** (a representative of sectoral association)

Experience of involvement and cooperation with HEIs



STEM employer representatives interviewed all had significant cooperation experience with the higher education sector. Representatives of SESs mentioned involvement in licencing and accreditation procedures, as well as development of occupational standards. Employer associations and individual employers had the most significant experience in all processes of higher education:

- ▶ **planning processes** (engagement with the Ministry to develop education system, development of occupational standards);
- ▶ **development and implementation of study programmes** (development of study programmes, development of training materials, offering traineeships and other practical experience, including excursions to companies, co-operating with students and researchers in problem-solving, offering topics and supporting preparation of thesis, participation in thesis defence);
- ▶ **governance and improvement** (supporting teaching staff skills development, for instance by offering internships, organising discussions, excursions and research presentations for teaching staff, as well as participating in Advisory Councils);
- ▶ **cooperating with HEIs** to ensure continuous learning opportunities to employees;
- ▶ **implementing initiatives to promote STEM fields to young people**, to support excellence in STEM subjects.



It was evident that boundaries between individual employers, employer associations and SECs were often blurred, as the same representatives are often involved in various forms of stakeholder organisations. It was stressed that the associations should be not viewed as something separate from employers, but rather as a group of employers. While cooperation at a practical level most often take place between HEI and employer, associations support and promote cooperation development between employers and universities by raising awareness and engaging more employers. And the most active association and employer representatives also participate in the SECs where they are responsible for planning sectoral education offer.

Differences in various regions and at different levels of education

According to the employer representatives, no significant regional differences can be spotted in the way how employers cooperate with educational institutions. The distance usually wasn't the obstacle, and employers from all regions cooperate with the specific educational institution that is important for the sector. Other more significant factors that determine the choices and successes of the partnership were mentioned:

- 1 ► The specific demand of the sector or individual employer. The demand for higher qualification specialists require cooperation with HEIs, but in case medium level specialists are needed, employer cooperates with VET institutions.
- 2 ► The goals of the educational institution and their compatibility with the goals of the employers, the interest and responsiveness of the people involved.



Main challenges in industry – higher education cooperation

The main challenge stressed by four STEM sectors was the lack of qualified specialists. Too few young people choose to study in STEM fields, too few have sufficient basic STEM knowledge to complete their studies, too many do not complete their studies and too few graduate leaving industries in constant labour shortage.

The existing offer and situation in higher education was also found to be insufficiently competitive: study

programme offer was often too fragmented, able to attract only few students and the capacity of HEIs to attract and retain passionate teachers was comparatively low.

Finally, the lack of proactivity of HEI leaders, lack of systematic cooperation, especially in evaluating and improving study content, and slow pace of problem-solving were also mentioned as important obstacles.

Successful aspects in co-operation

Almost all industry representatives stressed that industry partners are very interested in co-operation, especially due to the situation in the labour market. Many also mentioned specific positive experiences of cooperation with interested universities and lecturers. There were many various opportunities for co-operation, and the most often mentioned as successful were: occupational standards development, providing traineeships and the involvement of industry in the development of doctoral theses and research. One employer even mentioned that they offer a “menu list” of co-operation offer to their partnership educational institutions each semester.

Recommendations to better develop skills needed in the 21st century

- The industry representatives almost unanimously agreed that the most critical elements to be improved are the basic STEM knowledge and skills at schools.
- Availability and professional development of teachers was as important factor. Teachers should be able to integrate 21st century skills development in study programmes via interactive teaching methods. Co-operation among teaching staff members and with industry was seen as a tool to enhance teaching efficiency and to co-ordinate and improve study content, learning outcomes and methods. As the most important 21st century to be developed, learning to learn, digital skills, soft skills, problem-solving and analytical skills and emotional competencies were mentioned.
- Ensuring industry and practical experience via various methods was mentioned as another possible method to improve leaning experience. These may include traineeships (preferably in several enterprises), practical tasks, workshops, simulations, case studies, trips, projects, camps, problem-solving, thesis development et cetera.
- Industry representatives also expressed firm interest in co-operation in study programme development. Study programme content should be evaluated each year and learning materials should be updated accordingly.
- Industry representatives also expressed wish that HEIs more actively work on reducing the drop-out rate, developing adult learning offer, work with families, schools and industry to attract young people to STEM fields, and overall develop their competitiveness to attract young people.
- Finally, agreeing on common goals and involving the right people motivated to co-operate, could also be helpful to achieve positive results.

3.2. Stakeholder engagement mechanisms in Serbia

System for stakeholder consultation and engagement in higher education

Until now, 21st century skills are not formally integrated into the curricula of Serbian HEIs. There are three main mechanisms which enable engagement of stakeholders in higher education system of the Republic of Serbia. Those mechanisms are:

- Council of Employers
- Dual Model of Studies and
- Sector Skills Councils

In addition to three mentioned and already established/formalized paths there is also informal individual engagement of stakeholders due to their history of cooperation with HEIs or their background in education or through their activities connected to the alumni associations. This informal engagement can be also considered as relevant and sustainable solution for integration of 21st century skills into curricula, particularly with respect to the STEM field.



Council of Employers in HEIs

Republic of Serbia adopted Law on Higher Education in 2018¹. In the Chapter VI, Article 60, regarding the Bodies of a Higher Education Institution, it is stated that *'The higher education institution, for the purpose of realizing cooperation on the development of study programs, in line with the needs of the labor market, has a council of employers.'* Although the Law states that *'Independent higher education institutions shall comply their organization and general acts with this Law within six months from the date of entry into force of this Law'* (Article 143), it is not clear whether all Serbian HEIs have established Council of Employers and there are no mechanisms to follow up the current situation, but certainly it is the first path of stakeholders cooperation to ensure better 21st century skills. Obviously, the idea was that the Council of Employers, as an advisory board, will provide in a systematic way the information on modern trends and needs in the labor market and help in the continuous improvement of study programmes and teaching and provide extracurricular support, with the aim of harmonizing the competencies of graduates with the demands of the modern market. Among other things, because the success of colleges and universities in the world is also measured by how quickly their graduates find work.

It is planned that the Council of Employers will be connected with the Chamber of Commerce of Serbia, while the Ministry will submit lists of the best graduates to the Chamber. The term of office of the members of the Council lasts four years starting from the date of the constitution. Generally, the Council of

Employers consists of representatives from business, scientific and professional fields in which the HEI has accredited study programs, as well as representatives of employers who are interested in hiring staff educated by the HEI.


Dual Model of Studies in Higher Education

The second mechanism enabling engagement of stakeholders in higher education was established by adopting dual model of studies in higher education in Serbia. The basic elements of this model have been elaborated through the Erasmus+ CBHE project “Implementation of Dual Education in Higher Education of Serbia” (DualEdu)². On 18 September 2019, the National Assembly of the Republic of Serbia adopted the Law on the Dual Model of Studies in Higher Education published in the Official Gazette No. 66/2019 dated 18 September, 2019. The Law regulates the dual model of studies in higher education, which is implementation of curriculum in higher education study programs through active teaching at higher education institutions and practical training at the employer’s place of work, which represents learning through work and thereby acquiring knowledge, skills and abilities in harmony with the study program and the standard of qualification.

The legislator allowed higher education institutions to accredit dual-model studies as a stand-alone study program or as a module within the study program. Higher education institutions established a network of employers and, in cooperation with them, implemented a model of dual education. The legislator also stipulated conditions that employers must meet to participate in the dual education program. The mutual obligations of higher education institutions and employers are governed by the dual model contract, while the employer-student relationship is governed by a work-based learning contract. The law also stipulates the form and content of these contracts. The legislator entrusted the Serbian Chamber of Commerce to maintain a Register of Dual Model Contracts, which will be kept as an electronic database, while all data will be publicly available on the Chamber’s website. The employers have the obligation to submit the contract to the Chamber.



It is important that the Law also stipulates financial security of students: it stipulates the students’ right to compensation. The law provides criteria for determining the minimum amount of compensation.



The law was adopted to educate personnel in accordance with the needs of the labor market. By adopting this law, the legislator considered few goals of the reform of the educational system, which are being achieved, such as increasing the relevance of higher education, employing graduates, as well as modernizing the teaching process through cooperation with the economy and contact with modern technological achievements. Now just few Serbian HEIs have started to enroll students in dual studies, and the number of such students is still modest. The interest of the foreign companies operating in Serbia for dual studies (particularly those which have implemented dual studies in their countries) is high. That applies particularly to German companies which currently work on accreditation and implementation of dual studies with some Serbian HEIs.

Sector Skills Councils

Finally, as a third mechanism of involving stakeholders in education policy making including integration of 21st century skills into the curriculum, after adopting the Law on National Qualifications Framework of the Republic of Serbia (NQFS) in 2018, a legal basis was created for the formation of organizations and bodies responsible for its implementation, and in 2018 members of the NQFS Council were appointed, a Qualifications Agency was established as well as 12 Sector Skills Councils. The Government of the Republic of Serbia issued decisions on the establishment of 12 Sector Skills Councils covering the sectors of education and economy. Those Sector Skills Councils are:



- Sector Skills Council for the fields of Social Sciences, Journalism and Information
- Sector Skills Council for the fields of Health and Social Welfare
- Sector Skills Council for Industrial Development
- Sector Skills Council for Information and Communication Technologies, Electrical Engineering, Automatics and Electronics
- Sector Skills Council for Education
- Sector Skills Council for Other Services
- Sector Skills Council for Agriculture, Food Production, Forestry, Fishery and Veterinary sectors
- Sector Skills Council for Business Administration
- Sector Skills Council for the Natural Sciences, Mathematics and Statistics
- Sector Skills Council for Transport and Transportation Services
- Sector Skills Council for Trade, Hospitality and Tourism
- Sector Skills Council for Arts and Humanities.

The Sectoral Skills Councils that are relevant for STEM fields are primarily the Sector Skills Councils for Industrial Development and for Natural Sciences, Mathematics and Statistics. For instance, the main function of the Sectoral Council for the Industrial Development is to determine relevant qualifications in accordance with the needs of the labour market, scientific and technological development and society as a whole, in the following areas: textile, chemical-technological, mechanical and metal processing, construction industry, wood and processing industry, mining and metallurgy, as well as energy. Its tasks are:



- 01** ▶ Analyses the existing and determines the necessary qualifications in the sector of the Industrial Development.

- 02** ▶ Identifies qualifications that need to be modernized and identifies qualifications that no longer meet the needs of the sector of the Industrial Development.

- 03** ▶ Makes a decision on the development of a proposal for qualification standards within the sector of the Industrial Development.

- 04** ▶ Gives an opinion on the expected outcomes of knowledge and skills within the sector of the Industrial Development.

- 05** ▶ Promotes dialogue and direct cooperation between the world of work and education.

- 06** ▶ Promotes opportunities for education, training and employment within the sector of the Industrial Development.

- 07** ▶ Identifies opportunities for training adults within the sector of the Industrial Development; Considers the implications of the national qualifications framework for qualifications within the sector.

- 08** ▶ Proposes lists of qualifications by level and type that can be acquired through the recognition of prior learning performs other tasks in accordance with the Law on the National Framework of Qualifications of the Republic of Serbia.



Mandatory institutionally delegated members of the Sector Skills Councils are the representatives/experts of the Chamber of Commerce and Industry and representative associations of employers (representatives of entrepreneurs), Council for Vocational Education and Adult Education, National Employment Service, Conference of Universities of Serbia and Conference of Academies of Applied Studies, associations of vocational schools, the Ministry of Education, Science and Technological Development, the ministry responsible for the area of work covered by the Sector Skills Council, trade unions and professional associations e.g. the Serbian Chamber of Engineers.

Creating and maintaining an organized and relevant system of qualifications, as well as raising the quality of the education and training system in the Republic of Serbia, is the primary goal of the sector councils.

Summary of interviews with STEM employers about their involvement in higher education in Serbia

Six interviews with Serbian STEM employer representatives were conducted to find out their opinion about employer-higher education cooperation. All interviewees were engaged in sector skills councils as their members, four of them had long-term cooperation experience with HEIs, one has been engaged in implementing dual higher education, and one has been involved in activities of the Chamber of Commerce.

The following opinion of employers can be summarized about their involvement in higher education, main challenges and successful aspects in industry – higher education cooperation, as well as their suggestions to improve development of 21st century skills:

- 1 All of them have experience in cooperation (some of them long-term) with higher education sector in different ways. Sometimes by organizing students' traineeships, interviews related to employment, providing additional education regarding new technologies, donations, and in some cases this cooperation is related to concrete engineering problems solving.
- 2 Regarding the challenges and obstacles in implementing the cooperation, the stakeholders indicated the lack of initiative and insufficient commitment of HEIs which are not always aware of the real needs of the industry. Employer representatives request 'a better' education system that provides graduates with the knowledge of advanced technologies and software and prepares graduates to easily fit in a short period of time into the work environment.
- 3 Generally, the stakeholders appreciate the theoretical knowledge of the graduates, have positive experiences with students' traineeships and work-based learning (dual education), and are looking forward to joint research projects.
- 4 With respect to regional differences in Serbia, the cooperation largely depends on the location of the company, namely, it is likely that HEIs in vicinity of the company will develop some kind of cooperation due to the logistics issues. Also, it should be mentioned that there is uneven industrial development between regions.
- 5 Stakeholders mentioned the lack of practical knowledge and skills of students and graduates, they expect some more involvement and commitment of the Government, particularly regarding financial support, but also indicated that HEIs must improve the practical skills of their students.
- 6 Although the majority of stakeholders are not still fully aware what are the 21st century skills, they understand the importance of soft skills (in addition to technical skills) and practical trainings, development of new curricula in HEIs, further positive effects of work-based learning, focus on interdisciplinary learning and needs to foster entrepreneurship and innovations.


Finally, as one of the key findings, the stakeholders suggested completing the ongoing process of establishing the Council of Employers, with its intention to involve industry professionals to provide guidance on curriculum development and consultancy on other aspects of higher education. Additionally, all of them understand the necessity to prepare graduates closer to the real need of the labor market. So, although they have not been previously instructed on all aspects regarding 21st-century skills, they are intuitively in line with the basic ideas and concepts elaborated in the previous chapter.


A BLUEPRINT FOR STAKEHOLDER ENGAGEMENT





04 | A BLUEPRINT FOR STAKEHOLDER ENGAGEMENT


Based on the research conducted, a blueprint or, in other words, plan or a model for stakeholder engagement was elaborated. The methodological steps completed to arrive at the final model were the following:

- 1  Scientific literature review was conducted to identify the strategies, approaches and areas for industry's involvement in higher education.

- 2  The existing practices for employer engagement in Latvia and Serbia, based on literature sources and experience of authors, were described.

- 3  Based on these sources, a draft higher education – industry co-operation model was elaborated.

- 4  Partially structured interviews with industry representatives were conducted to evaluate their previous co-operation experience, to collect challenges and success factors in higher education – industry cooperation, recommendations for improvement, as well as feedback on the elaborated model.

- 5  Based on the analysis of the interviews, the model was improved. The final version is included in the Table 4.1.

	HEIs	Individual Employers	Employer Associations	Sectoral Expert Councils
1. Planning higher education offer				
Researching and agreeing on the 21st century skills, labour market trends and requirements for HE	Involved		Involved	Responsible
Development of sectoral qualification frameworks (SQF)			Involved	Responsible
Development of professional qualification requirements (occupational standards)			Responsible	Involved
Cooperation and information exchange	Responsible	Involved	Involved	Involved



	HEIs	Individual employers	Employer associations	Sectoral Expert councils
2. Development, implementation, and provision of study programs (SP)				
SP development that ensures development of STEM knowledge and 21st century skills, involves good teachers and attracts many students	Responsible	Involved	Involved	
Licencing and accreditation of SP	Responsible	Involved	Involved	Involved
Teaching methods to develop 21st century skills	Responsible	Involved		
Guest lectures about the industry and practical application of knowledge, lecturers of study courses	Responsible	Involved		
Research, development of doctoral thesis	Responsible	Involved	Involved	
Involvement of students in technology transfer , development of innovative products , problem-solving for employers, developing students' innovation and entrepreneurial abilities	Responsible	Involved	Involved	
Provision of traineeships for students, dual study programmes	Responsible	Involved	Involved	
Extra curriculum activities that provide other practical experience (excursions to companies, practical seminars, WSs, hackathons, simulations etc.)	Involved	Responsible	Involved	
Development of final thesis , offering topics for coursework and challenges for tasks	Responsible	Involved	Involved	
Defence of theses and final examination	Responsible	Involved	Involved	
Addressing student drop-out	Responsible			
Providing non-financial support to students, including personal development , study and career planning, individual plans, mentoring	Responsible	Involved	Involved	
Financial support to students, scholarships	Responsible	Involved	Involved	
Provision of study infrastructure and materials	Responsible	Involved	Involved	



	HEIs	Individual employers	Employer associations	Sectoral Expert councils
3. Governance and development of SP				
Setting common goals and coordinating co-operation	Responsible	Involved	Involved	
Governance of study programmes, participation in Councils	Responsible	Involved	Involved	
Constant evaluation of SPs and their implementation, including by collecting feedback from students, teaching staff and employers, and other relevant data, analysis and use of data	Responsible	Involved	Involved	
Implementation of improvements and communication of improvements to stakeholders	Responsible			
Improving skills and awareness of teaching staff (internships, discussions, research presentations, excursions etc.)	Responsible	Involved	Involved	
4. Implementing the third Mission of universities – addressing societal and economic challenges				
Providing adult learning opportunities (including micro-credentials) by identifying needs, designing and offering programs	Responsible	Involved	Involved	
Provision of expertise, dissemination of research results	Responsible	Involved	Involved	
Career support to pupils, attracting pupils and especially girls to STEM studies and work in industry	Involved	Involved	Involved	
Supporting basic STEM skills development in schools	Involved	Involved	Involved	
Supporting STEM teachers in schools	Involved	Involved	Involved	

Table 4.1. A model for higher education – industry co-operation to ensure the development of 21st century skills

As it can be seen, the blueprint for stakeholder engagement provides a list of cooperation areas in all main phases of higher education, as well as the division of responsibilities between all stakeholders involved. It can be used as a ‘menu-offer’ for establishing or advancing co-operation between higher education institutions and industry representatives. Although individual choices for involvement will always depend on the individual goals and capacity, the authors hope that providing the complete list of engagement opportunities, tested with industry representatives, will inspire for more active cooperation for the mutual benefit of stakeholders and better development of 21st century skills.

CONCLUSIONS





CONCLUSIONS

A stakeholder-based approach to strategic management of higher education can help higher education institutions to achieve long-term success by building strong partnerships, increasing institutional effectiveness, creating positive work and learning environment and fostering a culture of continuous improvement. By creating value for all stakeholders, institutions can build trust and legitimacy, enhance their reputation, promote institutional sustainability and resilience. But, most importantly, better opportunities to students are offered by equipping them with the skills and knowledge needed to succeed in the 21st century job market and to drive economic growth.

As a first step to establish the cooperation, the key stakeholders, their needs, goals and expectations should be identified. Having a clear understanding of who the stakeholders are and what their expectations and interests are, is crucial for higher education institutions to create effective strategies and make informed decisions that will benefit both the organization and its stakeholders.

A blueprint for stakeholder engagement, or in other words, a model for co-operation between higher education institutions and employers, provide a clear roadmap of engagement opportunities and potential action for all involved higher education and industry stakeholders. Although individual choices for involvement will always depend on the individual goals and capacity, a complete list of engagement opportunities, tested with industry representatives, can inspire for more active cooperation for the mutual benefit of stakeholders and better development of 21st century skills.

The main barriers that prevent HEIs from engaging with industry more actively, are the public research agenda and the supply of educational programs that does not comply with the industry's demands, the lack of financial incentives to interact with industry and the lack of an entrepreneurial culture in universities. Developing incentives to overcome these barriers, promoting awareness on the benefits and opportunities for cooperation, as well as promoting entrepreneurial culture in higher education sector is highly recommended in order to implement the engagement model in practice.

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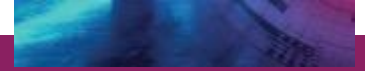
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ANNEXES

Annex 1. Interview questions with industry representatives



01



What is the **experience of your organisation in cooperation** with higher education sector? What are the main **cooperation mechanisms** to facilitate the offer of higher education according to the needs of the industry?

(If needed, clarifications were asked about the role of employer associations, role of individual employers, role of higher education institutions)

02



What are the **three main challenges** in industry – higher education cooperation?

03



What are the **three most successful** aspects or cooperation mechanisms?

04



Are there any **regional differences** or **differences between higher education and VET** in your country when it comes to the cooperation between education institutions and industry?

05



Feedback about the elaborated cooperation model:

5.1 A table with co-operation model was shared on a screen (in case of online interview) or provided in a printed version.

5.2 Each phase in higher education was briefly introduced, outlining the role of HEIs, individual employers, sectoral associations and sectoral expert councils.

5.3 Interviewee was invited to provide immediate feedback whether he/she agrees to the activities foreseen to facilitate 21st century skills development and the distribution of roles.

Guiding Questions: *Do you agree with the proposed activities to ensure that HEIs do their best to prepare graduates for the labour market of the 21st century?*

Do the proposed roles– responsibilities and involvement – reflect the ideal model of cooperation?

Do you see anything to be improved or clarified?

06



What can be done better to ensure that students develop skills needed in the 21st century skills?



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