Universities of Applied Sciences in 2035: Vision-Based Approach for Future Developments in Estonia

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Annotation

This article analyzes the success factors that would ensure and support the future of professional higher education alongside (traditional) university education. The paradigm of the binary higher education system is changing, the key question is in which direction professional higher education should develop and who defines the needs of trends.

The purpose of the current article is to describe the development of professional higher education in Estonia in general, and in this context, the recent trends in labour market, skills and new knowledge necessary for graduates of universities of applied sciences (UAS), are examined.

The first part of the current article focuses on the general developments and trends of professional higher education in the 21st century, e.g. lifelong learning, more quick changes for professional requirements, and importance of access to education in regional centers. The second part describes the changes in the labour market, new skills and knowledge and emphasizes the close cooperation of universities of applied sciences and employers. The third part concentrates on the analysis of main factors influencing professional higher education in Estonia. It gives an overview of the legal environment, key performance indicators as the number of admissions, the number of students, the number of graduates as well as the dynamics of financial support for universities of applied sciences in 2014-2019 in the context of economical and legislation changes in Estonia. Presentation and understanding of current situation analysis of strengths and weaknesses is the foundation for the content and role of professional higher education in the future. In the end of the overview recommendations are given to guarantee the sustainable, competitive and high-quality professional higher education.

Key words: university of applied sciences, future trends, key performance indicators, regional development, labour market

Introduction

The changes of the last 15 years on the higher education landscape have been more rapid than the changes of the previous 50 years combined. Some technological developments like digitalization and new forms of teaching and learning, e.g. distance learning and e-learning, and internationalisation appear to be here to stay. They all are having an increasing impact on social life. Automatisation leads to new and different types of employment. The learning economy is no longer just about acquiring and applying knowledge, but more about linking expertise to requirements in society. Professionals must be critical, entrepreneurial and innovative. They must have a definite direction to remain standing in a complex society. According to the vision document of Estonian Rectors' Conference of Universities of Applied Sciences (RCUAS), high-quality professional higher education must therefore contribute to the development of people, the regional competitiveness and development, and the development and improvement of the economy. It is crucial to understand, adapt and be ready for the technological changes, regional access and for the constant need for retraining (Professional Higher Education in 2035, 2019).

In 2014, the RCUAS presented a road map for professional higher education that included a vision for 2020 (Rakenduskõrgharidus Euroopa kõrgharidusruumis..., 2014). It gave an overview of the current situation of the member organizations and predicted their future based on the institutions' key performance indicators. Five years later, in 2019, the vision document Professional Higher Education in 2035 was compiled to analyse the development trends of professional higher education as well as the main factors and changes influencing professional higher education and the activities of universities of applied sciences (Professional Higher Education in 2035, 2019).

In a number of countries, the higher education system consists of two distinct sectors, one of which has a more academic orientation and the other a more applied orientation. Universities make up the sector with the more academic orientation, while the institutions in the more applied sector go by a variety of names, e.g., colleges of professional education, universities of applied sciences (UAS), institutes of technology, and polytechnics. In many countries, non-university postsecondary institutions concentrate on offering programs of an applied nature. Many students have found the opportunity to study in applied sector institutions attractive because of cost, employment prospects, the attractiveness of hands-on learning, and the emphasis on teaching that is common in such institutions (Skolnik, 2015, 363).

In many countries the initiatives have successfully established higher education institutions, such as the UAS, with the mission of providing bachelor programmes in technical, health care and professional areas. Some countries have realised synergies and economies of scale through careful orchestration of institutional mergers. Such institutions have often been extremely successful and have grown rapidly, frequently concentrating their research efforts on applied topics, and with a different teaching style from universities (OECD, 2014).

The Statutes of RCUAS as a social organisation were registered by the Estonian Ministry of Education and Research on March 2, 1993. The aim of the activities of RCUAS is to develop the joint activities of Estonian UAS, to form common positions and to represent common interests in promoting professional higher education and shaping education policy in Estonia. As a result of the work of RCUAS, the University of Applied Sciences Act entered into Law in Estonia in 1998.

The information presented in the current article is based on the vision document that was compiled from April to December 2019 by the members of RCUAS. The methodology of compiling the vision document is described by figure 1. The academic professionals of UAS, the employees of the higher education department of the Estonian Ministry of Education and Research and the participants of the RCUAS Vision Day were involved in compiling the vision document. The round table discussions involved 8 tables (2 tables in English) and 4 issues focusing on the future of professional higher education. The outcome has a significant impact on all the stakeholders due to their involvement and cooperation.

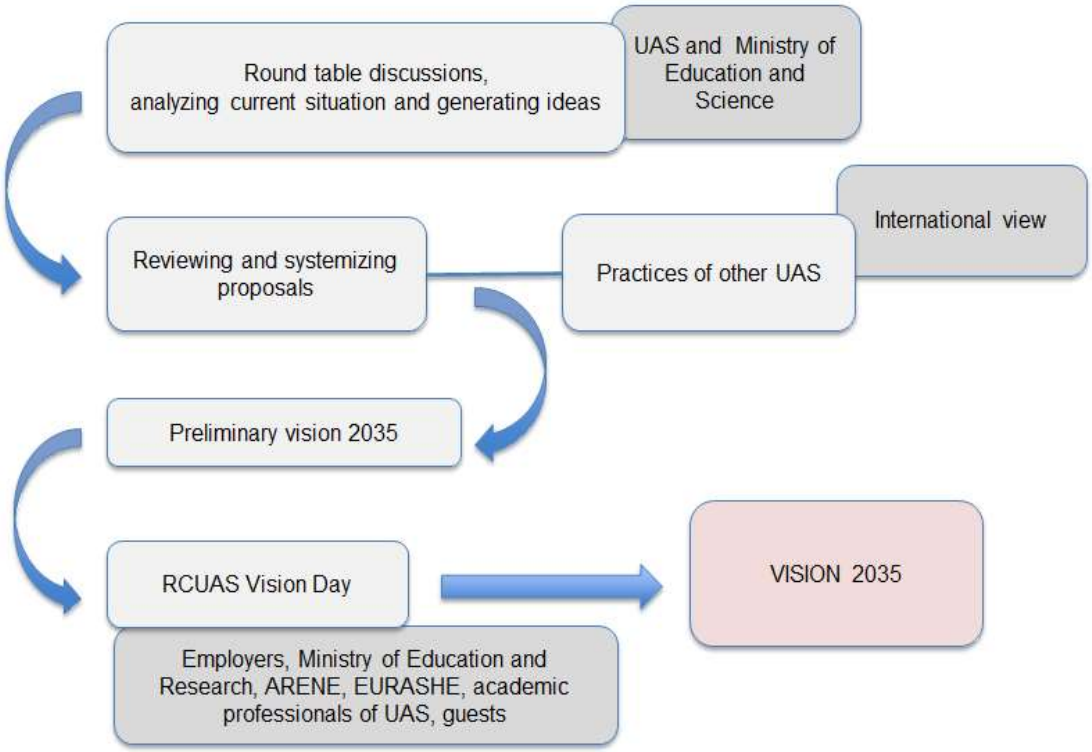


Figure 1. The methodology of compiling the vision document (Professional Higher Education in 2035, 2019)

This document was preceded by a cooperation project of universities of applied sciences "Professional higher education in the European Higher Education Area: outputs, institutions and operating models 2020". In the course of the study, the dynamics of changes in the basic data of member councils of the RCUAS in 2008–2012 was analyzed by four categories: 1) general efficiency indicators (overheads, total area per student); 2) students (number and change of students, employment in the labor market), 3) academic and support staff, and 4) research, development and creativity (RDC) activities. In addition, an overview of curricula, study process, internationalization and applied research is given (Rakenduskõrgharidus Euroopa kõrgharidusruumis..., 2014).

In addition to the analysis of the performance indicators of Estonian UAS, data were collected from study trips to UAS in several countries and semi-structured interviews were conducted with members of the rectors' councils and higher education experts of European Union (hereinafter EU) institutions. The interviews identified the main developments in UAS and the reasons for them in the context of the higher education system as a whole. An overview article introducing the final report of the study was published in the journal Professional Studies: Theory and Practice in 2016 (Lend et al., 2016).

In February 2014, the Government of the Republic approved the concept of monitoring and forecasting the labor market and skills development coordination system. It aimed to link better the labor market needs and provision of training (Tulevikuvaade tööjõu- ja oskuste..., 2018, p. 13).

Furthermore, in 2018, a study was conducted by Estonian Labor demand monitoring and forecasting system OSKA “The future vision of labor and skills needs: education and research”. The study analyzed how the employment and skills required of the professions in the field will change over the next five to ten years, and what changes would need to be made in the training offer, etc., in order to better meet the changing needs. This applied research does not seek to predict the development

trends of the workforce in the near future, but expert assessments are mediated desired future situations. Thus, this applied research provides support and specific assistance to policy makers on how to lead the future (Tulevikuvaade tööjõu- ja oskuste…., 2018).

The higher education institutions and the higher education landscape in general have changed over the past decades. In order to respond to the future development of higher education content and take into account technological, societal and labour market changes as well as the expectations of new generations, government and entrepreneurs, it is necessary to identify the reasons for the changes in professional higher education and then define the preconditions for implementing the changes. In accordance with the main goal set for this article, the following research tasks were formulated:

- What is the (professional) higher education landscape today and what are the transforming ideas and key influencers for the future?
- What are the main factors influencing professional higher education in Estonia?
- What could be the development goals of professional higher education, when taking into account the local and global drivers shaping professional higher education?

1. Theoretical basis - Transforming ideas of professional higher education

The development of the knowledge society in a learning economy will be the dominant development. The speed of economic and social development is constantly accelerating. Knowledge is available worldwide at any time, and new information is evolving faster and faster. Networks supported by digital technologies can operate quickly and affect the functions and processes of both society and professional practice. Long-term predictability is becoming increasingly difficult. In the 21st century knowledge-based society professional training of graduates and already gained professions are forced to alter constantly. Tomorrow's specialist will have to work longer than his/her parents and career will be much more diverse. Changing careers and jobs are already the norm rather than the exception. Organizations, systems and people need to adapt more and more to dynamic circumstances, and the circulation of knowledge is therefore becoming increasingly important. A complex, hybrid and diverse society is emerging. Due to the global epidemic, borders are already disappearing between the physical and virtual worlds. As a result, the confidence and predictability decrease even more. As stated in the vision document of The Hague University of Applied Sciences (2015) "*Every university of applied sciences is expected to play its part in the development of society, particularly the professional world, through education and research and by making knowledge available*".

Future development trends and problems of UAS is a widely discussed topic in most countries. The implementation of rules following the Bologna process, recognition of foreign educational qualifications and studies are some examples of the harmonization of higher education. Concerning the content of professional higher education, the UAS have been updating and innovating the curricula, improving the methodical approaches to better meet external stakeholders demands. For example, some universities have included entrepreneurship subjects or study modules in their study programme. However, the core question is: are these initiatives and changes sufficient, and in whose opinion this will be sufficient? (Camilleri, et al., 2014).

When to talk about higher education, it is also worth looking at the trends in the northern neighbors. E.g. Minister of Education and Culture Sanni Grahn-Laasonen, announcing the vision as part of the celebrations of 100 years of Finland's independence, said: "*Global competition for expertise is tightening. Finland has no other strategy for success than being the most capable nation. Finland should aim for the best-trained workforce in the world. It requires higher education, open educational provision and continuous learning, international networking, quality, effectiveness and strong inputs into RDI [research, development and innovation] activities.*" (Myklebust, 2017).

The task of influencing regional development can be highlighted as one of the main tasks of UAS (Rauhala, 2008, 95). Universities of applied sciences have the mission to train professionals with emphasis on labour market needs and conduct research and development which supports instruction

and promotes regional development. The education emphasises co-operation with the business, health care, medicine, industry and service sectors at the regional level in particular.

The regional impact of UAS has been defined as follows (Käyhkö et al 2006, 13):
1) effectiveness of the strategy of UAS and regional participation and networking (eg. the participation in regional strategy work, in regional centre programmes, programmes of centres of expertise and other development projects in the area)
2) proactive role of UAS and influencing on the activities in the area (e.g. strengthening of knowledge in the area, increasing social capital, building innovation environment and anticipating proactive response on the needs of the area).
Over the past few years regional development and agreements between universities of applied sciences and employers have become more significant in education and training. As stated by Rauhala (2008, 98): "*The effectiveness of the programmes of centres of expertise should be based on specialization on strong top areas, formulating regional strategies and tying the different partners to realize the strategies. The target of the programmes is to promote division of labour between areas in developing the knowledge to international leve*l".

Universities of applied sciences have a very good opportunity to promote regional development in two ways: firstly, UAS plays an educationally important role in developing entrepreneurial skills, knowledge and cultures to ensure that the full potential of regional human capital is realized. Secondly, UAS can contribute to regional development through close links with local businesses and organizations. Many of these networks have been set up through regional business research and advisory services and include students doing their postgraduate studies or placements there. If these possibilities are followed, the institution of professional higher education or its unit can become a key resource for the economic development of its region (Jongbloed, 2010).
The continuing development of distance education and e-learning is an important factor that has so far received little attention in the context of regional development and access to higher education in regional communities. In the mainstream over the past decade, e-learning has been established as a central and critical way to serve students. In particular, e-learning helps community colleges move their goal of universal access "from promise to practice" (Web-Based Education Commission, 2000, p. iv). Bohland et al emphasized already in 2000 that *Online learning has opened doors to higher education for many students otherwise restricted by fixed schedules and geographic obstacles.* However, extending access to traditionally underserved citizens, such as working adults and people who are living outside major centers. Current spring 2020 highlighted the importance of the development of the distance learning skills in the universities of applied sciences.

2. Demands of the labour market and new knowledge and skills expected from graduates

Professional higher education was born in Germany in the 1970s based on the needs of industry and employers. People with vocational education did not have enough knowledge to work with new and more complex machines, and university graduates did not have enough practical skills. Moreover, relatively few people graduated from university and did not meet the needs of the German economy. The economy needed specialists with higher education with practical skills. Over the years, the level of lecturers in universities and professional colleges has harmonized. Universities of applied sciences have become more academic, applied research and international cooperation have been launched, but more internships have been added to university curricula (McClelland, 1982).

Cooperation with companies is a criterion for success not only in terms of securing jobs for graduates, but also in terms of curriculum development and applied research. Today, professional higher education has become more popular in Europe than academic university education. In many European countries (e.g. Austria, Switzerland, Germany), admission to professional higher education is growing faster than to academic universities.

Globally, labour market demand for highly skilled workers is soaring as knowledge-work becomes essential for innovation, economic diversification and growth (OECD 2014). Economists and policymakers have identified higher education as a key mechanism to increase national productivity (Piketty 2014). Correspondingly, students and employers may attach greater value to the outcomes

of the vocational higher education sector resulting in recognition that routes to widen access to new forms of hybrid higher vocational learning are reconfiguring the relationships between academic universities and applied universities (Deissinger, 2015; Webb et al., 2017).

Current major European policy concerns related to establishing the European Higher Education Area are closely related to supporting graduates' career success, international mobility, cooperation among higher education institutions and employers. Upcoming tasks in innovation policy are connected especially to the increasing participation of enterprises. One of the core strategies of UAS is technology and knowledge transfer, which is constantly structured to address partners' needs – especially those coming from the business, healthcare, industry world − in the sense of service commitment. This self-conception of these universities as service providers differentiate it from its strategies and other universities (Baaken & Schröder, 2008, 103).

Based on Figure 2, the most important factors influencing the development of professional higher education come from the world of work. It is based on the understanding that education policy is part of economic policy and education policy should be integrated with global economic trends. Thus, the development of professional higher education needs constant dialogue with the trends of the world of work.

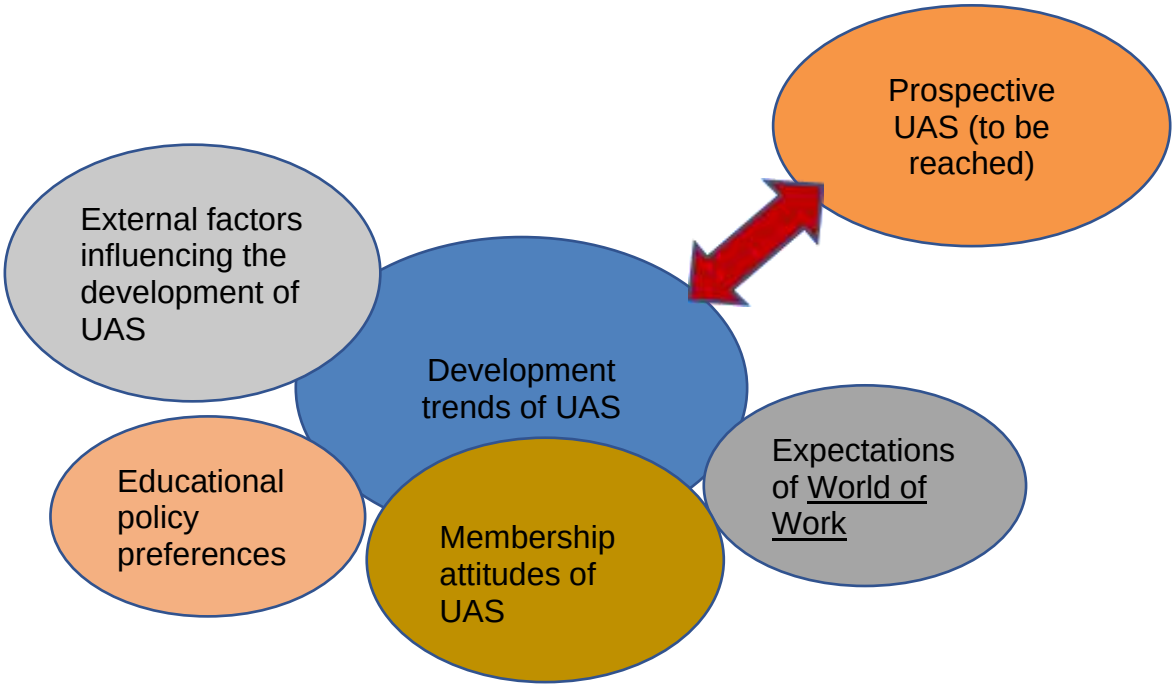


Figure 2. The key factors of the development of universities of applied sciences.

The diversity in the learning outcomes of curricula has been strongly influenced by the Bologna process. Many studies have been conducted on the effect of the Bologna reforms to educational policies and to the diversity of higher education institutions. E.g. Teixeira (2012) has analysed the sustainability of higher education systems and found that the most important competition factor today is the capability to offer contemporary study programmes compatible to the demands of the labour market, which may become huge challenges to higher education institutions when they are too focused on traditions. It is thought that diversification of tomorrow´s education market has to be implemented through learning outcomes and research and development activities (Lend et al., 2016).

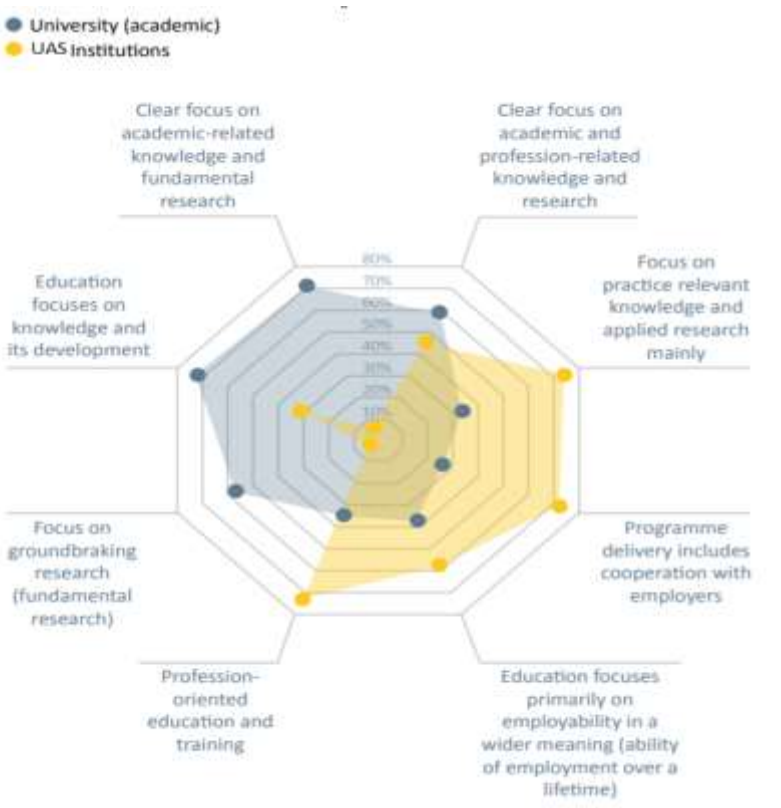


Figure 3. Profiles of academic and professional higher education (Camilleri et al., 2014, p. 27)

The distinction between academic higher education and professional higher education dates back to the 1960s when employers started to need graduates with higher education and practical skills. The output of universities was not practical enough and the one of vocational institutions was not academic and professional enough. Considering the close cooperation of UAS and employers, the management system and curriculum development is rather flexible in UAS, and the learning outcomes comply with the expectations of the enterprises and support the high employment rate of graduates. In Figure 3 it is shown the well-established profile of UAS and the university sector from 2014 (Camiller et al., 2014).

In the post-knowledge era, the meaning of knowledge is changing. Knowledge is not viewed as the most important ingredient for action (to do something with it). Higher education institutions are traditionally seen as producers of new knowledge, technology and quality graduates. The Institute for the Future (IFTF) report analyzed in 2011 key drivers that will reshape the landscape of work and identified key work skills needed in the next 10 years. Rather than focusing on future jobs, this report looks at future work skills—proficiencies and abilities required across different jobs and work settings and which will be critical for success in the workforce (Davies et al., 2011, 8-12):

- Sense-making: ability to determine the deeper meaning or significance of what is being expressed.
- Social intelligence: ability to connect to others in a deep and direct way, to sense and stimulate reactions and desired interactions
- Novel & adaptive thinking: proficiency at thinking and coming up with solutions and responses beyond that which is rote or rule based.
- Cross-cultural competency: ability to operate in different cultural settings.
- Computational thinking: ability to translate vast amounts of data into abstract concepts and to understand data-based reasoning
- New-media literacy: ability to critically assess and develop content that uses new media forms, and to leverage these media for persuasive communication.
- Transdisciplinarity: literacy in and ability to understand concepts across multiple disciplines

- Design mindset: ability to represent and develop tasks and work processes for desired outcomes
- Cognitive load management: ability to discriminate and filter information for importance, and to understand how to maximize cognitive functioning using a variety of tools and techniques
- Virtual collaboration: ability to work productively, drive engagement, and demonstrate presence as a member of a virtual team (Davies et al., 2011, 8-12).

The common denominator of these ten skill descriptions is that they are based on relationships, the terms skills, knowledge and also competence. Knowledge in the context of application implies closer connections between different institutions and actors in the knowledge production system and requires universities to `reach out' and cooperate with industry and government to a far greater extent than before. At the centre of this cooperation is the evolutionary triple helix model which advocates strategic interactions and collaboration between universities, industry and government to foster economic and social development. The model emphasizes on boosting innovation for a development. It describes the role of university to join hands with industry and government (Leydesdorff, 1995; Leydesdorff & Etzkowitz, 1998; Etzkowitz & Leydesdorff, 2000).

The best example of Triple Helix is Silicon Valley. The government provided land, flexible financing, stretched tax holidays and fitting guidelines to the IT cluster in California, US. The small and big IT businesses thrived in this cluster. The world has seen success stories of Dell, HP, Oracle, Intel, Microsoft etc. The collaboration between universities and the industry is increasingly perceived as a vehicle to enhance innovation through knowledge exchange. This is evident by a significant increase in studies that investigate the topic from different perspectives (Ankrah & AL-Tabbaa, 2015, p. 386).

Universities of applied sciences are supposed to provide the applied research on which industry builds commercial goods. According to Etzkowitz and Leydesroff (2000), the transfer of people between university and industry is a mode of transfer of knowledge. A university flourishes because of research, and industry grows on research in universities. But, as stated by Baaken and Schröder (2008, 113) more important in terms of success is to measure the effect of knowledge transfer performances achieved by looking at outcomes (level of increase of employees, less unemployed people in the region, market share of customers, newly established job positions, increase in turnover and growth in market share of customers (Baaken & Schröder, 2008, 113).

The motivations for universities to enter into relationships with industry are among others: the access to complementary expertise, state-of-the-art equipment and facilities, employment opportunities for university graduates, shift in knowledge based economy (growth in new knowledge), discover new knowledge/test application of theory, obtain better insights into curricula development, expose students and faculty to practical problems/ applied technologies, promote innovation (through technology exchange), and contribute to regional or national economy (Ankrah & AL-Tabbaa, 2015, p. 392).

For industrial sector the motivational factor for cooperation are access to students for summer internship or hiring, hiring of faculty members, enhance the technological capacity and economic competitiveness of firms, shift in knowledge based economy (growth in new knowledge), business growth, access new knowledge, cutting-edge technology, state-of-the art expertise/research facilities and complementary know-how and enhancement of corporate image (Ankrah & AL-Tabbaa, 2015, p. 392).

Therefore, the collaboration between universities and industry is largely seen as one approach to improve innovation in the economy by facilitating the flow and utilization of technology-related knowledge and experience across sectors (Perkmann et al., 2011).

According to the authors' positions of this paper, it is not necessary to change the profile of professional higher education, as long as there are no clear and formulated analyzes. After a deep investigation, through modifying and improving is possible to create a balanced system of relationships between different dimensions in the learning outcomes.

3. The positions of UAS and the main factors influencing professional higher education in Estonia

The purpose of this chapter is to look at what has happened in recent years and what have we accomplished. We have analysed the development trends of higher education, the questions concerning the funding of higher education, and the role of professional higher education and the universities of applied sciences in Estonian higher education landscape.

In 2014, the Estonian RCUAS had 12 members, and 14,000 students studied at the universities of applied sciences. In 2018, ca 11,000 students studied at the UAS, and the RCUAS had nine members (starting from September 1st, 2019, RCUAS has eight members). There are seven state UAS in Estonia (all are members of the RCUAS), and five private UAS (Estonian Entrepreneurship University of Applied Sciences being a member of RCUAS). Currently 8,545 students are studying at the state UAS (Professional Higher Education in 2035, 2019). .

The number of students at the private UAS in 2018 was 2,131. In addition to this, professional higher education can be acquired at the colleges of the University of Tartu, Estonian University of Life Sciences, Tallinn University and Tallinn University of Technology (TalTech), where the total number of students studying in professional higher education curricula in 2018/2019 was 4,044 (https://www.haridussilm.ee/). When in average, the number of students in public state universities has decreased by 22% (in 2014/2015 there were 42,205 students and in 2018/2019, 35,343 students), then the number of students in state UAS has been relatively stable and has decreased only by 4% (in 2014/2015, 7,259 students and in 2018/2019, 6,974 students (https://www.haridussilm.ee/).

3.1 Updating the higher education legislation

In 2013 free state higher education through the higher education reform was implemented. The main goal of this reform was to ensure equal access to higher education, to make the higher education sector less fragmented and to minimize the doubling of curricula. The most significant and tangible change for universities and higher education institutions was that the intake of paying students was no longer allowed.

In 2016, the modernization of the Estonian higher education legislation began. In the process of modernisation, the legislative acts concerning higher education were reorganised. However, the main principles of the higher education system such as free higher education, the autonomy of higher education institutions and the tertiary system were not changed.

On September 1, 2019, The Higher Education Act took into force (https://www.riigiteataja.ee/en/eli/529082019022/consolide).
The most significant change for the UAS is that the students accepted in 2019/2020 will get a bachelor's degree at graduation. The system is clearer now, a uniform bachelor's degree is more easily understandable inside as well as outside Estonia. Under the new act, the same requirements apply to professional and academic higher education, though one point differs, namely that a student of professional higher education acquires not only basic knowledge, but also the skills to work in a certain field, which connects those students starting their work career easier in reality. In professional higher education, practical training must form at least 15% of the curriculum compared with academic universities, where the proportion of the practical training is not so clearly specified. The specialties of professional higher education are tightly connected to professional standards, which ensures that, in addition to overall knowledge competences, the students of professional higher education shall acquire professional skills needed for working in a certain profession. In addition, cooperation with employers and professional associations is important in the development and creation of professional higher education curricula, so that the training meets the expectations of the world of work.

3.2 Key performance indicators of applied universities under the RCUAS

For analysing the effects of the reform to the key performance indicators of the UAS, they were divided into two groups: the institutions governed by the Estonian Ministry of Education and Research (6), and the UAS belonging to the RCUAS (6+3) – the abovementioned plus the Estonian Academy of Security Sciences, the Estonian Military Academy and the Estonian Entrepreneurship University of Applied Sciences (Figure 4 and 5).

The cumulated number of admissions of the UASs belonging to RCUAS during the analysed period increased by 14.7%, and the general number of students decreased by 3.7%. The constant decrease of students lasted until the academic year 2017/2018. Last academic year, the general number of students started to increase. However, the number of graduates has dropped by 18.9%. The number of graduates during the analysed period was mainly influenced by the constant decrease of paying graduates (the last admission of paying students was in 2012/2013).

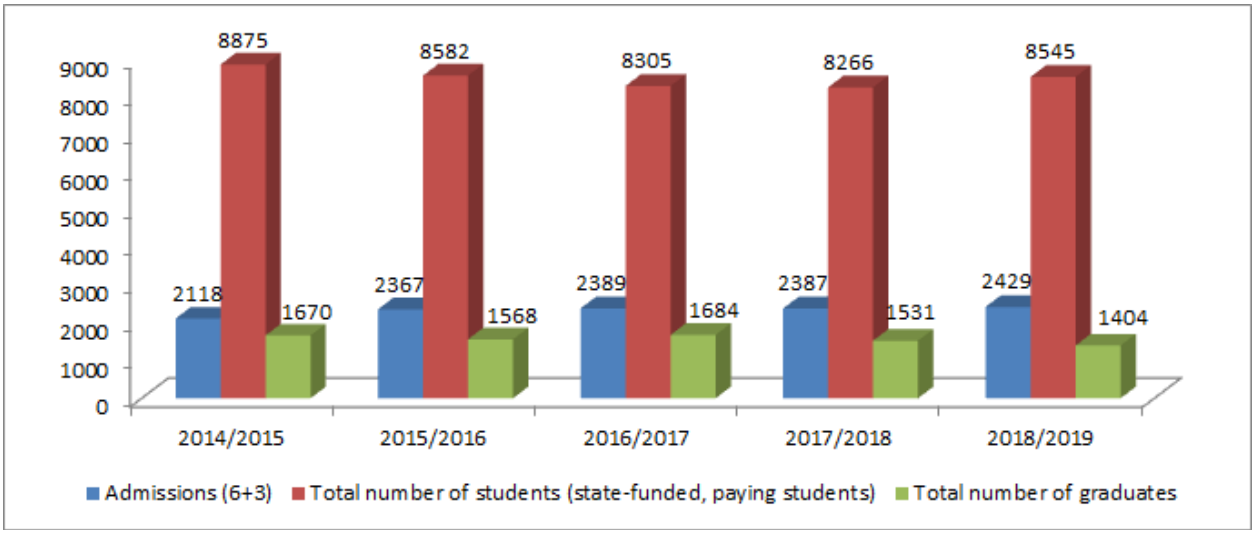


Figure 4. The key performance indicators of the members of RCUAS in 2014-2018.

The number of admissions of the six UAS has grown by 10.4% in the given period, the general number of students has increased by 5.2%, and the number of graduates has decreased by 14.7%. It is important to point out that in the academic year 2014/2015, 659 students had to reimburse study costs (as they failed to reach the full study load and were studying part-time), of them 468 (71%) being the students of TTK University of Applied Sciences. In the end of the period, 172 students reimbursed their study costs (80.1% being the students of TTK University of Applied Sciences). The study behaviour of paying students had an inevitable effect on the number of graduates.

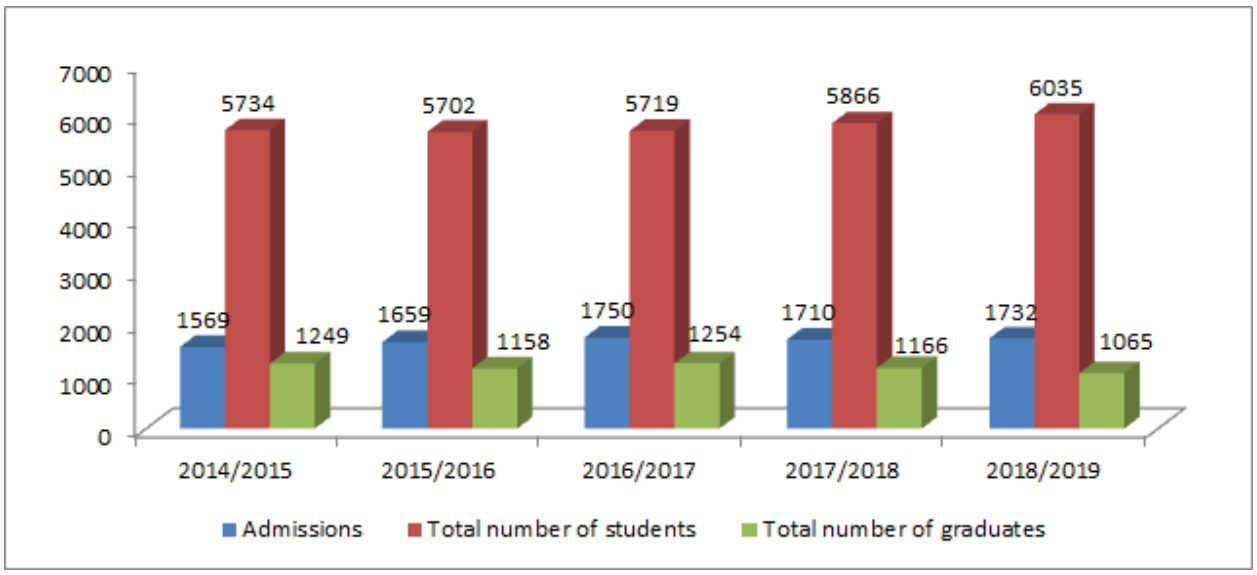
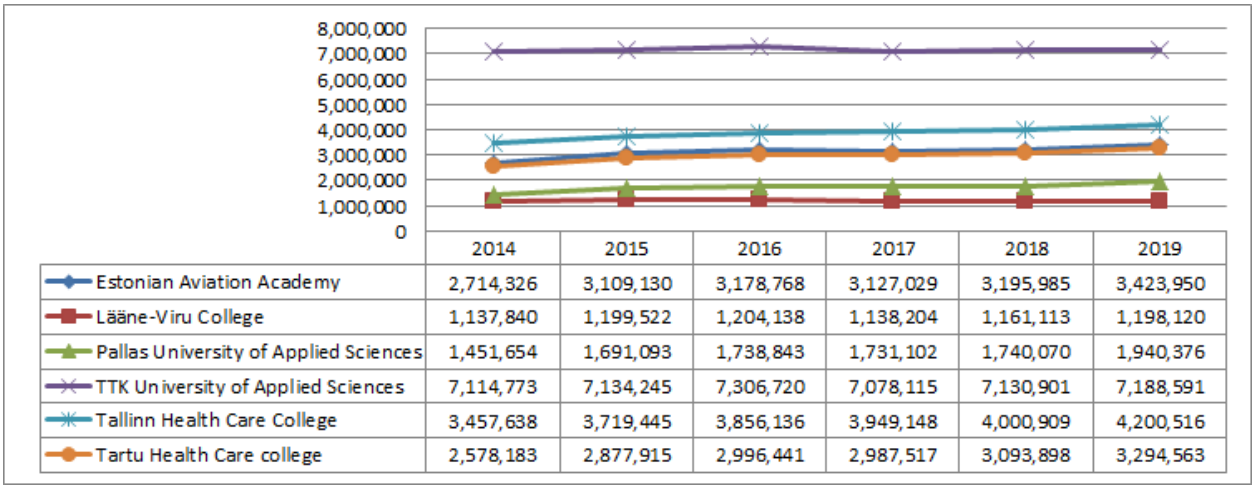


Figure 5. The key performance indicators of the universities of applied sciences governed by the Estonian Ministry of Education and Research in 2014-2018.

3.3 The principles of funding in higher education

In 2017, the new operational support model was implemented in Estonia. The model has two components – baseline funding and the changeable performance funding based on key performance indicators. The principles of the operational support are similar to UAS and universities (except for doctoral studies, research funding, etc.). With the new financing model that took into force on January 1, 2017, the obligation of annual reports that was connected to annual contracts was discarded. The new model introduced 3-year administration contracts for public state universities and activity support directives for state UAS. Six key performance indicators were determined. The indicator with the highest value is the share of students graduating with nominal time (NOM+1 or NOM+2) (https://www.hm.ee/sites/default/files/uus_rahastamismudel_0.jpg). The other key performance indicators are: share of graduates in employment, share of students participating in short term mobility (since 2019, also in long term mobility), share of enrolled international students, share of private funding and the operation of a higher education institution in their area of responsibility.

Due to the reform, comparing the data from the period of the beginning of the higher education reform with today's data in the context of higher education funding is not entirely adequate, as in addition to the changes in funding, the study behaviour of students has changed considerably during this time, and the higher education institutions have thoroughly analysed their principles of operation. Therefore, the comparison of the post-reform data of admission, student and graduate numbers, taught credit points and passed credit points to previous data needs further detailed analysis that was not possible in the scope of the present vision document. For example, the higher education institutions are still looking for the ultimate balance between the demand of graduates from enterprises (the need of specialists), the reasonable relation of admissions and graduates, and the key performance indicators of the operational support calculation model (Professional Higher Education in 2035, 2019).



	2014	2015	2016	2017	2018	2019
Estonian Aviation Academy	2,714,326	3,109,130	3,178,768	3,127,029	3,195,985	3,423,950
Lääne-Viru College	1,137,840	1,199,522	1,204,138	1,138,204	1,161,113	1,198,120
Pallas University of Applied Sciences	1,451,654	1,691,093	1,738,843	1,731,102	1,740,070	1,940,376
TTK University of Applied Sciences	7,114,773	7,134,245	7,306,720	7,078,115	7,130,901	7,188,591
Tallinn Health Care College	3,457,638	3,719,445	3,856,136	3,949,148	4,000,909	4,200,516
Tartu Health Care college	2,578,183	2,877,915	2,996,441	2,987,517	3,093,898	3,294,563

Figure 6. The dynamics of financial support of the universities of applied sciences governed by the Estonian Ministry of Education and Research in 2014-2019, in Euros.

Figure 6 presents the dynamics of state funding of the UAS governed by the Estonian Ministry of Education and Research. The biggest increase of operational support was achieved by Pallas University of Applied Sciences (33.4%), Tartu Health Care College (27.8%) and the Estonian Aviation Academy (26.1%). The operational support increased the least in TTK University of Applied Sciences (by 1%) and in Lääne-Viru College (by 5.6%). When looking at the cost of a student place at the universities of applied sciences governed by the Estonian Ministry of Education and Research in 2018/2019, the most expensive student place – 14,200 euros – was in the Estonian Aviation Academy, and the least expensive – 1,340 euros – in Lääne-Viru College. As the cost of a student place in the Estonian Aviation Academy differs considerably from others, we decided to analyse the dynamics of the cost of student places based on five universities of applied sciences (Table 1).

In conclusion, we can say that the direct impact of the development gap in operational support is expressed in the fall of competitiveness of the employees' salaries. As the share of staff costs in the budget of UAS is ca. 65-80%, we can say that the maximum capacity of staff costs has already been reached in most institutions. The increase of average salary in Estonia between 2014-2019 has been 44% (data from Statistic Estonia: https://www.stat.ee/stat-keskmine-brutokuupalk) and the consumer price index has risen by 10% (Statistics Estonia: https://www.stat.ee/stat-tarbijahinnaindeksi-muutus). Compared to the increase of the cost of a student place being only 2.5% (Table 1), it is clear this is not enough for maintaining the competitiveness of staff costs.

Table 1. The average cost of a student place based on the data of five universities of applied sciences governed by the Estonian Ministry of Education and Research, in Euros.

Academic year	*2014/2015*	*2015/2016*	*2016/2017*	*2017/2018*	*2018/2019*
Average cost of student place	*2,883*	*3,052*	*3,127*	*2,997*	*2,956*

3.4 Current situation of universities of applied sciences

One of the strengths of UAS is the quick implementation of changes in the world of work and curriculum development. In addition, the flexibility of UAS is expressed by their willingness to open study groups near the employers' locations to ensure needs-based regional education and the recognition of employers' needs. This is enhanced by the support and feedback from the employers and their will to value graduates on different levels, e.g. specialists with professional diploma.

Another strength of UAS is the distribution of the fields of education – every institution has its clear role, which helps to avoid the doubling of curricula and train employees that are needed by the state. As most of the UAS in Estonia are state-owned, the state can determine the student places according to the needs of the world of work. This gives the state the possibility to govern the UAS purposefully. However, the clear division of fields of education can also be seen as a weakness, because, for example, there is no input from the Ministry of Economic Affairs and Communications for educating engineers and technical workers. Other areas such as health care and aviation have a clear public procurement. However, in case of health care, the ministry that gives the main strategic input to the public procurement is the Ministry of Social Affairs, but the ministry is not contributing to the financing of health care education.
Compared to academic universities in Estonia, the number of international students in the UAS is relatively low. The essence of this question lies in the role of UAS in Estonia: is the purpose of UAS to prepare the workforce for the Estonian employment market, or to offer studies in English for international students? Unfortunately, fulfilling these two goals simultaneously is extremely difficult, as the graduates of UAS are expected to have high proficiency of Estonian language. Offering studies both in the national language and in English is resourceful.
However, the biggest weakness in relation to applied universities in Estonia lies in the lack of basic research funding. Nevertheless, UAS in Estonia have conducted applied research relatively successfully according to their own financial means. The state funding directed to applied research and development activities would create favourable conditions for an important and long-awaited development leap which would enable to conduct applied research on a much larger scale. The stable financing for applied research is expected both by the society and the world of work. In many European countries, basic funding for applied research is guaranteed for universities of applied sciences independent from the evaluation of research, and this could also be the first step in the Republic of Estonia in order to support the development of professional higher education.

In conclusion, we can say that the success factors of UAS are:

- Curricula and learning outcomes that are dynamically aligned with the world of work, vocational standards and with the needs of enterprises and professional associations;
- The teachers/lecturers of UAS have professional experience with skills and potential for research and development activities;
- Universities of applied sciences have the state-of-the-art infrastructure that supports the acquiring of skills, knowledge and experience, and participation in research and development activities.
- Practical training is considered a supervised purposeful activity in a real working environment. Before entering the real working environment, students pass simulation trainings;
- Applied research and product development projects have become an integral part of the learning process.
- It is flexible to transfer professional higher education to regions further away from the capital to train professionals with emphasis on labour market needs, to promote regional development in particular. Work-based learning offers many opportunities to ensure a good education outside the capital.

4. The content and role of professional higher education in 2035

When discussing the future of UAS, mostly the content and learning outcomes of the programmes are focused on rather than individual institutions. When we think of whether the development trends in professional higher education are Estonian-centred or international, we can say they are rather international. By 2035, the significance of professional qualification certificates, diplomas and other status proving regulations will probably decrease, and the formulation of learning outcomes in study programmes will become more dynamic. It may be possible that in 2035, we cannot talk about the differences between academic and professional higher education anymore, but of a new type of higher education (Professional Higher Education in 2035, 2019).

Apprenticeship studies are common in vocational education institutions, but this type of studies could also be integrated into higher education. Apprenticeship studies are highly effective at equipping individuals with valuable knowledge, skills, and work experience. It is also a great way for employers to address skill gaps and ensure they are getting the most from their training investments (Fuller & Sigelman, 2017). When employers depend solely on the education system to prepare their workforce, they often find that new hires are far from job ready. When they use apprenticeship instead and partner with a college for the related instruction, they can be more sure that trainees are learning firm-relevant skills as well as broad knowledge about the field (McCarthy et al., 2017).

Currently, the apprenticeship studies in professional higher education are being piloted in Estonia. It is important that employers also value this type of study programmes. One of the main points of future discussion will be whether universities of applied sciences continue to stand out in the higher education landscape or will the differences between professional higher education and baccalaureate programmes disappear.

Other important factors are **the expectations and needs of the employers**. Standing out in the future is possible, if: a) the employers still need graduates with different profiles (academic and practice-oriented); b) the students accept this trend and wish to stand out as students/graduates of professional higher education; c) the universities of applied sciences are flexible, able to reorient quickly and provide employers with the necessary curricula

It is known that today, the companies are expecting and valuing specialists with professional higher education backgrounds - the people who have acquired certain skills and knowledge and who do not need additional training when entering the world of work. Today, the curricula of professional higher education are based on occupational qualification standards, and the students have a possibility to obtain a professional qualifications certificate when graduating. When an occupational qualification standard changes, so does the curriculum. The development of innovation and technology happens where it is supported by an educated workforce.

Today slightly problematic is the competition-based financing model for UAS governed by the Estonian Ministry of Education and Research. No funding for applied research is included in this model. Further analysis is needed, e.g. which activities could be jointly organised in the current system. Although the UAS prefer autonomy in their actions, jointly offered services and actions could be organised through a roof organisation (RCUAS).

The factors that will ensure the distinctive identity of UAS: a) lecturer/teacher profile; b) curricula (share of practical training); c) cooperation with employers; d) learning environment; e) practical and applicable in-service training; f) applied research and its funding; g) increase of life-long-learning programmes. The education system of the future should be more open and flexible. Creativity and individuality should be favoured and encouraged. Social skills and creativity are decreasing among young people. They should be taught to be more open and curious in order to find new possibilities. In today's system, young people are accustomed to preconditioned activities, the roots of which are in secondary school education. Generation Y (1982-2002 [also known as the Millennials]) is characterized as highly skilled according to the accessibility of technology, the internet, mobile phones, and social networking. Ransdell et al (2011) concluded that:
"Younger students groups show poorer knowledge application skills and are more self-reliant than older students. Older student groups were better at knowledge application, that go 'beyond the

information given'. Older students' active participation and social reliance contributed to better knowledge application. Instructors teaching millennial-age students need to encourage active, meaningful participation in applying knowledge". Therefore, it is absolutely necessary to direct and encourage middle-aged and older people more towards professional higher education - either to continue the education that has never been completed or to acquire a new profession instead. Under the guidance of competent lecturers, their teaching should go smoothly and successfully.

Conclusions and further recommendations

For the future development trends in professional higher education we offer the following directions:

- Providing skills and knowledge connected to professional specialties and the needs of the world of work in the curricula of universities of applied sciences;
- Acknowledging the diversity of learning forms, including enhancing the broader use of apprenticeship study in higher education;
- Ensuring regional access to higher education, decreasing the role of location in entering higher education;
- Financing of applied research and creative activities, including achieving the steady state financing for research, development and creative activities in universities of applied sciences; having more flexibility and sources for financing research and development projects;
- Broadening the offer of life-long-learning (in-service training) programmes, supported by a suitable financing model and the needs of the world of work;
- Internationalisation and mobility of universities of applied sciences should be included to the key performance indicators: number and percentage of international students; number and percentage of international staff; number and percentage of students studying abroad and their destinations; participation in European programmes or other supranational programmes, where relevant (in education, research and capacity building), capacity building in developing countries.
- Integration of EQF level 5 to professional higher education;
- Developing master programmes, incl. one-year master programmes primarily directed to area-specific specialisation;
- Networking of education institutions, piloting of an action-based consortium;
- Developing heterogenic financing models – considering the diversity of student profiles, e.g. a person entering professional higher education may already have a master's degree. The current model presupposes that a student follows a linear study path;
- Internationalisation and mobility of professional higher education for supporting and improving the quality of teaching, research and creative activities and for supporting smart immigration. Participation in European programmes or other supranational programmes, where relevant (in education, research and capacity building), capacity building in developing countries.
- Enhancement of digital/virtual learning and teaching. The findings of the several studies (e.g. Sarker et al, 2019) suggest that a majority of the students are found to be highly enthusiastic about the online courses. They are eager to participate and interact in the online platforms, which are somehow limited in the traditional classroom settings. E-learning can also contribute and ensure regional access to higher education.

For curriculum development we offer the following directions:

- Decreasing the fragmentation of subjects in curricula and enhancing the integration of subjects inside and over curricula;
- Finding a reasonable balance between general secondary education subjects and specialty subjects in the process of preserving the relevance of shorter study programmes;
- Taking into account the needs of the world of work (creating even more practical study programmes focusing on the development of specialty skills);
- Enhancing research, development and creative, as well as e-learning activities in universities of applied sciences and integration of research, development and creative activities to study process.

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