



Shifting of Gears in Higher Education

Mid-Term Policy Strategy 2016

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1. Introduction

1.1 The necessity to transform the system of higher education in Hungary

The period since the change of regime

Since the change of regime, **several positive processes** have started in the Hungarian higher education system. Access to higher education widened, groups excluded from education in the previous decades could acquire their desired qualifications, freedom of teaching became a reality, a unified structure of the institutions and programmes in Hungarian higher education was created, the unity of education and research was restored, and a need to improve quality in higher education appeared. University workers continue to enjoy above-average recognition, and domestic institutions have become more deeply integrated in international scientific circulation, both in terms of education and research. In terms of access to higher education, it can be concluded that the institutional system covers the whole of the country in its spatial structure, and therefore universities currently serve as one of the key catalysts of social mobility. Those holding a tertiary qualification have outstanding recognition in society and on the labour market, the relative wage advantage they receive is the fourth largest among OECD countries.

Paradoxically, the transformation ran its course just to eventually allow the emergence of a higher education system whose functioning, regarding most of its elements, offers relatively **low efficiency**. It is enough just to mention the uncritical implementation of the Bologna system, the support of mass education without meaningful control, the distancing from the demands of the labour market, the misinterpretation of higher education autonomy, or the unwise establishment of institutional integration and programme structure. The **education policies** lacking true vision, lost in the details of institutional operation, or simply building on newer and newer formal reforms **mised** students and institutions alike. Institutions do not truly challenge students, nor is the environment sufficiently motivating, and, for this reason, many leave the university without adequate knowledge and/or a degree. The institutions are in situation without real competition or competitive pressure, their administration is bureaucratic, and they possess a management structure that is outdated from many perspectives. The interests of the leadership and of student, instructor communities in many cases do not overlap.

The higher education perspective of government objectives

The ambitious economic and social policy objectives of the government impose high quality requirements on the institutional system of higher education, which leads to a major emphasis of performance-centred approach in higher education, too.

Based on its vision of the future, the **goal of the government** is clear: maintaining a higher education system that is highly positioned in the international education and research space, is able to respond to social challenges, fundamentally determines the economic success of Hungary, and is fundamentally driven by competition. If students are not put to challenges, if instructors lack enthusiasm, if researchers are wary of the mistaken illusion of being decades behind the developed West, then performance will indeed fail permanently. To put it into other words: standards will only be raised, competitiveness will only increase if society imposes greater requirements on the entire higher education system. However complacent we have become in the past, we need competition, more stringent standards, challenges, in a nutshell: we need performance-driven education.

The **objectives for higher education** can be summed up in brief: knowledge-based society where the driving force of the economy is the increasingly domestically-owned production, and its organising force is an innovation network built around the higher education institutions. What the task encompasses is to transfer the principles of the changing public opinion as to how it sees the economy to higher education. We, and the members of society, too, must understand that the future of higher education is inconceivable without an aspiration for renewal, i.e. we will not be able to make a living using the knowledge gained at the beginning of a career until the end of our lives without further education. We need continuous learning and continuous performance.

Financing and community funding

It is worth redefining the **business relations of higher education** and defining the responsibilities of the state and of the institutions. It is necessary to answer the question anew of who the owner of higher education is, and who the buyer and the client is.

For Hungarian higher education to not fall behind the higher education of other countries permanently in an international comparison, the capability, and the conditions, should be created at the institutions of operating **outside the exclusivity of community funding**. The development support available to Hungary in the current budgetary period between 2014 and 2020 is unmatched, however, this is the last opportunity for Hungary to create a domestic higher education that is competitive in the knowledge-based world economy. **Developments after 2020 (2023) cannot be based on** subsidies coming from **Structural Funds**. This is why it is necessary to help institutions with government incentives, too, so that they can supplement community resources by attracting external resources gained from their operations, while the role of the government slightly increases despite the declining student numbers. To achieve competitive training and raise standards, therefore, there is growing need to accept the view that the higher education institutions of the state can and must also **operate according to market principles**. Obviously, the financing of the whole education system cannot be based on market principles, but to provide the necessary resources, institutions need more legs to stand on, because the **current level of dependence on direct state funding** may lead to instability.

Global challenges - breakthrough points

Domestic higher education must adapt to an environment that is created by the **global functioning of the world**, has a growing international character, and do this in a manner that in addition to utilising the opportunities offered by Hungarian higher education in a focused manner, observing value preservation and value creation, using resources efficiently, a system should be created that offers higher quality, is performance-driven and meets the demands of the players of the economy.

If the country is to stand firm in the long term in the regional and, subsequently, in the Western European competitive situation, then it needs higher education that enables broad and high-quality access to knowledge that **provides the right foundations to succeed in the knowledge economy**. Admittedly, the basic level knowledge, skills and abilities demanded by the economy and society do not necessarily overlap with what is provided in bachelor studies. What it offers is in some cases too much, in other cases not enough. Therefore, the programme structure must be revised and adjusted to realistic requirements in the light of the experiences of the past decade so that we can take the path that leads to Hungarian higher education becoming the best in Central Europe.

Transplanting the sectoral approach that has proven itself in economic policy into higher education is also indispensable. **Restructuring should be performed based on and in response to the labour market and innovational demands of key strategic fields of study** (medical and teacher training, engineering, economic and agricultural fields). This is all the more necessary because a significant part of state funding should be practically used for the few areas that have already proven themselves in international comparison and that account for the major part of the higher education output.

1.2 Strategic environment – content and formal requirements

The higher education strategy titled “Shifting of Gears in Higher Education” and its revised system of objectives and measures is a medium term national strategy for the 2014-2020 period, and a **governmental control instrument with regard to its function**. This document also functions as the ex-ante conditions of the grants received from the Structural Fund available in the European Union’s 2014-2020 financial programming period.

An instrument of governmental strategic management

Pursuant to Government Decree 38/2012 (III. 12.) on Governmental Strategic Management, the higher education strategy is also a policy strategy (Section 35(1)). In accordance with this, it is the medium term strategic planning document for the realisation of the vision concerning higher education, a separate field of public policy, constituted by, based on the Fundamental Law, education and research, and the independent institutions determining the content and methodology thereof, and it contains the following:

- ❖ a detailed situation analysis and situation assessment of the relevant field of policy;
- ❖ measurable targets that can be realised in the relevant field of policy;
- ❖ an accurate definition of the scope and instruments of the required interventions;
- ❖ personnel, material, professional, financial and organisational conditions of the necessary interventions, and
- ❖ the principles and system of implementation, monitoring and evaluation.

Strategy, as ex-ante conditionality relating to community resources

The ex-ante conditions of the 2014-2020 programming period of the European Union relating to structural funds (European Regional Development Fund - ERDF, European Social Fund - ESF) are determined in line with the thematic objectives.

In the case of the higher education objectives and **regarding the access to community funds, it is a preliminary requirement** to have a national or regional level strategic policy framework in place relating to higher education, which includes at least the following:

- ❖ (if necessary) measures to increase inclusion and graduation rates in higher education among low income, underrepresented, disadvantaged social groups;
- ❖ (if necessary) measures increasing graduation rates that reduce attrition and/or improve the ratio of graduates;
- ❖ measures supporting the creation of innovative content and programme structure;
- ❖ measures aiming at increasing employability and entrepreneurial spirit that encourage the development of “transversal skills” in the relevant tertiary programmes, including entrepreneurial skills, too;
- ❖ measures aiming at increasing employability and entrepreneurial spirit that reduce gender inequality in the field of academic and professional choices.

On December 22, 2014, the Government **accepted** the strategy titled “Shifting of Gears in Higher Education” along with measures that support increased access, and ones aimed at increasing employability and entrepreneurial spirit.

The revised higher education strategy titled “Shifting of Gears in Higher Education Mid-Term Policy Strategy 2016” **states the current situation in consideration of the changes and interventions implemented between 2014-2016** and the further elaborated objectives and interventions resulting from it.

The strategic policy framework determined in the higher education chapter of Part 2 of the Guidance on the ex-ante conditionality related to European Structural and Investment Funds (*Guidance on Ex ante Conditionalities for the European Structural and Investment Funds, PART II, A.10-2 Higher education*) – which means a national- or regional-level document, or a collection of documents, which can typically take the form of a white book, government strategy, higher education law, or a combination of these – include the (in a higher education perspective) **horizontal strategies** that (among other things, and as relevant) were defined with relevance to every academic level:

Hungarian National Social Inclusion Strategy II. (2011-2020)

Government Decision No. 1603/2014 (XI. 4.) on the acceptance of Hungarian National Social Inclusion Strategy II., the Framework Strategy of the Life-long Learning Policy, the Public Education and Improvement Strategy, and the Mid-term Strategy preventing School Leaving without Qualifications

The Hungarian National Social Inclusion Strategy details the special interventions that affect the disadvantaged and the Roma, including the increasing of their participation in higher education, as well as the programmes that support it, and deals separately with the measures facilitating disadvantaged and Roma youth in reaching and remaining in secondary and higher education (7.3.3).

References are made to the programme in the relevant objectives of the strategy titled “Shifting of Gears in Higher Education” but the strategy does not elaborate on the actual actions again.

The document is available here:

<http://www.kormany.hu/download/1/9c/20000/Magyar%20NTFS%20II%202%20mell%200%20NTFS%20II.pdf>

National Disability Programme (2015-2025)

Decision No. 15/2015 (IV. 7.) of the National Assembly on the National Disability Programme (2015-2025)

The National Disability Programme elaborates on the expansion of the knowledge related to disability, access and rehabilitation in the training, and the establishing of customised complex services that facilitate the participation of disabled youth in higher education and prevent their attrition. (III. INTERVENTION AREAS, THEMATIC OBJECTIVES - 3.4 Higher education) The measures are included in separate Government decrees.

References are made to the programme in relevant objectives of the strategy titled “Shifting of Gears in Higher Education” but the actual actions are not repeated in the strategy again.

The document is available here:

<http://mkogy.jogtar.hu/?page=show&docid=a15h0015.OGY>

National Youth Strategy

The National Youth Strategy accepted in Decision No. 88/2009 (X. 29.) of the National Assembly determines the social objectives related to the young generation for a period of fifteen years (2009-2024) and the related tasks that require state coordination.

The National Youth Strategy elaborates on the following in detail: supporting talent promoting programmes, expanding and reinforcing talent management services, talent management service.

The document is available here:

<http://emmiugyfelszolgalat.gov.hu/ifjusagugy/nemzeti-ifjusagi/nemzeti-ifjusagi-strategia>

National Dormitory Development Strategy in Higher Education

Dormitory developments in higher education are detailed in a separate Dormitory Development Strategy in Higher Education. (Government Decision No. 1722/2016 (XII. 9.) on National Dormitory Development Strategy in Higher Education) This document contains the infrastructural investments of dormitories. The material does not affect resources co-financed by the European Union.

Digital Education Strategy of Hungary

The strategy accepted in Government Decision No. 1536/2016 (X. 13.) contains the digital education elements in higher education.

The objectives are also included in the material titled “Shifting of Gears in Higher Education”, but the measures are not repeated in detail, and reference is made if they affect community resources co-financed by the European Union.

The document is available here:

<http://www.kormany.hu/download/0/cc/d0000/MDO.pdf>

Framework strategy for the life-long learning policy in the 2014/2020 period

Framework strategy approved by Government Decision No. 1603/2014 (XI. 4.) .

The strategy establishes measures to increase participation in and the availability of life-long learning, to reinforce the principles of life-long learning in the education and training system and in the field of adult learning, and to promote the visibility and acknowledgment of the value and results of learning; these measures are not reiterated in the document “Shifting of Gears in Higher Education” [“Fokozatváltás a felsőoktatásban”].

The document is available here:

<http://www.kormany.hu/download/7/fe/20000/Eg%C3%A9sz%20%C3%A9leten%20%C3%A1t%20tart%C3%B3%20tanul%C3%A1s.pdf>

“Investment in the Future” National Research and Development and Innovation Strategy.

The strategy covers the entire R&D&I system.

It includes the increase of Research and Development expenditure to 1.8 percent of GDP throughout the entire R&D&I system by 2020.

The objective in the area of human resources is to raise the number of researchers from 38 thousand to 56 thousand, meaning an addition of 18 thousand people by 2020 through a growth of approximately 2500 people per year.

The strategy “Shifting of Gears in Higher Education” examines relevant measures within the scope of higher education.

The document is available here:

<http://nkfi.gov.hu/szakpolitika-strategia/nemzeti-kfi-strategia/befektetes-jovobe-kfi>

National Smart Specialisation Strategy

Smart specialisation provides a framework for the unified target system of the European Union and the European Research Area (ERA), based on which all member states must have their own strategical frameworks.

The document “Shifting of Gears in Higher Education” contains necessary references with regard to regional analyses on higher education.

The document is available here:

<http://nkfi.gov.hu/szakpolitika-strategia/nemzeti-strategiak/nemzeti-intelligens-150203-4>

National Infocommunication Strategy, 2014-2020

The purpose of the strategy is to give a comprehensive overview of the status of Hungary’s information society and ICT market, establishing a target condition, professional orientations for the EU’s 2014-20 programming period, and developmental focus points with regard to the infocommunications sector. A horizontal target of the strategy with regard to the R&D&I system is the increase of the research, development and innovation activity of economic operators in the digital market (particularly the ICT sector), with regard to the demands of the general public and sectors making intensive use of ICT devices and applications. Priority objectives of the strategy include reducing the rate of the digitally illiterate below 30% by 2020, and ensuring that internet access with sufficient bandwidth and capable of fulfilling needs is made available for all educational institutions by 2016.

The document is available here:

<http://2010-014.kormany.hu/download/b/fd/21000/Nemzeti%20Infokommunik%C3%A1ci%C3%B3s%20Strat%C3%A9gia%202014-2020.pdf>

Irinyi Plan – The Directions of Innovative Industrial Development

The Irinyi Plan covers priority sectoral developments, the prioritisation of which serves the re-industrialisation of the country. These goals are supplemented through objectives and measures for higher education and the development of services and training of new personnel in the following areas.

- ❖ Automotive industry
- ❖ Industry production of specialised machinery and vehicles
- ❖ “Sanitation economy”
 - In connection with: Tourism: health and medical tourism
- ❖ Food industry
- ❖ “Green economy”
- ❖ ICT sector
 - In connection with: SSC sector (Shared Service Centre)

The document is available here:

www.kormany.hu/download/d/c1/b0000/Irinyi-terv.pdf

Jedlik plan – National Strategy for the Protection of Intellectual Property

The strategy concerns the 2013-2016 period: it outlines medium-term objectives with regard to intellectual property. It is based on situational analysis, the fundamental goal of which is to provide an overview of the most important institutions, the current status, and domestic and international trends in the protection of intellectual property. In view of the situational analysis, the strategy envisions a target status to be reached by the end of the strategic period. The toolkit is an indispensable component of the plan: it includes the identification of human and financial resources, as well as the specification of tasks, indicators and liable persons for the implementation, monitoring and impact analysis of the strategy. The Jedlik plan is notably connected with the “Shifting of Gears in Higher Education” strategy in terms of the provisioning of human resources, where the training of new research personnel reinforces the growth in the number of patents.

The document is available here:

www.sztnh.gov.hu/hu/jedlik-terv

1.3. Hungarian higher education in 2030

2030. It is no accident that the target date goes beyond both the mandate of current government and the programming cycle of the EU. Higher education is a **robust, difficult-to-change system**, in which substantial change needs a long time. Therefore, if the government intends to achieve truly fundamental changes, sufficient time will be needed. The 2030 date allows for **fuller** definitions of the necessary professional objectives and the actions deriving therefrom. Most of these actions must be implemented within the 2014-2018 governmental cycle in order to reach the long-term goals.

How do we imagine higher education in 2030?

Students

Students are better prepared and more mindful, but, in exchange, they receive more valuable, higher quality **education, that they can better utilise in their later lives**. Naturally, quality higher education can only be based on **good public education**, for which, in 2030, the improving Hungarian public education system provides students with the necessary entry-level capabilities, ensuring that they are more likely to complete their higher education. The instructors can safely rely on the higher than average competence levels of students entering higher education.

In 2030, it will be natural to differentiate between students in accordance with their capabilities. Inquisitive and motivated students can inspire one another to proceed further and farther in their studies, gain international and labour market experiences, or may even join actual, practical projects or real fundamental research tasks during their school years. Students with scientific interests and farther reaching professional goals, and also those who want to use the research and development skills acquired in projects created during their university years to their benefit in the labour market, can apply for theory-focused bachelor studies, with the majority acquiring further knowledge in a master programme. Of course, this is not a new idea, in its most basic form it is already present in higher education, but, by 2030, it will become commonplace.

The students, instructors and institutions are reacting to challenges, international competition with better performance and by **setting increasingly high achievements**. Those who fail to perform adequately can modify their expectations for themselves accordingly, focusing on completing a course at a lower step on the chain of higher education. Accordingly, there are less and less students quitting higher education without a degree, prematurely and in frustration due to the inadequate surveying of their knowledge levels.

By 2030, it will be reasonable to set higher expectations for students, as **the quality of education offered by institutions will greatly improve by that time. Instructors will be better prepared in both professional and methodological terms, as the educational experience will become more intensive and personalised education will be more widespread.** The master-pupil relationship will become common practice again within the higher education system, with students forming more personal relationships and providing more assistance to one another, as properly guided student will gain their degrees based on realistically structured master syllabuses.

There are **talent development programmes** in all institutions: **scientific student clubs have a historical past**, they bring together, in a traditional way, students interested in scientific careers, while providing them with opportunities for development; at the same time, **colleges for advanced studies**, which are unique to Hungarian higher education, not only organise in-house programmes and contribute to community development, but are actively connected to tertiary programmes and research. **Roma colleges for advanced studies**, as unique products of the Hungarian higher education system, are promoting participation in higher education in Roma communities and the successful academic development of Roma students at an increasingly high quality, thus supporting higher education in prevailing in its role in social mobility. The tutorship-based, personalised forms of talent development are becoming more and more prevalent, as all talented students can expect professional assistance, support from their instructors at the start of their careers.

Institutions

In 2030, the interrelationships of institutions are characterised by **cooperation** and **healthy competition** between educational courses.

The higher education institutional system of 2030 is **marked by an unequivocal division of labour**: university missions are focused on scientific research, creating new knowledge, while universities for applied sciences emphasise the utilisation of knowledge all throughout bachelor, master programmes, practically oriented research and research with industrial application. The **two types of institutions** are not independent of one another, they work in close cooperation with each other and their economic environments in order to promote social welfare and enterprises. This specialisation-based, focused and cooperative process is implemented with the active participation of significant labour market participants and social actors. In addition to voicing their needs, companies, private and public employers also actively participate in education and research financing.

A new form of education is integrated into the higher education institutional system as **the community-based higher education centre**, in service of regional interests, promoting development in the given region. The basic function of the centre is to provide a knowledge base for the local community in areas, situations where courses would not be sustainable in a market-based form, but only through contributions from all stakeholders.

Institutions also have highly specialised, well-defined educational profiles. Certain institutions are focused on vocational training and bachelor studies, while others concentrate on one or two sectors, offering dual study programmes that pose significant challenges and require a great deal of additional work, but attract applicants through appealing employment opportunities. Still others offer academic programmes and careers to the most accomplished young students, with a typical focus on strengths and a robust institutional profile. A well-defined profile also supports the international recognition of institutions: which institution offers the best education is obvious to every Hungarian and international student, and enterprises are well aware of which institution should they cooperate with in a given field and where can they hire the young applicants most experienced in a given profession.

All institutions are considered world-class with regard to the disciplines involved in their respective areas of focus, while, as a whole, the country's higher education institutions collectively cover all areas of knowledge and all knowledge levels. By 2030, there will be no untapped parallel capacities within the given city or region.

Research

By 2030, **educational specialisation will be implemented not individually, but in parallel with a focus on research and development activities**, as result of which funds will be concentrated at a higher level, and any given area will attract the best international talent to domestic institutions. The fundamental research conducted within the country will return our scientists to the vanguard of the academic world, thus helping to address the social challenges of the future. At the same time, domestic research and innovation activities will significantly improve the competitiveness of the flagship sectors of European and the Hungarian economies.

Programme structure

By 2030, the programme structure will be not only better differentiated, but also more flexible than the current one. All students meeting the higher enrolment requirements will be accepted for bachelor studies, while the best will also have access to high-quality practically oriented master programmes in order to enhance their knowledge. These students will be the innovators and entrepreneurs of the future, equipped not only with technical abilities, but also business and analytic skills. The short-cycle tertiary programmes are also popular among students, as at the end of such courses they can either immediately start working or they can further improve their options on the labour market in a practically oriented bachelor programme – which is also available to capable students leaving the vocational training system with excellent results.

The **transfer from bachelor to master programmes is fully open-ended**: students with practically or theoretically oriented bachelor degrees can join practically or theoretically oriented master programmes, so that the decisions made at the age of 18-19 with no higher education or experience can be re-examined and corrected in accordance with academic success and personal interests. Postgraduate specialisation programmes offer another solution to this problem, as these provide options for meaningful professional advancement and re-orientation.

Supporting fact-based decision-making

By 2030, fact-based decision-making will be commonplace in terms of both sectoral management and individual institutions. This will be based on electronic registration systems operating with unified, sufficiently detailed and accurate uploaded data. The smoother management and funding of institutions can be implemented with support from information systems. There will be regular anonymised, student-level connections with databases maintained by various government bodies, providing a basis for the continuous updating of DPR data. The resulting detailed databases will enable the continuous monitoring of both higher education as a whole and also individual training courses. The output indicators will be used for strategic decision-making and specification of developmental directions.

Institutional culture

Institutional culture is characterised by one word, quality. Daily operation, strategical decision-making, the evaluation of instructors, researchers, teachers and programmes are all focused on quality, which is guaranteed at the national level by strict, objective accreditation criteria and full transparency.

1.4 The environment of modern higher education – global challenges

Addressing global challenges directly affecting national economies and the competence of national governments requires solutions reached in cooperation with decision-makers in the policy field, market players, and also experts able to analyse long-term trends in technology and society; it also requires these parties to be able to communicate. This also applies to environmental issues, sustainable economic development, questions of social cohesion and political stability, all of which pose significant challenges today. In the cycle ending in 2020, the European Union itself dedicates 41% of its total research and development funds to solving so-called “major societal challenges”. These challenges require an interdisciplinary, problem-oriented response, which can only be found by well-trained experts.

An essential condition to the social integration of technological development and efficient practical use of this development for the betterment of society and families is the enhancement of the adaptability, innovativeness and cooperation skills of individuals and organisations. Since the beginning of the modern age, the **duty of intellectuals** was to **react to cultural, social, environmental and technological processes requiring analysis and response**. Today, such processes are realised at an unprecedented rate and speed, meaning that the scientific and educational capacity necessary to understand and debate them is also greater than ever.

The society of the 21st century is characterised by **continuous change and organisation into transnational networks**. In this world, awareness of foreign culture becomes a market factor, just as there can be no efficient change management without an understanding of social processes. When developing a national higher education strategy, we must be aware of the fact that the knowledge necessary for success in the labour market is not static, but progresses dynamically over the years, meaning that an educational course cannot consist of the simple transfer of lexical knowledge, instead, it must teach students to **adapt to change** and prepare them for life-long learning by developing the competences that serve as a basis for these skills.

Education will only prepare students to face future challenges, to reach adequate answers to basic global and domestic trends, if it prepares them, in every sense of the word, for **interdisciplinary and problem-oriented, problem-solving thinking and teamwork**. Of course, this does not mean that the educational policy cannot endorse **preferences** in line with the economic interests of the country, but, in addition to economic expectations, the articulated social demand for a well-functioning society, a strong middle class, a good state and an artistic-cultural sector must also be represented.

Institutions fulfil their missions if **the overall knowledge and skills acquired by students, and their qualifications certifying the acquisition of such knowledge and skills, are relevant to the labour market**, if **research results are beneficial to society and the national economy**, and if the institutions are able to fulfil their roles as **regional catalysts**. However, higher education is a slow-to-develop system: about a decade will pass before the students now admitted can become significant factors on the labour market. Similarly, ten to fifteen years will pass before research results can become products, before the fundamental research can lead to improvements in quality of life perceptible to society as a whole. **Therefore, the real question is not what the current demands of the labour market are but what they will be in ten years.** There is no need to analyse what are the current major societal challenges, but rather what challenges will there be in a decade.

The world around us continues to change, challenges are becoming increasingly great, so the current higher education strategy must be defined in terms of the **socio-economic megatrends** apparent in

the **next one, one and a half decade**. Our future will differ from the world we currently know by at least five considerations:

- ❖ the incredible rate of technological development is pushing the biological boundaries of humanity;
- ❖ globalisation will be fully realised and socio-economic borders will disappear;
- ❖ aging populations that are nevertheless active for increasingly long periods will subvert our ingrained ideas on age-specific characteristics;
- ❖ members of society are becoming increasingly active in voicing their needs and, through social networks, participate individually in shaping the future;
- ❖ the recognition that resources are limited is driving humanity toward forms of sustainable development.

Technological revolution: our technological opportunities are growing exponentially, as essentially the entire developed world has become directly connected through smart and mobile devices. By 2025, there will be 5 billion smart phones connecting almost the whole of humanity, as our data and applications become accessible not just in a location-based manner, but anywhere, at any time, through so-called “cloud-based” services. Productivity increases, in certain areas human resources will be replaced by robots, social participation in business life will rise, and megacorporations and private entrepreneurs will be competing over customers within the same market. A significant portion of humanity’s knowledge base is available publicly, in a digital format, while, instead of the transfer of actual, lexical base knowledge, education is increasingly focused on teaching knowledge acquisition methods, technologies; additionally, the boundaries between personal and virtual presence, between independent and computer aided decision-making are becoming blurred.

Globalisation: space and time are blurred, the workweek is now 7 days, the workday is now 24 hours long, as somewhere, someone is always working. There are new economic powers (BRICS) emerging, reshaping the existing world order. Since 2013, developing countries have a more than 50% share of the global economy, as their economies no longer consist only of manufacturing centres, but innovation is also increasingly present. The lack of higher education capacities is also most prevalent in the Third World, since this region has the highest proportion of young people within the population, but the countries in question are unable to meet such needs on their own within the foreseeable future. By 2020, half of the world’s middle class population will be Asian, in comparison to the quarter of the world’s population being in this group in 2010. The world will become even more urbanised, a major part of humanity will live in cities, a significant part in megapolises. A unique characteristic of the global economy is that a single local problem can generate great waves, as instability in a single country can result in a regional or even global economic crisis. Naturally, this interdependency also applies the other way, for periods of economic boom.

Demographic processes: By 2030, the age groups defining the labour market will have only heard of a time before the existence of the internet. There are less and less children born in Europe, but people are living for increasingly long periods, and at the same time, working for increasingly long periods, partially because they have become used to and started needing an active lifestyle, and partially because they cannot live off of pension alone. In 1 January, 2000, a 65-year old or older person was supported by 5 working age people, by 2050, expectedly, there will only be two providers to one elderly person.

Societal needs: personal fulfilment and the meaningful use of leisure time are becoming increasingly important to individuals, almost every service and the entire marketing and media industry have become personalised.

Depleting natural resources: energy and raw material prices are continuously rising – even after shorter drops, or rather when basing the analysis on a multiple decades-long period of investigation –, global climate change is affecting everyday life, so the culture demanding environmentally conscious, economical, self-financing and sustainable systems has become widespread.

The above described **five megatrends** affect all social and economic players, therefore not even the systems of higher education of the various countries can become independent of them.

Having defined these items, the **focus points of a strategy intended to establish a competitive and high-quality higher education** can be specified:

- ❖ In the future, all participants of the higher education system, including students, instructors and institutions will be similarly high-performing, successful, and **motivated by the competitive situation**.
- ❖ Hungarian higher education **offers European quality services** to society and the economy equally in terms of education, research and in areas of the third mission.
- ❖ The completion of the mission is made possible, is supported by a **modernised institutional system adapted to the regional structure of the country and the Carpathian Basin**, in which all participants well-aware of their duties. The education system adapts to demographic trends, institutions are functioning efficiently and effectively.

1.5 The current situation of Hungarian higher education

The vision and the objectives are clear, but to reach the envisioned state, we must have an accurate picture of the current situation of Hungarian higher education, since **measures implemented within the system of higher education are only realised later, in the medium-term**. In order to achieve the desired results and effects, both the socio-economic conditionality and the international position of the Hungarian higher education system must be examined within the following dimensions of interpretation.

Connecting to the economic subsystem

In addition to its social impacts, **higher education also plays a significant economic role**. The methodology of the Global Competitiveness Report issued by the World Economic Forum annually divides the development of national economies into three typical phases based on the annual per capita GDP: resource-driven, efficiency-driven and innovation-driven phases. According to the report, Hungary is currently in the phase of **transitioning from the efficiency-driven to the innovation-driven phase**, so the decisive issue of the economic development of the coming decade will be whether this transition – a significant factor of which is the availability of a highly skilled workforce – can be realised on firm grounds. The above-mentioned development phases can also be described by the fact a higher proportion of the labour force is employed by levels higher up in the value chain, i.e. where jobs produce greater added value. This is only possible with adequately qualified employees, however. All this leads to the fact that **the key issue in the economic development of Hungary is the availability of a higher education institutional system of adequate size and quality**.

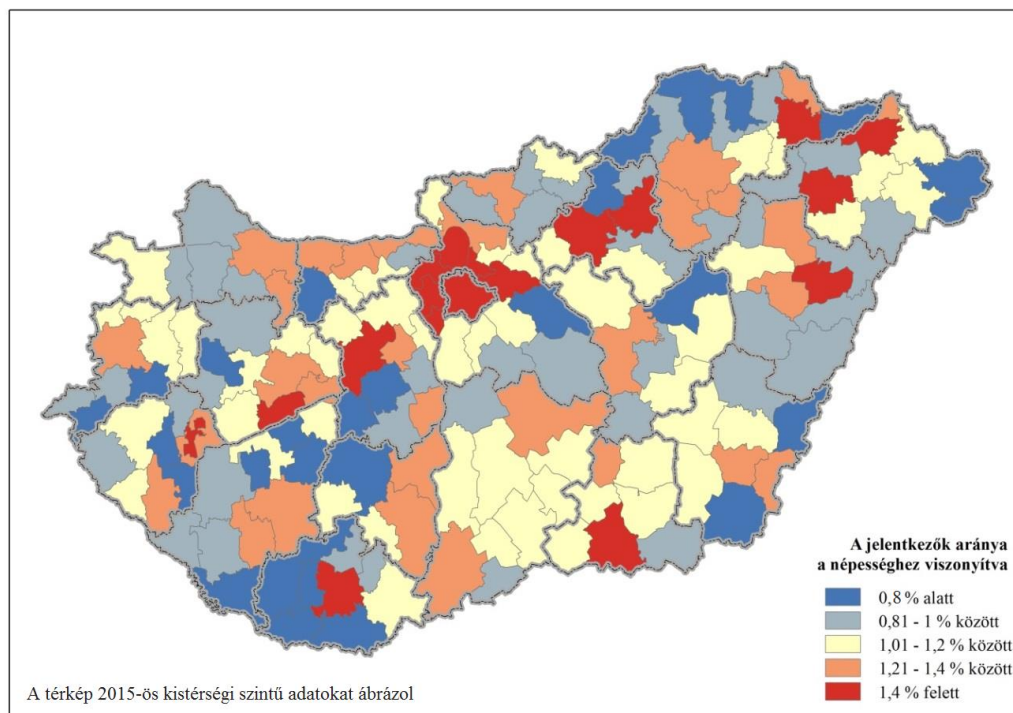
Demographic indicators – social mobility of disadvantaged groups

During the restructuring of higher education, attention must be paid to another problem also related to enrolment numbers. In the previous years, the **reduction resulting from a drastic drop in the past in the number of births** has started affecting higher education: according to the data of the HCSO, on 1 January, 2010, the statistical count of 18-year olds was 126 360, while on 1 January, 2015, members of this age group numbered at 110 440, meaning an almost 13% decrease within a few years. This trend has significantly reduced and **will continue to reduce the demand for higher education in Hungary** in the coming years, at least in this age group.

The presumably declining student numbers are in fact a resource, too: the freed up capacities can be utilised well in the quality transformation of higher education. At the same time, the proportion of people in Hungary with tertiary qualifications among 30-34-year olds is continuously rising, with the country already achieving the 30.3% threshold set as national goal in the Europe 2020 strategy with 34.3% in the year 2015.

The mission of modern higher education institutions is the socio-economic utilisation of education, research and wealth of knowledge. By accomplishing its complex mission, higher education serves the community in a number of ways; nevertheless, facilitating social mobility has an even greater significance among its important functions. **Considering that the promotion of social mobility is a core requirement for any given academic level**, it follows that in the process of reconstructing the higher education institutional system, special attention must be paid to ensure availability in all areas, but particularly in disadvantaged regions.

Examining **the relationship between territorial disadvantages and participation in higher education** in Hungary, it can be concluded that **the place of residence and its characteristics, but mostly its location, have a significant impact on the willingness for enrolment application.** While there are ample opportunities for the residents of Budapest and the large cities to pursue their higher education studies locally, residents in smaller settlements and/or in settlements with a less favourable location would in some cases need to travel more than 60 minutes by road to reach the nearest higher education institution. These major access disparities impose a significant influence on the costs of participating in higher education, thus reducing application willingness among those living in settlements at a distance from universities and colleges. As a result, **the number of students applying for or admitted to higher education in the most prosperous districts is almost double of those in the most disadvantaged districts** with regard to the overall population.

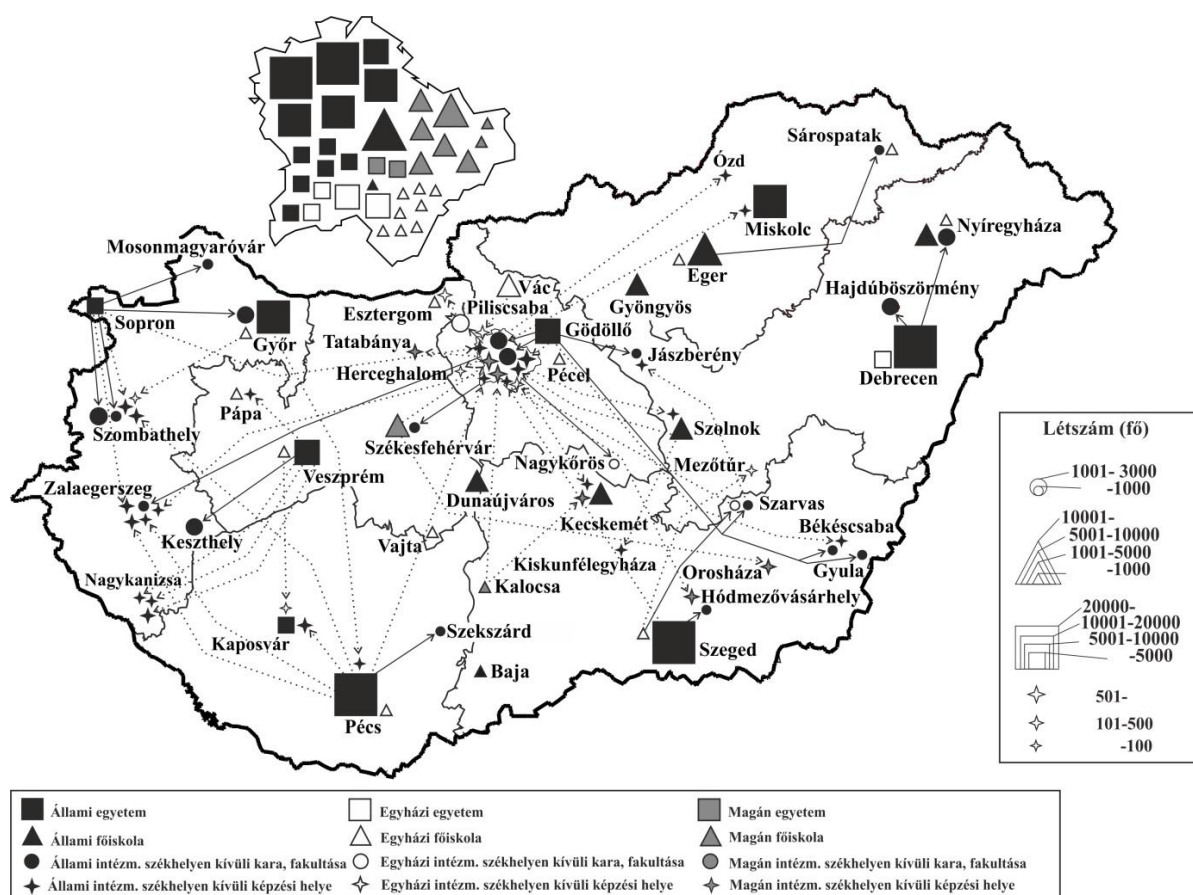


The university seats, branch campuses and outsourced courses of domestic higher education institutions currently have the following configuration¹.

From a geographical perspective, Hungarian higher education institutions are Budapest-centric, which, however, stems from Hungary's spatial configurations, so it should be treated not as a problem but as an attribute.

¹ Situation as at the time of the first version of the strategy in 2014, institutional transformations taking place since then are not shown on the map. Eszterházy Károly College and Károly Róbert College have merged under the name Eszterházy Károly University, Kecskemét College and Szolnok University College have merged under the name Pallas Athena University, while the Sopron-based University Of West Hungary has transferred its Mosonmagyaróvár and Győr campuses to Széchenyi István University. The University of Veterinary Medicine separated from Szent István University.

The map does not show higher education institutions located in the border regions, in some cases across the border, that offer programmes available in Hungarian. Putting Révkomárom, Beregszász, Ungvár, Nagyváradi, Szabadka and Zombor on the map would somewhat improve the situation, it would modify the framework of the analysis.



Higher education plays a major role in the country's less developed regions, where the needs for social mobility and economic development are emerging simultaneously and with urgency, but, in its current state, the institutional system has a limited capability to meet this two-fold challenge. Consequently, a segment should be created within the institutional system that focuses on finding prosperity locally, and that in a manner that the relevant institution should offer practice-oriented programmes suited to the needs of the local labour market, and thus a suitable career to the youth. A further goal that needs to be laid down for such institutions should be for them to undertake a significant role in non-school-based training programmes, too, and to function as true intellectual centres and to become a major factor in local economic development.

In order to improve the competitive situation of disadvantaged regions, the introduction of **community-based higher education centres** will enable communities in disadvantaged regions to access competitive knowledge, which will in turn allow them firstly to prosper at the local level, and also to have sufficient, widespread access to competences providing a sufficient basis for success in the knowledge economy.

It is an unfortunate fact that family background is a strong determining factor in the educational achievement of students within the Hungarian education system, even in international comparison. **Socially disadvantaged students participate in higher education at much lower rates** than their peers living in better conditions. Based on the family background index applied in the National Assessment of Basic Competencies, only 11% of students with the worst family background continue

their studies in higher education, while in the middle and the top segments, the continuation rate is 37% and 71%, respectively. Therefore, the **admittance pool** of Hungarian higher education is **mainly limited to the middle class and the higher social classes**; therefore, the social mobility function of the higher education institutional system should be further reinforced.

There is complete agreement in the academic literature in this regard – both PISA surveys and the analyses applied in the case of the Family Background Index (FB Index) agree – that **tendencies of inequality of opportunity** associated with disadvantaged situations **exert their influence as early as in the childhood**.

The processes working against social mobility are less predominant upon admission to and completion of higher education, as major part of the attrition is already realised within the public education institutional system, primary upon choosing a secondary school. **There is no substantial difference between applicants and admitted students: social and territorial disparities are not prevalent by the time of the enrolment process**. There is no difference in terms of the application and admission rates, which means that **once a student has applied, the chance for them to be admitted is the same**, regardless of social and/or territorial disadvantage.

All in all, inequalities materialise in the willingness to apply for higher education and before, within the public education system. For this reason, the strategy cannot be limited to the higher education segment and its institutional system, higher education interventions should support the public education system and its function to reinforce higher education **by reaching grades 6-8 with career orientation and skills development programmes and by developing teacher training**.

The proportion of Roma people with tertiary qualifications is far below that of the total population. According to the 2001 and 2011 census data of the HCSO, the proportion of people above 25 with tertiary qualifications within the total population was 12.6%, then 19.0%, while in the case of **Roma** people, the same rate was at 0.37% (2001) and 0.83% (2011). However, as regards the Roma participation in higher education, it is particularly important to consider the talent pool, which consists of secondary school graduates. According to the census data, the rate of secondary school graduates among people above 18 within the Roma population was 1.39% in 2001, and rose only to 3.41% by 2011 (while the same data considered with regard to total population shows 38.2% and 49% proportions respectively). During secondary school studies, the rate of attrition is much higher than in the case of non-Roma students; however, Roma students graduating from secondary school have a higher chance of continuing their studies in higher education.

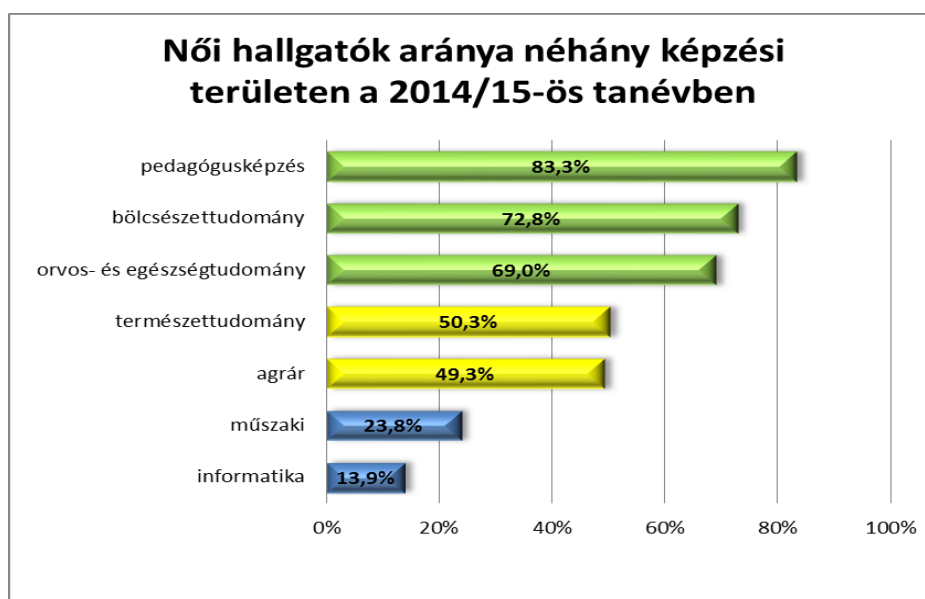
The Hungarian National Social Inclusion Strategy and the inclusion practice helps the inclusion of Roma youth with a package of measures including several components. When considering the social inclusion policy, it is important to highlight the “Útravaló” Scholarship Programme, particularly its “Út a Diplomához” sub-programme, and also the national network of Roma colleges for advanced studies.

EUROSTUDENT V examined **students with impairments or long-standing health problems**, too. The data shows that **8 percent of students live with some kind of an impairment** or suffer from a chronic illness. For this disadvantaged social group, there is a fundamental need to provide equal access in higher education, too. This is ensured by existing measures.

Since 1999, additional grants must be provided to higher education institutions for students with impairments. The amount of this greatly increased between 2015-2017.

Since 1 September, 2002, it has been mandatory for higher education institutions to appoint disability coordinators to ensure that the conditions for providing equal opportunities to students with impairments are met as necessary for them to complete their education.

In Hungary, **women's equal access to higher education** can be said to be guaranteed, as, **since the 1993/1994 academic year**, female students **have been in majority**, therefore general data on participation show no sign of negative discrimination. **However, there are significant differences in gender disparity within certain fields of study.** In the case of information technology and technical fields of study there is a significant majority of men, while elsewhere - including in teacher training and arts - women are overrepresented, however, there are areas where gender distribution is more balanced. (There is a similar trend in the majority of European Union Member States, with different variance.)



Although there has been a female majority among people acquiring tertiary qualifications for decades, there is a significant gap between men and women at the higher levels of the scientific hierarchy. **There has been a widening employment gap in the university hierarchy**, and while we can see women being the majority among full-time students, their proportion is one-third among associate professors, and merely one-fifth among professors.

In the case of the significant differences between programmes (and therefore professions), early career orientation extended to grades 6-8 can ensure suitable intervention. There are greatly successful programmes for these, but they need to be extended nationwide.

As for academic faculty and career development, objectives may be achieved through the promotion of part-time work and the expansion of family-friendly workplaces, as well as the infrastructural and organisational developments necessary to implement these improvements.

Attrition

With regard to the phenomenon of **attrition**, we can say that it is still a **significant challenge** for the Hungarian education system **to get students admitted for higher education to securing their qualifications**, although data of the Higher Education Information System (HEIS) show a clear trend of improvement in the past period. As regards academic levels, there is a **significant rate of attrition (36-38%)** in the case of **bachelor and single-cycle long** programmes, where the duration of the programmes is longer and participants are usually working to acquire their first professional qualifications. This rate is much lower in the case of **master and postgraduate specialisation programmes**: it is between 14-17%. As regards fields of study – irrespective of academic level –, **there is typically high attrition in the agricultural, technical and IT fields, as well as in medical and health sciences**. Also, irrespective of academic level, **arts, teacher training**, and, to a lesser extent, **humanities** programmes are characterised by low attrition rates. In an international comparison, Hungarian data shows that domestic attrition rates are in magnitude 10 percentage points higher than the 25-30% average of EU member states, so there is substantial potential to be utilised by interventions meant to increase student success and decrease attrition.

New research personnel

It should be noted that according to indicators established to measure the innovation capacity of countries, **Hungary performs negatively in the field of doctoral studies**: in the 25-34-year old age group, PhD degrees are issued to 0.8 in a thousand inhabitants, while the EU average, using the same measure, is at 1.69. Hungarian results are low not only in comparison to developed countries such as Germany (2.65), Sweden (2.9) or Switzerland (3.68), but also in comparison to Central and Eastern European countries acting as competitors in the competition for international research centres. In this area, there has been no significant developments since 2008, as the number of students acquiring PhD degrees are stagnating at 1200 per year, which number is insufficient for ensuring a proper **supply of new instructors and researchers** and for improving the international competitiveness of our country. **For this reason, increasing the headcount of doctoral students and their qualification graduation rates seems indispensable for meeting the demand for new academic personnel**. It is also important to note that it is absolutely necessary to increase the involvement of economic partners and the proportion of topics determined by economic operators in doctoral programmes, too.

Internationalisation, student mobility

In higher education, the pool of potential students diminishing due to downward demographic trends may be offset by **increasing internationalisation**, attracting more and more foreign students to our country. Between 2010 and 2015, the number of foreign students among full-time students grew by 53%, their proportion grew by 4.9 percentage points. **In 2015, there were approximately 23 thousand foreign students**, which is 12% of the **total number** of students participating in **full-time education**, excluding foreign students participating in PhD and tertiary vocational programmes. According to 2014 data, most of them came from Germany, but relatively many - around one thousand per country of origin - arrived from Brazil, Iran, Norway and Nigeria.

The number of **Hungarian citizens pursuing their studies abroad** in OECD countries according to 2012 data was 6110, no notable Hungarian student community can be identified in countries outside the OECD. The number of Hungarian students participating in bachelor and master programmes in the OECD member states is between 6-8,000. Since 2012, the **mobility of Hungarian students travelling abroad** has been improving continuously, but not at a considerable rate. One of the reasons for this is Hungary's growing involvement in bilateral, then international and EU programmes (Tempus, CEEPUS, Socrates/Erasmus, LLP, Erasmus+ etc.). The number of Hungarian students travelling in the framework of the Erasmus programme between 2007 and 2013 was 28,275 in total, although Hungary did not use up the Erasmus quotas in any of the years. Connecting the Campus Mundi Programme with the "Erasmus+ zero grant" scholarship resulted in the two funds operating in harmony. The partial or further education of ethnic students in their mother country, providing study or researcher exchange programmes continue to be priorities. Every ethnic community that maintains training or educational institutions need to provide an opportunity to support the foreign studies of students in language faculties.

Structural characteristics, student skills development

In the field of tertiary education, a number of criticisms have been raised by clients-employers: the comments concerned **the programme structure, the quality of the programmes, the content of the programmes and the number of the graduates** as well. The government is responsible for creating a better planned and organised tertiary education system consistent with strategic objectives.

In the past quarter century, adapting to the needs of the converging economy and modernising society, the number of students and educational establishments engaged in courses and programme specialisations **training students for the tasks of the tertiary sector has significantly increased**. The relatively lower prime costs of such programmes contributed to the fact that a wide range of the higher education institutions announced such programmes. **This fragmented programme portfolio in some cases raises questions about the uncertainty of the quality and of the professional output**. It may be a consequence that in several institutions the number highly-qualified instructors and researchers has decreased.

The correction of the programme structure was realised within the first two years of the implementation of the strategy, while also retaining academic levels. **Today, the evaluation of academic courses can be based on relevant information**, as, on the basis of the **findings of the Graduate Career Tracking System**, we have a clearer picture of students graduating from courses introduced in the Bologna Process, while **data series concerning further education and attrition** and the **societal needs** made apparent by applications for admission are available from the **Higher Education Information System**. Based on these measures, the labour market focus of the programmes can greatly be improved, career orientation activity may become more successful and clearer, and at the level of the institutions the concentration of the resources can be successfully implemented.

Professional consensus shows that measures must also be taken concerning the quality of the courses, which presupposes further improvements for the **stricter control of quality management and accreditation requirements, the development of the quality of education and the preparedness of instructors, and the more stringent control of admission criteria**, therefore the prescription of advanced level secondary school graduation examinations and foreign language proficiency are considered medium-term concepts. At the start and at the end of an academic course, **the level of the**

relevant competences of students must be evaluated in order to determine to what extent the given course contributed to developing the students' skills and knowledge. The data recorded at the beginning of the programme may help determine which students need mentoring and assistance in catching up more, while the totality of the data provides an accurate picture of the extent to which the given institution is able to develop the skills and knowledge in question during the course. The data will provide an intervention opportunity for the maintainer, but also for the programme organisers and instructors of the institution, too. It is foreseeable that more prepared students, more motivated instructors and a more strictly controlled quality management system will guarantee to improve the quality of the training.

Modernising the programme and outcome requirements of academic courses, the contents of courses in a broader sense, and, in certain cases, the reconstruction of internal focus points requires continuous cooperation between higher education institutions and socio-economic players. Thanks to this, the relevance of the programmes in the labour market, the extent of graduates' knowledge and the applicability of this knowledge can improve significantly.

The **new enrolment process system based on departmental capacity** can ensure that expectations concerning the number of graduates, primarily those voiced by economic players, are met. Since the Hungarian economy, which is on a growth trajectory, requires a large number of well-trained professionals, **it is necessary to increase the number of those holding a tertiary qualification in a structure that corresponds to the needs of the economy.** It is particularly important to reduce the rate of attrition and initiate further interventions in the development of the supply capacities of certain fields of study. It is apparent that the growth of the Hungarian economy is limited in several fields of study – primarily the technical and IT sectors – by a lack of skilled professionals in certain departments, while the interest for certain other departments – particularly the economics and humanities sectors – is unreasonably high with regard to labour market prospects, meaning that the educational supply is not in line with the actual demand.

Traditionally, the most popular fields of study in Hungarian higher education are related to the disciplines of humanities and social sciences. (In the past two years, the situation has changed in a way that engineering and teacher training have become very popular.) In these fields, the students' interest is outstanding not only in terms of numbers but quality, as well: half of those continuing their education with the highest academic results went on to these fields of study. The **economic significance of the competences provided by humanities programmes is also continuously increasing in the industry and innovation sectors.** However, it is also true that the students in these fields of study in many cases do not acquire the skills and knowledge required by real economy.

Today, the establishment of a more open educational supply and research portfolio is, in many cases, also hindered by an **outdated, rigid institutional structure.** When rethinking the capacities relating to specific programmes at the level of the institution, it is necessary to explore and activate the currently unused infrastructural and human resources potential - one example for this is the low rate of female students in technical and information technology programmes - and it is worth repositioning the institutional profiles.

The regulation and the quality assessment of **programme and outcome requirements** has until now focused on programme input (application/admission criteria, history), the content of its building blocks (subject, field of knowledge) and size (number of lessons, credits), phases (grounding, core training, differentiating) and organisation (mandatory, chosen, optional). **The new approach focuses on the outcome: the results that need to be achieved at the end of the process.** This system

defines the knowledge, abilities and other competence elements required for the issuing of a specific qualification at the academic level. This approach does not focus on “input”, as students may arrive from various places with diverse knowledge, abilities, competences, it defines instead the level and the structure of these that will be created by the end of the learning process.

During the review of the programme and outcome requirements completed in 2016, the teaching of **transversal skills** that increase employability, such as **entrepreneurial skills, digital skills** and **foreign language proficiency**, has been strengthened. There are characteristics, competences applicable to any degree acquired in tertiary vocational, bachelor or master programmes, that is characteristics and competences that are relevant to all academic courses within the given level, including – but not limited to – critical thinking, independent but cooperative problem-solving, civic education, digital skills and foreign language proficiency, ability, attitude, and the competences of autonomy and personal responsibility. The characteristics of the common module of tertiary vocational programmes define further particular transversal competences and skills.

Launching a dual education system

Due to positive domestic and international experiences with the system of training of higher education, and also due to increasing labour market demand, it is now necessary to introduce not only practically oriented courses, but a special form of practically oriented courses, **wherein the government further promotes cooperative training implemented through the inclusion of business organisations within the system of training**, and, for this purpose, also the introduction, control of dual study programmes as defined by the Act on National Higher Education. The **amendment of the legislation defines dual study programmes as a form of full-time training**. The amendment to the act provided an authorisation, furthermore, for the operation and the competences of the Council for Dual Education.

In the 2015/2016 academic year, dual higher education study programmes **were launched within the technical, IT, agricultural and economics fields of study** by institutions cooperating with corporate partners and other organisations. In September 2015, 440 dual students could begin their practical training in 19 higher education institutions at 198 dual corporate partners.

By the **2016/2017 academic year**, there was a significant expansion in dual study programme opportunities: 24 higher education institutions announced dual study programmes in 6 fields of study (agriculture, technical, economic sciences, information technology, social science, natural sciences) in 49 different programmes (40 BSc and 9 MSc), with more than 500 dual partner companies cooperating with the institutions. According to the data of the National Statistical Data Collection Programme, in the 2016/2017 academic year, a total of 1,051 students learned in dual study programmes, 644 of whom began their studies in the 2016/2017 academic year.

R&D&I

In the Hungarian economy, the amount of money spent on **research and development and innovation** has been constantly on the rise since the economic crisis; this, however, is fundamentally the result of corporate spending. While academic and university R&D&I expenditure has practically

stagnated, companies have been increasing their expenditure in these areas at a rate of more than 10% per year, demonstrating that Hungary is transitioning at an increasing rate from its past manufacturing centre, producing the traditional products of the region, to production with high added value, requiring research and development.

Both the community of the European Union and the community of Hungary have defined **R&D&I** and its funding as **areas of strategic importance** and have allocated the necessary funds. The efficient utilisation of such funds providing economic and social development is the fundamental interest of the country. For this reason, the Government approved the document titled: “Investment in the Future: National Research and Development and Innovation Strategy 2020” and devised an action plan with which the shortcomings of knowledge bases and knowledge production can be eliminated, which can manage problems of knowledge flow, knowledge and technology transfer and the cooperation mechanisms of corporate and community sectors performing knowledge utilisation, too.

However, there are numerous **problem areas** within higher education R&D&I, which may hinder the efficient, sustainable operation of the system.

- ❖ The financing of higher education R&D&I activities has remained practically unchanged, with spending in relation to GDP fluctuating around 0.24% for a decade.
- ❖ Higher education does not provide a sufficient supply of new researchers, in a major part due to the shortcomings of doctoral programmes experienced earlier. Since the introduction of the current PhD system, only 43% of the students in regular education have attained a scientific degree, and this is what led to the structural transformation of doctoral programmes.
- ❖ There are too many independent doctoral schools; as their activities are not focused on areas important to R&D&I, there is, at the same time, only a low number of doctoral programmes and doctorands being recorded in the technical, natural sciences.
- ❖ The proportion of direct R&D&I funds, that is R&D&I financed not through public grants, but primarily by corporations, is relatively low in comparison to the total income of institutions.
- ❖ The structures established to provide the necessary conditions for direct cooperation between institutions and companies have been developed in a non-sustainable, inefficient way.
- ❖ The R&D&I activities of institutions are often paired with an inefficient use of resources; the rate of professional cooperation between doctoral programmes and the institutions is low.
- ❖ The EU’s R&D&I funding programmes have produced a unique situation, as the lack of community resources has an adverse effect on the excellent institutions active in the central region.

The utilisation of the R&D&I potential available in higher education institutions is a key question for the economic development of the country. A major problem in the Hungarian innovation system is, namely, that it is structurally composed of two conflicting parts. On the one hand, Hungary ranks **excellently** on the list that measures the economic impacts of innovation – among the countries of the region –, thanks in a large part to the level of innovation culture and technology represented by international **enterprises**. On the other hand, we are the **last** according to indicators

measuring innovation within the **SME sector**. It is clear, therefore, that the government efforts aiming at developing Hungarian companies that are competitive on both domestic and international markets (hereinafter referred to as ‘SMEs’) can only prove successful in the long term if the **innovation intensity of companies** can be **increased**, which, however, can only be achieved efficiently by utilising the potential that is available in higher education. Therefore, one of the most substantial intervention areas in the higher education strategy is to establish a support system which, through the purposeful use of the innovation funds, will encourage higher education institutions to provide R&D&I support for the corporate sector, especially for the SME sector, and inversely, higher education institutions should be granted a major role in utilising the targeted support provided to the R&D&I sector.

The third mission

In the last decade, decade and a half, **higher education**, by fulfilling its **third mission**, has become an important economic factor all throughout the world. Domestic institutions are yet to properly emphasise certain activities considered to be part of the sector’s third mission, such as **social responsibility, the popularisation of science and the dissemination of knowledge**. There has been some good examples since the start of the development of the field, but their influence and prevalence are not at the desirable level. The development of domestic higher education institutions in this area is unavoidable, as the challenges presented by the global competitive situation, the evolving social needs and the necessity of life-long learning all show that in the future, no system of higher education will be possible without fulfilling these needs.

Life-long learning

To provide the human resources which can serve as a basis for an internationally competitive economy, Hungary has one more important problem to face. The **further training and retraining of the workforce** is realised through various forms of life-long learning; the **indicators** for our country in this area are very **negative**. This can be illustrated clearly using data on participation in non-formal training. In Hungary, 10% of the 25-34 age group and 22% of the 55-64 age group participate in non-formal training, which is barely a fourth of the OECD average (37% and 23%, respectively). Solving problems with life-long learning is not among the primary duties of higher education, but, in the course of the structural reconstruction, even higher education must answer this challenge.

Chancellery system

The basis of the new management model is the establishment of chancellery functions, associated with the direct employer status of the maintainer and assigned individual responsibilities. The most important expectations towards chancellors are the operative control, operation of institutions in accordance with the principles of efficiency and expediency, ensuring the budgetary balance of institutions, as well as guaranteeing operational transparency towards the maintainer and other bodies.

² This piece of data disrupted by a data recording problem; registration, reporting of non-formal training courses, and data aggregation must be improved.

Thanks to the function of the chancellor, the operation, processes of institutions have become transparent towards maintainers, while thanks to the control and motivational system of the chancellery, there has been a significant increase in efficiency in the economic management area.

All in all, it can be said that the introduction of chancellors has modified the erroneous operational models, initiated the development of the most disadvantaged institutions, and, in the case of institutions in more favourable positions, further improved operation.

Consistory

The competence of the rector and the Senate mainly covers academic and scientific issues and strategic decision-making, while powers concerning the economic management and daily operation of the institution fall within the competence of the chancellor. The rector and the chancellor are ex officio members of the consistory. The remaining three members are delegated by the maintainer; recommendations on the appointment of these members are made by organisations significant to the higher education institution's socio-economic environment, the given higher education institution itself, as well as the student council of the higher education institution.

The prior agreement of the five members of the Consistory is required for a decision, having economic consequences and made by the senate, to be valid, with particular regard to the institution development plan, the research, development and innovation strategy contained therein, the budget, the annual report prepared based on accounting provisions, and the institution's asset management plan, as well as the senate's approval of the foundation of a business organisation or the acquisition of stake in a business organisation.

The separation outlined above ensures that the interests of the maintainer, along with any external interests (economy, community, etc.), are represented, as well as that the maintainer plays an actual role in the operation of the institution. Subgroups within the body appointed by the local government ensure that education and research remains autonomous as prescribed by Fundamental Law.

2. EDUCATION

The international educational environment of the Hungarian system of higher education

Since the end of communism in Hungary, access to higher education has been democratised, which resulted in the share of the total population with tertiary qualifications doubling over 25 years, and tripling in the younger (30-34) age group. The disparate criteria of **the expansion and the excellence of education** have created a dynamic ecosystem of competing institutions and academic courses.

In the currently developing socio-economic system of the 21st century, knowledge and creativity are increasingly replacing the essential resources of the past, such as arable land, minerals, or the availability of a large, cheap workforce. Qualification has become a determining factor in competitiveness.

Globalisation and the general availability of the internet has reframed physical distances, as the students now choose the location of their further training not based on country or city, but mostly on the quality of institutions and the academic courses they offer. At the same time, the **competition** for the best students, **for the most renowned professors and for research grants has become international**.

As a couple of statistical indicators show, higher education in our country **seems to be lagging behind**, unable to escape the shadow of its past. The core subjects of the discourse on higher education policy are still the level and distribution of state funding, and the necessity of the reformation of the institutional system and institutional management. Meanwhile, many of our most talented students and instructors are trying their luck abroad, while our institutions are at an almost insurmountable disadvantage in the competition for the European Union's research and development funds. The challenge remains significant, despite the fact that numbers show: **Hungary's higher education is attracting more foreign students than any other country in the region** and there are relatively few Hungarians choosing to study at universities abroad. For numerous other reasons, steps must be taken to continue the modernisation of Hungarian higher education, building on already encouraging foundations

Evaluation criteria for the Hungarian system of higher education - overview

In the course of the reconstruction of higher education, it must first be determined how an institutional system can be designed that is competitive at all academic levels and in all forms, and which can provide high-quality programmes, while ensuring that all Hungarian citizens are able to exercise their rights under Fundamental Law, that is to have access to higher education suitable for their abilities. The pointless debates on educational policy must end, instead we must focus on providing practical solutions to problems.

The following table summarises policy related issues and the practical tasks associated with them.

EDUCATIONAL POLICY RELATED QUESTIONS	CONCRETE PROBLEMS, PRACTICAL SOLUTIONS
Accessibility	Hungarian state scholarship (thus undertaking the obligation associated with domestic occupational activities in connection with these forms of financing), student loans, student grant scheme, selection processes and educational methods enabling efficient studies for active workers.
The general quality of education	The value and social appreciation of degrees have decreased over the last decade in the perception of the general populace. Truly valuable knowledge requires more personal investment and study.
Inadequacies of the programme structure	Newly admitted students have very different levels of knowledge, attrition is high, educational content must be modernised, there is no real competition between students.
Programme structure	Professional (practically oriented) and academic (theoretical) training is merged, historical achievements overshadow current labour market value.
Educational methodology	The focus on contact hours must shift to a focus on students' occupational activities. Educational methodology and technology must be modernised.
Selection	The utilisation of grants without selection processes is inefficient, quality is dropping; it is not lexical knowledge that is truly important, but rather learning competences and attitude (motivation).
Equality	Insufficient differentiation (or differentiation left over from the past) between fields of specialty is counterproductive to quality and compliance with labour market demands.
Lack of cooperation	There is no widespread cooperation between institutions – neither at the Hungarian-Hungarian, nor at the Hungarian-international level –, competitiveness between academic courses is limited: both of these factors adversely affect quality. Regular and long-term cooperation between the economic and academic spheres must be improved.

EDUCATIONAL POLICY RELATED QUESTIONS	CONCRETE PROBLEMS, PRACTICAL SOLUTIONS
Input vs. outcome financing	<p>Outcome financing results in the devaluation of degrees, while input financing results in uneconomic training courses and high attrition. The solution is to establish actual competition between the educational courses of institutions, making the issuance of high-quality degrees a question of prestige. Historical norms must be replaced by a system based on actual educational costs. The connection between financing and obligations is not traceable. There is a need for differentiated financing, realistic self-financing. Private financing is insufficient, state funding is limited in extent in relation to the demand.</p>
Market function vs. state regulation	<p>External expenses must be integrated into fees; a predictable financing system clearly reflecting governmental objectives is necessary to form long-term plans.</p>
Accreditation, international dimensions	<p>The accreditation criteria of the labour market and the Hungarian Accreditation Committee (HAC) differ greatly, which results in tension on the institutions' side. Market considerations are realised in a distorted manner at enrolment, as the actual competition is no longer constrained within national borders.</p>
Research financing	<p>In cross-financing between education and resources, the division of funds is often dominated by science policy influence and past performance that is no longer guaranteed.</p> <p>Unnecessary correlations in place of cooperation worsen international competitiveness.</p>

On solutions in general

The above set of problems clearly shows that economic success, social welfare in Hungary can only be achieved through high-quality education and research, which, in turn, can only be ensured through the improvement of performance. However, higher performance on the long term can only be gained through competitive status, therefore this strategic document is focused on the restoration, clarification, control and enhancement of the competitive status.

In the field of tertiary education, a number of criticisms have been raised by clients-employers: the comments concerned the *programme structure*, the *quality* of the programmes, the *content* of the programmes and the *number* of the graduates as well. It is difficult to get a clear picture, as the opinions advocating change are divergent, often requesting that Hungarian higher education follows conflicting trends. The government is responsible for initiating action within the state's competence based on the submitted proposals for change, and, as a result of such action, for creating a better planned and organised – in comparison to the practice of the previous years – tertiary education system consistent with strategic objectives.

In the past quarter century, adapting to the needs of the converging economy and modernising society, the number of students and educational establishments engaged in courses and programme specialisations training students for the tasks of the tertiary sector has significantly increased. The relatively lower prime costs of such programmes contributed to the fact that a wide range of the higher education institutions announced such programmes. This fragmented programme portfolio in some cases raises questions about the uncertainty of the quality and of the professional output. It may be a consequence that in several institutions the number highly-qualified instructors and researchers has decreased.

The education sector intends to increase access to higher education and the availability of a programme structure that is relevant to the labour market in the form of a complex programme.

The improvement of the students' chance for admission, the support of their educational success, and, finally, the enhancement of their ability to meet labour market challenges are components of the value chain-based approach to the development of academic courses:



As regards admission to higher education, regional and social disadvantages are most prominent within the public education system (elementary school, choosing a secondary school, ultimately the secondary school itself), therefore the strategy cannot be limited to the sphere of higher education and its institutional system: interventions in higher education must use early career guidance and talent development programmes to support the public education system and its function of providing new entrants to higher education. Accordingly, the first stretch of the value chain and the interventions of higher education start at the 11-12 age group, 6th graders, meaning that higher education programmes are impacting the public education target group. By cooperating with, supporting out-of-school activities and the public education institutional system, admission to higher education is supported in both the talent development and the motivation aspect. The middle stretch of the educational value chain is essentially targeting the increase of the efficiency of the higher education programme structure and of educational methodology. By way of the promotion of cooperative and dual study programmes, the last stretch covers not only the higher education institutional system, but also the employment environment.

The admission of disadvantaged and Roma students must be particularly supported by the public education institutional system; good examples of such support include the Arany János Talent Support Programme and the "Útravaló" Scholarship Programme. There is need for significant expansion within this field – but the detailed discussion of this issue is covered by associated strategies.

The field of education must react to the challenges imposed by the changes of the labour market and technology. The competences and knowledge expected by the labour market have changed and are continuously changing.

As the latest element of industrial strategies, it is vital to our eminent competitiveness, with regard to industry, particularly the competitiveness of large manufacturing sectors, that the system of higher education takes on a dominant role, preferably through an expansion covering the entire career, with regard to the preparation, education and training of experts with interdisciplinary views, who can act as drivers of the digital changeover of certain sectors.

Complex governmental measures for the promotion of the digital changeover of industry and the Industry 4.0 National Technology Platform [Ipar 4.0 Nemzeti Technológiai Platform] mean new or unavoidable conditions with regard to the higher education strategy. Therefore, it is very important that the higher education strategy provides adequate answers to megatrends, particularly in relation to the comprehensive reformation of the IT education and training system.

The implementation of the Strategy includes, as a specific task, the inclusion of experts and employers involved in the Industry 4.0 National Technology Platform. It is necessary to provide continuous consultation for the channelling of employer and technological expectations, and to incorporate results into measures associated with the given subject and measures concerning educational courses using the digital toolkit, with regard to the focus and the financial framework conditions of such measures. With regard to the above, the enhancement of international R&D educational-excellence knowledge centres within the specified technological fields (cybersecurity, e-mobility, self-driving cars, manufacturing logistics, etc.) should be given priority, as it guarantees the improvement of students' entrepreneurial skills. In these areas, significant improvements can be made even on the short-term by building on the supply of new courses – new international majors and on attracting international talent.

On the other hand – for example –, within the financing framework of IT courses, additional incentives are incorporated, as the digital changeover of the industry and the emergence of new business models result in an incalculable rise in the demand for technical-digital competences both among students and instructors, which raises the issue, even on the short-term, of the effective output capacity of courses becoming limited due to migration.

To summarise the considerations most important to the Industry 4.0 strategy:

In the areas of education and HR strategy, we must start with the observation that there is a significant, and exponentially growing labour shortage in international and domestic sectors with high added value, particularly the labour market of the IT sector; the shortage inhibits growth and jeopardises competitiveness. The output of higher education is not yet in line with the growing demand for qualified professionals.

The reconstruction of tertiary programmes is essential. There are two possible directions for modifications:

- in the case of long-term educational processes (such as the “traditional” public education-university chain), proficiencies for continuous study based on a solid theoretical background and the application of the acquired knowledge must be improved;
- short, concentrated forms of further training must be introduced, under which the teaching of cutting-edge knowledge and its application is limited to the essentials.

2.1. Primary objectives, expected results

As result of measures implemented within the field of education:

- ❖ the institutions, through restructuring, will be able to respond more swiftly and efficiently to the needs of the labour market;
- ❖ the local institution system of higher education will provide an opportunity to everyone to access higher education;
- ❖ the number of those coming from disadvantaged areas, disadvantaged family backgrounds, impaired or Roma students and graduates will increase;
- ❖ participation of women students will increase in STEM + IT programmes;
- ❖ the number of students and graduates of STEM studies will increase; attrition will be significantly reduced;
- ❖ the labour market-related competences of students will improve;
- ❖ all in all, the age group-based proportion of those having a tertiary qualification will increase;
- ❖ due to supporting processes, the number of those participating international mobility programmes will increase;
- ❖ the pedagogical and teaching methodology knowledge of instructors will significantly increase;
- ❖ students will acquire diplomas that provides more competitive, more thorough knowledge;
- ❖ Hungarian higher education will become more attractive;
- ❖ owing to the single structure of education, the ability of institutions to provide education services internationally will increase, and, in parallel with this, their own revenues earned from training will increase, too.

2.1.1 Objective: Supporting student achievement

Explanation: Hungary undertook to increase the proportion of those holding a tertiary qualification or equivalent to 34% by 2020 in the 30-34 year old age group. The increase in the proportion of those holding a tertiary qualification can be achieved primarily through increasing graduation rates, i.e. by decreasing attrition rates. Higher education institutions must provide active support to students for the successful completion of academic courses.

The success of students entering technical or scientific tertiary programmes can be greatly increased in the medium term by involving the higher education institutions in shaping the natural sciences course materials in secondary schools. Secondary school education that is better aligned with the input requirements of the “user” universities can greatly reduce the time required for convergence and the rate of attrition.

2.1.2 Objective: Creating an education system that ensures equal opportunities, social advancement, broad access

Explanation: In modern societies, one of the channels of social mobility that works the best is the successful participation of adequately prepared applicants, students in higher education. This objective especially focuses on:

- residents of districts impacted by the developments of the beneficiary, complex programme to be developed and defined in Government Decree 290/2014;
- those in the Roma community;
- those with impairments;
- women (young female students, female students)
- those that are below average based on the Family Background Index of the National Assessment of Basic Competencies.

The objective is intended to reduce the reviewed regional disadvantages and disadvantages experienced due to family background, particularly the assistance of Roma students and students with impairments, with specific strategies (NSIS II (2011-2020) and the National Disability Programme (2015-2025)) established for this purpose.

2.1.3 Objective: Increasing the interoperability and outcome alternatives of higher education programme outcomes

Explanation: Training forms are needed that are better adapted to labour market participation.

2.1.4 Objective: Making scientific, postgraduate specialisation programmes more flexible so that higher education institutions will be the location of life-long learning

Explanation: There is a growing need for further training and retraining and non-conventional training programmes because of the renewal of knowledge, the continuous change of professions, and because nearly half of the students work besides studying, and about one third is permanently employed.

The need for further and retraining is also growing because of the renewal of knowledge and the continuous change of professions. In the future, within the programmes, the weight of bachelor studies will significantly decrease, the role of further and retraining, forms of training where physical presence is not required or only to a smaller extent, and the programmes available in correspondence and distance education will increase. The linear structure of bachelor + master + doctoral programmes requiring a 40-hour full-time presence is not able to respond to the changed circumstances. Therefore, the capacities that were created primarily for full-time bachelor studies will need to be transformed into further training or distance education capacities.

Both on the input side and during the process and on the outcome side of the programmes, we need to adapt to the requirements of life-long learning and the compatibility of work and learning. Non-conventional forms of training need to be widely introduced that are capable of handling the unity of work, learning and family. For this, it is necessary to establish distance education and forms of training that are more flexible and better meet the needs of employers and employees.

One area of this - where Hungarian higher education must absolutely keep up - is increasing the share of content that is available in a digital form or online, but, most importantly, expanding the range of online forms of training and courses (MOOC) which make it possible to acquire knowledge modules or specific knowledge or skills.

2.2 Content objectives

2.2.1 Objective: Employer (corporate, entrepreneurial) relations must be reinforced at national and institutional level, programme requirements must be represented in the programmes to ensure the renewal of the content of tertiary programmes, with special regard to technical language training

Explanation: Tertiary programmes prepare professionals for the labour market, the students apply for higher education to acquire knowledge and competences that can be well utilised, therefore the external (client) environment should also have influence on the content, quality and depth of the training in addition to the instructor teaching on specific courses. It is of absolute importance, as well, to provide foreign language professional knowledge. Having regard to a labour market environment where in many cases the owners are foreign and the language of work is a foreign language, it should be encouraged to launch training in foreign languages, which is a prerequisite for the knowledge export performance of Hungarian higher education and for increasing the headcount of foreign students.

2.2.2 Objective: Preparation for active citizenship

Explanation: Pursuing an active civic role is an important element of social cohesion in democratic countries. Its extent is definitive from the aspect of institutional operation, the efficiency of the economy and, ultimately, the welfare of the people. Higher education plays an important role in strengthening the subsequent generations in taking a more active civic role, because, in addition to making an effort to prepare its students for independent, critical thinking and facilitating the understanding of the complex nature of modern societies, it offers an opportunity to gain hands-on experience in community actions and roles. For this purpose, the players in Hungarian higher education will need to step up their support in gaining the skills, knowledge and attitudes necessary for active citizenship in the case of the social groups affected, primarily among the students.

2.2.3 Objective: Increasing the international mobility of students and instructors, researchers

Explanation: Increasing foreign language content and intensifying mobility programmes will allow the training of graduates that better adapt to international labour market expectations. A prerequisite for the competitiveness of higher education institutions is to join in the international student, instructor, professional and research networks.

2.2.4 Objective: The teaching methodology used in higher education, in the field of education innovation, should be centred on practice and student work.

Explanation: Bad habits and pedagogical practices that hold back performance and do not facilitate the proficient acquisition of professional knowledge need to be eliminated.

A characteristic feature of domestic higher education - which has broad presence, if not everywhere - that limits quality is the focus on lessons requiring personal presence, the high number of lessons required of instructors and the low level of independent student work. This mode of operation in higher education encourages both students and instructors to hold back performance: students need to complete several subjects offering low credit value (usually 2) and requiring minimum effort, which are, however, coupled with a high number of lessons by the instructor.

This practice is harmful for a number of reasons:

- it does not encourage students to work independently and to practice to acquire the profession at skills level;
- the resulting “rushed” learning, preparing within one day offers low pedagogical value;
- the high number of lessons requiring the personal presence of the instructors means that the training and teaching workload of instructors are high;
- the high burden on instructors distracts the energy of the instructors from personal mentoring, tutoring, research activities and self-development;
- the high number of personal lessons generates excess infrastructure usage;
- the long exam period causes underutilised and overwhelmed periods both regarding the infrastructure and the life of the students and the instructors;
- according to credit monitoring studies, 2/3 of the domestic credits requiring an investment of 30 work hours can be accomplished with significantly less effort in several programmes, while

some programmes at the other end of the scale require significantly more, sometimes two-three times more investment than the 30 work hours to complete 1 credit.

In the coming years, the system of personal lessons, the work carried out by the students, the study period-exam period and “theory subjects” - “practical subjects” will need rethinking. A more intensive learning experience, practical skills acquisition and the project- and result-oriented approach required by the labour market demands that organising training based on subjects and courses be revised.

The past two decades saw an explosive evolution of teaching methodology and teaching technology in the world, especially in the past 5 years, which Hungarian higher education will absolutely need to keep up with. Spatial limitations matter less and less in the learning process. This does not mean merely the expansion of digital content or content available online as opposed to conventional in-library learning, online teaching forms, courses (MOOC) are more and more widely available which allow the acquisition of modular knowledge or special knowledge and skills. Virtual collaboration platforms also serve to replace the immobility of training and research where online practice and research can be conducted by sharing virtual space and real infrastructure.

Infocommunications developments allow to provide infocommunications accessibility which is presented in the objective as a horizontal principle,

2.2.5. Objective: the performance-based promotion system for instructors must be reinforced and, in this regard, conditions for competitive wage formation must be established in order to enhance instructor excellence

Explanation: The efficiency, effectiveness, competitiveness of higher education depends on having appreciated, adequately motivated instructors, researchers of high professional qualities and workers directly supporting education. As a countermeasure against the international “brain drain”, starting from 2015, gradual steps have been taken to implement the central salary adjustment, which has been lacking for several years, and which will promote the involvement of new practitioners in the educational process. The transformed higher education wage and remuneration system should ensure that the remuneration of instructors and employees in other categories performing education activities earned in full time employment will be competitive even in the case of young employees in comparison with that of employees trained by them, not working in higher education.

By devising Act CCVI of 2015 on the Amending of Certain Laws Regulating Education, the Government committed itself to increasing the wages of instructors, researchers, teachers working in higher education. This means a wage increase of 28% in a period of 3 years, which was carried out in steps.

It is a fundamental and acute problem in the Hungarian system of positions that fixed-term pre- and post-doctoral categories are missing, and, as a result, those working on their thesis or having recently gained their PhD can find few jobs, migration is most typical of this group. For this reason, it is necessary to create employment forms with targeted grants in certain higher education institutions for this target group.

2.2.6 Objective: Increasing the number of women instructors and researchers in underrepresented fields and positions.

Explanation: Although there has been a female majority among people acquiring tertiary qualifications for decades, there is a significant gap between men and women at the higher levels of the scientific hierarchy. **There has been a widening employment gap in the university hierarchy,** and while we can see women being the majority among full-time students, their proportion is one-third among associate professors, and merely one-fifth among professors.

In the case of the teaching staff and promotion, these goals can be achieved by making part-time employment more widely available, increasing the number of child-friendly positions, and the necessary infrastructural and organisational developments.

2.2.7 Objective: Education cooperation between institutions, launching joint programmes, strengthening the mentoring role of major institutions, the establishment of networks facilitating the faster development of students need to be encouraged

Explanation: In several fields of tertiary education it is necessary to provide nationwide coverage, but not every institution has, nor can have, the sufficient quality and quantity of resources for this, therefore the reasonable division of such resources is justified.

2.2.8 Objective: The system of quality assurance, quality control and accreditation must successfully contribute to achieving higher quality in training programmes.

Explanation: Higher quality programmes are inconceivable without continuous control and quality assurance.

Performance indicators

	START VALUE	TARGET VALUE
The number of announced programmes decreases by 15% while maintaining the affected capacities	10 732 (2013)	9122 (2020)
Attrition rate decreases by 10 percentage points in the average of bachelor and single-cycle long programmes	35% (2013)	25% (2023)
Number of foreign students	23 000 (2013)	40 000 (2023)
Proportion of students participating in dual bachelor study programmes in the relevant fields of study among students in their first year	0% (2013)	6% (2023)
Proportion of those holding a tertiary or equivalent qualification among the 30-34 age group	34.1% (2014)	35% (2023)
Proportion of students participating in terms abroad as part of a foreign trip or professional practice lasting at least 3 months or worth at least 15 credits	10.41%. (2012)	20% (2023)

3. RESEARCH

Main objectives, expected outcomes

The R&D&I activities of higher education institutions at the moment is performed in an unplanned, uncoordinated manner at the level of the institutional system. A consistently determined, system-level strategic coordination broken down to the level of institutions and its adequate implementation would allow to ensure the R&D&I role and the successful functioning of the whole system of higher education. Our aim is, therefore, to plan and consistently implement the R&D&I activities, structure and financing of the higher education institutional system in accordance with the technology-policy and excellence expectations of the country.

As a result:

- ❖ the headcount of researchers will increase both in the higher education institutions and in corporate- or state-financed research establishments;
- ❖ the number of researchers from EU Member States in domestic institutions will increase, along with the number of instructors and researchers conducting joint research with EU research institutes and higher education institutes;
- ❖ the scientific productivity of instructors, researchers, doctorands will increase, therefore the number of publications and graduation rate will grow, too;
- ❖ international recognition of higher education institutions will improve, certain disciplines will be among the vanguard of international excellence;
- ❖ higher education institutions will undertake a major part in developing corporate R&D&I capabilities, especially in terms of technology-intensive SMEs in Hungarian ownership;
- ❖ the volume of direct R&D orders will increase;
- ❖ direct community financing of institutions will significantly increase (Horizon2020) and participation in EU research programmes, networks will reach the EU average.

3.1 Objective: Higher education will take up an increased role in building up the innovation competences of technology-intensive companies, mainly SMEs

Explanation: Hungary is in the leading position in the region in terms of innovative enterprises, however, it is among the last regarding the SMEs with R&D&I capabilities in Hungarian ownership (26% of the Hungarian SMEs are innovative as opposed to the European average of 49%). The current EU funding period places emphasis on developing the innovation capabilities of SMEs, however, a major part of the Hungarian SMEs will not be able to efficiently utilise the available EDIOP resources without external support. Higher education institutions can play a prominent role in this process based on their existing know-how, in-country availability, tools and relations provided that suitable structures exist.

3.2 Objective: The system of research financing should support internationally competitive quality and resource concentration, and it should more intensively build on funding acquired by the institutions outside the state finances

Explanation: The financing of research and development can only take place in an organised and planned manner, in line with quality and the expected efficiency. Community resources for these objectives are available in abundance until 2020, their efficient use may result in the higher education R&D&I system standing on its own feet in the long term. It cannot be permitted, however, to vaporise research funds without focus or concept, or refinancing or rechannelling them to the field of study.

3.3 Objective: Creating R&D&I networks between institutions and strengthening the focus on institutional R&D&I

Explanation: Professional cooperation between higher education institutions is not typical, this leads to the fragmentation of resources, and ultimately to the uncompetitive operation of most institutions. For efficient functioning, it is necessary to identify and consciously develop the competence areas of the institutions, and to cover other fields in cooperation with other institutions. Furthermore, another aim is to establish an institutional network of cooperation. Clear effort should be made in this field to strengthen research aiming at handling the socio-economic-environmental problems and challenges of the country and of the Carpathian basin and to further social innovation.

3.4 Target: World-class R&D&I universities; increasing the international integration of higher education research

Explanation: The European Union EU2020 objective to increase and harmonise R&D&I capacities at EU level. In the 2014-2020 programming period, the Horizon2020 grants support the strengthening of the European Research Area (ERA) and the integration of the European potentials.

Statistics of the previous period (FP7) show that domestic higher education institutions were underrepresented in the EU research programmes compared to their research and scientific potential. For this reason, participation in ERA, Horizon2020 and the related (e.g. EIT, FET) international research initiatives should be intensified. The institutions with the best research indicators, in view of their scientific capacity and effectiveness, are less active within the European Higher Education Area and the European Research Area. The regional participation data of the 7th Framework Programme are disastrous, as 95% of the funds were used up by old Member States. Out of the new Member States, though, most of the successful applicants applied from the domestic R&D sector, and therefore Hungary was awarded the second most funds. The trend is reflected by the fact that while researcher headcount in new Member States is 245 persons per 100,000 capita, in more developed EU countries this figure is 560, i.e. more than twice as high. Between 2009 and 2012, in the research network and at universities altogether 65 Lendület (Momentum) research teams were formed (39 academic and 26 university) which are definitive elements in the content renewal of the research network, and potential centres for research with significant performance. However, while the funding of the 7th Framework Programme was EUR 53 billion, in the current planning period this amount has increased to EUR 81 billion. By strengthening of international research technology relations, ensuring the

international exchange of experiences, and designing and conducting popular science programmes, training programmes, training courses. These are helped by the R&D capacity expansions that facilitate the advancement in international rankings.

3.5 Objective: Providing human resources to R&D&I in the long term

Explanation: Providing the human resources aspect of R&D&I encompasses two tasks: increasing the number of researchers and strengthening the level of the adequate scientific degree. Both tasks are among the priority tasks of higher education, partly to provide own R&D&I capacity and partly to provide corporate and research institute capacities. The number of those participating doctoral programmes has significantly increased in recent years, but further measures are necessary to strengthen the numbers and the quality of scientific reinforcement. Strengthening the focus on research and practice poses the greatest challenge in the transformation and development of doctoral programmes.

3.6 Objective: Renewing the R&D&I infrastructure

Explanation: World-class achievements in the field of research and development can only be reached where the R&D&I infrastructure is continually renewed and modernised. It is a fundamental principle that the base infrastructure provided uniformly, centrally, nationwide is provided by the state. Nevertheless, in institutional infrastructural investments, one must take into consideration concentration and sharing, i.e. the use of large equipment, research infrastructure by more institutes and research teams.

3.7 Objective: Establishing University-Industry Cooperation Centres

Explanation: Strengthening the industry relations of higher education institutions has priority importance with the purpose that the scientific results of universities find the shortest possible route to application.

Although the most important task of universities is fundamental research and teaching research, it is also important to prepare for applied research and innovation. It is public interest that the results of fundamental research having practical applications that emerge from time to time find a way to implementation. Industry-university relations inspire fundamental research, too, and the specific knowledge that accumulates in the course of this can be applied to solve special problems that appear in industry.

For this reason, where relevant, direct industrial relations and the teaching of industrial-economic approach must be stimulated. The researcher training must include familiarisation with the industrial research environment, too, on the one hand, to satisfy the workforce demands of industrial research

establishments, and so that every graduate will be familiar with the culture of industrial research/development that is different from fundamental research.

Performance indicators

	START VALUE	TARGET VALUE
Calculated researcher headcount [per capita FTE]	23 837 (2012)	34 000 (2023)
Number of R&D employees per 1,000 employees	8 (2011)	12 (2023)
Higher educational R&D&I expenditure as % of GDP	0.24 (2012)	0.5 (2020)
Direct R&D&I revenues of institutional system [% of total budget]	1.5% (2012)	10% (2023)
Ratio of those obtaining a doctorate [as ratio of yearly headcount corresponding to the duration of the programme]	43% (2015)	56% (2023)
Number of higher education inventions [% of those registered in Hungary]	13% (2013)	20% (2023)
Number of domestic centres of excellence as in the field-specific survey of Centre for Higher Education (CHE)	2 (2014)	12 (2023)
Number of institutions included in the League of European Research Universities (LERU)	0 (2014)	1 (2025)
Number of higher education international research projects supported from framework programme (FP7 / Horizon2020)	397 (2007-2013)	635 (2014-2023)
Number of foreign language publications generated within the field of higher education	10 177 (2012)	13 000 (2023)

4. THE THIRD MISSION

In addition to their educational and research activity, higher education institutions play an important role in the **social development of countries**, and **their indirect economic role** is unquestionable. The so-called “third mission” summarises the activities and influences higher education institutions have on their environment. This impact, beyond the scope of apparent educational and research services, is pronouncedly strong, nevertheless it is exerted typically through indirect and soft instruments, therefore **it is difficult to quantify**.

The domestic institution system is potentially capable of fulfilling its third mission role. Its advantage is wide coverage with regard to university seats and branch campuses, for which significant intervention is only required in a couple of counties (Nógrád and Békés counties). Local connections in training, research, economic and settlement development are a given even in the case of institutions with a narrower profile. **Community spaces, service** (sport, cultural, library, public collections) **infrastructures are available to the local intelligentsia**, the institutions function as a living knowledge base, but very often they also function as regional centres of cultural and sport activities. Higher education institutions also contribute, or may contribute with their professional expertise, to organising local and regional public services, therefore, to providing social assistance and care, as well as community organising functions. In addition to this, significant international and EU funds are available for developments that typically strengthen the third mission of higher education.

Soft instruments and factors that are **gaining significance in economic recovery, regional and urban development** - innovational capacity, attempts to generate new knowledge, networking, social capital, trust, cooperation skills, expanding social, economic, scientific and cultural relations and networks - and the creative environment of higher education institutions are well suited to each other. There are well-functioning cooperation, services, programmes, i.e. good practices are available.

4.1 Objective: Strengthening the influence that higher education exerts on local economic development

Explanation: The economic integrity of Hungary has been significantly improved by the numerous industrial production centres created in the past 6 years, and the growing cooperation between the industry and higher education, the development of which continues to be a priority. It is indispensable for economic recovery to have large domestic scientific centres, higher education institutions contributing to the development of the entrepreneurial sector, especially to that of the Hungarian-owned SMEs, through their research and development performance.

At present, the spill-over effect of the research & development activity carried out in higher education institutions does not have a strong presence in rural towns, a dominant proportion of innovative SMEs operate in Budapest or its surrounding agglomeration. In the convergence regions, however, a major multiplier effect is visible in certain economic areas in increasing employment (e.g. Pécs), in generating fundraising projects (e.g. Eger) and in creating an incubation environment (Szeged, Debrecen).

In order to convert the results of scientific research into actual innovation, it is necessary to improve the knowledge and technology transfer capability of higher education institutions, to develop incubation services and the services assisting in establishing spin-off enterprises. An indirect aspect in economic revival is to channel the training, research capacities and knowledge base existing in higher education institutions into devising and implementing regional economic and settlement development strategies. As long as the client side directly participates in organising the structure and activities of higher education regarding the goals of training and research (the training and research portfolios need to be adjusted to the regional economic structure), the task, from the aspect of the third mission, is to achieve a more active involvement on the side of higher education institutions in the local economic and social processes.

4.2 Objective: Increasing the activity of higher education institutions in managing social challenges and in the spreading of social innovation

Explanation: The **social challenges** designated in the strategic documents of the research and technology development framework programme of the European Union between 2014 and 2020 address the current and future challenges that affect Hungary:

- ❖ (health care system, demographic changes and welfare;
- ❖ food security, sustainable agriculture and forestry, and organic farming;
- ❖ safe, clean and efficient energy;
- ❖ smart, environmentally friendly and integrated transport;
- ❖ climate change, environmental protection, resource-efficiency and raw materials;
- ❖ inclusive, innovative and reflective societies;
- ❖ Protecting freedom and security of Europe and its citizens.

The other objective of Horizon2020 is the enhancement of **social innovation**. From the aspect of higher education, social innovation means a series of novel approaches whose purpose in a broader sense is to help society to adapt to current challenges. Important elements of social innovation are, for example, novel measures attempting to remedy employment problems, or such initiatives that deal with the social impacts of fast-paced technological advancement. A common element in the forms of social innovation is that in every case they are firmly rooted in the well-established knowledge of the field. In devising new forms of education, employment and cooperation and their exemplary application, higher education institutions can be role model organisations in the country.

In humanities and social science disciplines, the differing social science topics and problems make it more difficult to measure scientific performance in an international comparison. In the financing of the specialised fields, the **fundraising ability** (tenders, economic-social partners) is low, both in a domestic and international comparison. Due to the increasing role of this channel in scientific research and education both in the domestic and international scientific circles, a way must be found to access these resources.

Expected impacts are felt in a number of levels: training courses and research programmes adapt to social, economic and environmental challenges, while reshaping the training and research functions. As a result, the above challenges are reflected in the training and research activities. Managing the social challenges are integrated into operation, management and institutional processes: these do not

only appear in research and training, but, among others, the environmental emissions, water and energy consumption of higher education institutions actually decrease, innovative, flexible forms of employment, training and education emerge in institutions, various smart solutions are integrated in the use and operation of higher education community spaces.

4.3 Objective: Expanding science popularisation, informative and opinion shaping services, and extending free access to higher education knowledge bases

Explanation: The public collection network (libraries, archives, collections) and the databases of the higher education institutions provide the broadest geographical coverage and the knowledge base offering the most extensive content in Hungary. Due to these characteristics, measures and recommendations initiated at universities and colleges attempting to solve present problems greatly shape the attitudes of the younger generations; students leaving higher education will not only be valuable employees but also educated, broad-minded, environmentally-conscious members of the middle class who handle problems smartly. It is highly important to establish (also) in this field the same infocommunications accessibility that emerges as a horizontal principle in the objective,

4.4. Objective: Creation of modern information content and provisioning of widespread access

Explanation: In addition to the supply of conventional textbooks, higher education libraries actively participate in creating and providing digital learning materials. Most higher education libraries already function as learning and informational centres, well beyond their traditional roles. The greatest change is visible in the new forms of learning, and this is proof indeed that university libraries have remained and will remain the places for learning; more and more new methods are developed where students' and instructors' high level information technology literacy and a new knowledge of scientific communication is taught. The continuous spread of mobile devices among users will need to be addressed by the library technology, as well, examples for this are the development of applications required for mobile services, or the creation of cloud structures for education. Connecting library networks with other cultural/informational networks will lead to the increased quality of higher education. Special attention must be paid in this area (too) to infocommunications accessibility, which also appears as a horizontal element in this objective, too.

4.5. Objective: Reinforcement of the service provider functions of higher education for both students and local society

Explanation: Higher education institutions are in possession of significant community, cultural and sports infrastructure which primarily serve the students and the instructors, but in some smaller university or college towns they are used by the whole population. The fruits of expanding and developing these will be broad-minded students and would-be intelligentsia who are more health-

conscious and who lead a healthier lifestyle, and its significance is outstanding also because the students graduating from the universities and colleges may later in their career as leaders and role models have a striking influence not only on their own health and lifestyle but also on the health and lifestyle of their environment. In improving and developing the training process and its environment, an important consideration is that the service system surrounding the students should have a socialising influence propagating adequate, regular exercise, adequate lifestyle and health-conscious attitude. It is fundamental that these services should not operate as enclosures in the institution, but they should be open to the surrounding community, not only to students and instructors. Therefore, developing and harmonising sport and health-promoting services that facilitate regular exercise and physical activity is an important goal, institutions with free infrastructural and service capacities may join in satisfying relevant local needs, cultural, recreational and health-promoting services may become a cornerstone in the local urban developments aiming at cultural, touristic, creative, recreational and health-promoting services.

Special attention must be paid in this area to groups whose access to these services is more difficult or can be arranged only through the provision of special circumstances, with special attention to those with impairments or those in worse financial conditions.

Extending sport, physical education, health education programmes is a priority goal, since the university sports events, sport opportunities, and furthermore, the sport and recreational service opportunities facilitating regular exercise and physical activity mobilise not only the institution but also a broader segment of society. This improves the prestige and appeal of both the institution and the town, health-conscious lifestyle as well as the positive attitude to regular exercise and physical activity and sport also improve, which has key importance in the prevention of several illnesses, thus facilitating the development and a broader reach of the culture of health.

In developing the higher education service systems in line with the above, an important inter-sectoral cooperation opportunity is presented by joining the “The healthy cities” higher education subprogramme of the World Health Organisation. Complying with the system of criteria of Health Promoting Universities means also the harmonisation of university-college service systems and numerous subprocesses, which facilitate health awareness, regular physical activity and exercise, sport and an adequately health-aware lifestyle, which is completely in line with the general goals relating to higher education, including the improvement of the training process and its conditions.

4.6 Objective: Qualitative and quantitative development of Hungarian education beyond our borders

Explanation: Improving the Hungarian higher education beyond our borders can only be effective if the skills and knowledge level of the Hungarian students abroad significantly increases as result of the activities applied, leading to a gradual accumulation of knowledge surplus among the members of the Hungarian communities beyond our borders. The desired effect may result from the quality-centred development of Hungarian higher education beyond our borders.

In every Hungarian-populated region beyond our borders, the proportion of Hungarian ethnicity is typically and significantly underrepresented among higher education students. This picture is further detailed by the fact that in parallel with the increasing academic levels, i.e. as we progress from bachelor to doctoral programmes, the ratio of Hungarian students and graduates (graduates, those

with a degree) decreases when compared to the members of the majority ethnicity group. All in all this means that the Hungarian intelligentsia beyond our borders cannot or can hardly reproduce itself, which directly leads to the gradual degradation of the education provided in Hungarian and indirectly to the declining numbers of these communities, and to increasing assimilation and migration.

The structure of higher education in Hungarian in the motherland is still deficient: complete fields of science (agricultural, technical, sometimes legal, economic and social science) are missing from the programme portfolio. The supply is predominantly concentrated on the areas of humanities and natural sciences, especially teacher training.

The goal is to create a unified education space in the Carpathian basin, since every segment of the education beyond the borders - in spite of their character differing from region to region - is intertwined with the Hungarian education system through numerous links, it forms an interconnected structure with it, therefore Hungarian higher education beyond the borders cannot be torn away from the bloodstream of the higher education in Hungary. Up to now, we have dealt with and analysed the Hungarian communities beyond the borders (those living in enclaves or those in diaspora, as well) and their situation in relation to the members of the majority ethnic group. However, in order to halt or reverse the negative trends mentioned before, the Hungarian higher education beyond our borders will also need to be observed and developed in the dimension of a unified Hungarian higher education, in a single higher education space. This approach ensures that in nearly every region government-level education concepts created along strategies that have already been prepared and elaborated, or at least their seed exists, can be pursued in terms of Hungarian education beyond the borders and in the field of higher education in Hungary, as well. In the course of the planning related to the Hungarian higher education abroad to be created accordingly the same qualitative and quantitative requirements should be determined as are in effect in the higher education in Hungary, too.

Performance indicators

	START VALUE	TARGET VALUE
Number of higher education, chamber, local government collaborations/consultative forums	2	12
Creative urban strategy in the implementation of which the higher education institution participates	2	5
Proportion of those doing sports, exercising who reach the minimum recreational level (based on the MEFS (Hungarian University Sports Federation) indicator)	23% (2014)	47% (2023)

5. INSTITUTIONAL MANAGEMENT AND FINANCING

The structure and operations of the institutional system should be transformed in a way that it is characterised by cooperation and the division of tasks. It would be advantageous to eliminate local rivalries resulting in parallel capacities within certain regions, as the unification of regional resources is essential for success in international competition.

The goal is to create an efficient and effective institutional system adjusted to the spatial structure of the country and to position it in the Carpathian basin and in Europe. Hungarian higher education provides an opportunity to the Hungarians of the whole Carpathian basin to access tertiary programmes, thus establishing the unity of Hungarian higher education in the Carpathian basin.

The efficient transformation and positioning of the institutional system includes strengthening the educational and research focus areas, clearly defining and demarcating the missions of various types of institutions, evaluating the quality fulfilment of the mission, rationalising the programme structure and adjusting financing in light of this.

There is an expectation towards higher education institutions to rely more and more on their own revenues, external, market resources while performing their core activity, educational and research activity, thus by stabilising external sources of revenue their dependence on budgetary resources can decrease. The anomalies, problems that occur in the current, strict regulatory environment of the budgetary financial management (wealth management, asset procurement limitations, constraints on the use of own revenues etc.) significantly inhibit and make the institutions counter-interested in achieving efficient financial management, in developments.

It is important to highlight, however, that in institutional management the academic and operational management responsibilities have been separated with the establishment of the chancellery system. The Consistory is created by the maintainer - from the relevant players of the socio-economic environment of the institution - and exercises the right of consent in relation to the long term, strategic decisions of the institution by the Senate that is elected as a self-government. The optimal operations management of the institutions is ensured by the chancellors, therefore the possibility to gradually loosen constraints has been created.

The fiscal austerity of public finances in relation to the financial management of budgetary resources, and the increasing involvement of market resources at the same time, and also efficient financial management, being strategic goals, all require that the performance of public duties using budgetary resources, the activities and projects performed using community resources, the “entrepreneurial” activity performed using external, market resources be strictly separated in the financial management of the institutions by the applicable legislation. Therefore, while the performance of public duties using budgetary resources and projects performed using community resources are characterised by strict purpose limitation and stringent settlement obligation, then the use of market revenues and financial management thereof will require a much more flexible financial regulation to be designed that is better suited to the market environment.

Higher education performs three core tasks, because the higher education institution is an organisation established - to pursue education, scientific research and artistic creative work, as core activities - in accordance with the provisions of the law, furthermore, the higher education institution,

by disseminating and economic utilisation of the intellectual values originating from its core activities, contributes to the social and economic development of its region.

The three core tasks are recorded at the highest legislation level:

1. education
2. scientific research and artistic creative work
3. third mission activity, i.e. ensuring community access to knowledge (disseminating the intellectual values originating from its core activity for community purposes) and contributing to local economic development and social innovation.

Introducing a task-based budgetary planning and financial management system will need to take into consideration the three tasks in respect of the public duties “ordered” from the institutions.

In the case of **educational activities**, the self-financing, student number, as well as the student attrition and success (including the *amount of course credits* completed) of the course should be considered – with regard to maintaining the quality of the course as well –, as this ensures maximum flexibility. Besides prime cost-based self-financing, certain special aspects also need to be considered, such as the grants provided to student with impairments, available since 1999. The financing of **scientific research** needs to be provided in observance of the provisions set forth in the smart specialisation strategy, with targeted, performance-based support. In addition to this, targeted special grants are required to ensure the supply of new researcher personnel, which is ensured by the New National Excellence Programme launched in 2016. The third element in supporting scientific research is the special support provided for a specific period to research organisations and processes that are outstanding in an international comparison and that support the handling of socio-economic-environmental problems, challenges in Hungary and in the Carpathian basin.

Cultural grants can also be provided to **third mission** activities as supplementary programme support or under other legal titles and strategies.

5.1 Objective: In the financing of training, research and scientific performance, a stable, predictable, task- and performance-based system based on realistic specific cost must be established that can adapt to labour market requirements and the relevant budgetary resources

Explanation: The current financing system is fundamentally based on student headcount and in no way does it acknowledge higher education performance, nor does it encourage students or the higher education institutions. Based on this, the new financing system need to be defined along the following principles.

- ❖ There are no hereditary right, financing is absolutely based on performance provided.
- ❖ The scope and amount of the duties to be provided by the higher education institution is determined by the state in consideration of the available budgetary resources. In determining the performance and financing of public duties, performance indicators are determined to ensure compliance with quality requirements.

5.2 Objective: Constant monitoring of the higher education institutional network, correction towards a hierarchical system of institutions adapted to Hungary's geographical structure which leads to quality improvement and creates competition

Explanation: The institutional restructuring performed between 2014-2016 created the framework for a network corresponding with the objective along the following principles.

- ❖ Budapest-centredness is a characteristic of Hungary's spatial structure which should not be handled as a problem, but rather as an asset.
- ❖ The fact that settlement structure is hierarchical cannot be overlooked in development policies.
- ❖ Instead of settlements, the basic units of spatial structure should be functional urban territories.
- ❖ The presence of higher education should be ensured according to the territorial function.

If further questions arise on the part of certain higher education institutions regarding structural transformation, the governance in the sector will continue to take the necessary measures based on these principles.

5.3 Objective: Efficient provision of central sectoral services

Explanation: Existing or forming central sectoral services, processes, infrastructures should be provided in a rational, cost-effective manner.

5.4 Objective The exposure of institutions to resources originating from the EU needs to be reduced, their market-based fundraising ability and social and economic roles need to be improved

Explanation: the financing of the Hungarian state higher education institutions in the period between 2012-2015 followed the pattern below:

1. Direct state funding (under various legal titles)	50%
2. Funding from community tenders (of which about one third were R&D-type projects, predominantly EU funds)	24%
3. Direct revenues (not for R&D tasks, predominantly tuition fees, services, etc.)	22%
4. Direct R&D revenues (from third parties)	2-4%
5. Patronage, donations	< 1%

Regarding the change in institutional financing, it needs to be taken into consideration that in the following years the direct state funding cannot be increased significantly, only at the rate of the growth

of economic performance. Due to the robustness of the system, it is not even desirable to be exposed to only one source of revenue, furthermore, community resources co-financed by the EU are only available until 2023 the latest.

Direct state financing will continue to play a predominant role and its rate - despite the decline in student numbers - will remain at the same level, funds freed up by reduced amount of tasks and the optimisation of the system will need to be used up for the quality improvement of higher education and the interventions determined in the strategy.

Arrangements need to be taken by all means to increase the *direct R&D* and other revenues originating from the operations of the institution, and also donation-type revenues, and also to establish the financial management environment that it requires.

In the 2017-2020 planning cycle, until 2023, the EU's community financing must be utilised to establish structures and business models that ensure that the financing gained, in the end, through direct activities, of a proportion corresponding to the funds, is visible in the system, to a large extent because of the individual roles played by students and the marketing of R&D&I activities.

It is not typical in Hungary, and for the time being, applicable, predominantly tax-related, legislation does not support that funds gained by the institutions are generated through donations, though in several countries of the world (USA, Germany, England) such income is regarded as an important mode of financing for higher education institutions.

6. PRIORITY FIELDS OF STUDY

6.1 Medical, health science and social training

The aging society is a typical characteristic of the 21st century. The average age of the world population is increasing rapidly, and this process is the most pronounced in Europe where even today every fifth resident is 60 years old or older. This proportion is expected to reach 33% by 2050. Aging societies pose challenges in every area of life, nevertheless, the situation has become most urgent in the health care and social care supply systems.

In addition, the health and social care supply systems are faced with several other problems and ever increasing challenges: environmental health problems, lifestyle problems - especially regarding addictions - health and social problems caused by everyday stress, challenges typical of marginalised social classes that result from social inequalities, etc.

Accordingly, health science and social fields of study should be treated as a priority in higher education, too.

While **medical training** is a success story within the Hungarian higher education, graduate and postgraduate medical training that embodies the triad of healing - education - research is faced with several challenges simultaneously. The three units are inseparably connected to each other: healing will generate the experiences that define the questions for education and research, research will find and education will disseminate the answers to healing. The quality of the university environment is ensured by the presence of all three functions, where the token of the efficiency of the system is that one person will participate in all of the three processes, and education and research are based on clinical experiences. The majority of the instructors in medical and dental training are actively involved in patient care as well as research.

Considering the entirety of medical training as a complex system, interventions are necessary in *six interconnected fields*.

1. Higher education will **need to satisfy the Hungarian health care system's demand for professionals in every necessary area**. According to our surveys, in past years, increased higher education capacities have provided sufficient input for this purpose: By 2020, based on a 2012 survey of the Office of Health Authorisation and Administrative Procedures, an average of 1,000 medical practitioners, 185 dental practitioners and 120 pharmacists are expected to retire due to their age annually, to be replaced with new professionals. From 2014, the number of admitted students with Hungarian citizenship has exceeded these figures, almost without exception in courses supported through Hungarian state scholarships, therefore by accepting the obligations of domestic employment with regard to this form of financing. At the same time, the risk of attrition must be reduced and appropriate medical career paths (with sufficient specialists in all medical fields) must be provided.

2. The four universities providing medical training actively participate in the medical training of the European Union. The table illustrates the proportion of foreign students; in general, every second student is from abroad.

	Medical and dental students in total	Out of which a foreigner	Proportion of foreign students
University of Debrecen	3,833	1,972	51%
University of Pécs	3,381	1,831	54%
Semmelweis University	5,353	2,553	48%
University of Szeged	2,710	1,187	44%

Despite relatively high self-financing costs, there is a significant number applications over the college quota; 3-5 times the number is typical for both English and German language courses. As for medical training in rural areas, the number of students can be realistically doubled, while in the case of Budapest, the number of students may be increased to two and a half times the current figure (in addition to increasing Hungarian language training to 400-450 people / year, student numbers for both English and German language courses can be increased to 500 people / year), so that in the training of doctors and dentists, Hungary may become an **important centre for training new medical staff within the EU**.

In the surrounding countries, medical degrees can be attained currently at lower prices, and in these countries, more and more universities start offering training in a foreign language. At the same time, domestic training courses have the advantage of being practically oriented and having an accompanying clinical background. In order to retain our positions and increase the number of foreign students, 1) education infrastructure, the clinical background and the associated infrastructure must be developed and expanded, 2) in addition to university hospitals (clinics), teaching hospitals must also be more actively included in education, and, finally, 3) a significant expansion in human resource capacities is necessary to ensure the high-quality of foreign language academic courses. To sum up, the required additional capacities need to be provided to maintain the quality of the training courses. However, commercially utilising excess capacities and reinvesting the revenues generated this way in the development of training, and health care in general, offers an important potential in Hungarian medical training.

3. The third intervention area of the institutional system of medical training is its state of providing **typically highly progressive care within the patient care sector**. As a process, the active connection of clinical capacities to regional and national patient care has already been started, but the coordination of hospital and university clinic capacities must be continuously improved – particularly in Budapest.

4. The fourth intervention area and the associated goal within medical training is to provide, through integration into the operational process as a whole, a **research background** and new research personnel **for the health care industry**. In fundamentally three areas: 1) providing medicine development and medicine testing processes; 2) strengthening the research capacities necessary for the manufacturing of medical diagnostics instruments in Hungary, and finally 3) development of health informatics: in the area of analysing epidemiological and pathological “big data “ generated in patient care.

5. As for the fifth, we should not forget about the usage of the significant **amount of data and information**, acquired and generated through clinical activities and medical training, **for the purpose**

of making public health and health policy decisions. For this reason, the conditionality of the collection and analysis of datasets usable at the public policy level must be fully provided for with regard to the four universities and the teaching hospitals.

6. Last, but not least, the above assets and developments may create such capacities and services that will ensure the revival of **health tourism**, that health services are rendered in Hungary in a greater proportion.

Pharmaceutical training can satisfy the requirements for domestic pharmaceutical and corporate pharmaceuticals manufacturing and development professionals in terms of the health care professionals in operating registries, however, in the areas outside this scope or in certain special fields there is significant shortage of professionals (clinical-hospital pharmacy, pharmaceutical service, wholesale quality assurance). Furthermore, there are three additional areas where opportunities are significantly underutilised. In the case of further training, the set of criteria must be established to launch a large number of pharmacovigilance and EU inspector specialisations, as there is an elevated demand for such programmes in the whole of the EU. In order to improve the quality of providing new researchers, the outdated assets need to be significantly modernised. It is also necessary to ensure, for emergency situations, the availability of critical manufacturing capacities in strategical, military and national security related pharmaceutical production, as many production processes are currently realised under severely outdated conditions.

In the **health sciences, particularly in the training of nurses**, the greatest challenges are the training of new personnel and to acquisition of sufficient practical knowledge. In Hungary, graduate health care workers have been trained for nearly four decades. Geographically, university education provides good coverage: in addition to the courses in Budapest, there are three universities (in Debrecen, Szeged, Pécs) providing medical training and two higher education institutions with medical faculties (Miskolc, Győr) covering the spatial structure of the country. However, problems include a) issues on the input side of academic courses, traditionally provided for through vocational medical training, b) high levels of attrition, c) there has been significant technical development – new learning content – in nurse education, as well as in various other fields for ancillary health care professionals. It is not only a question of education but also of health policy, too, that leaving the career and migration is significant, i.e. the sector is struggling with permanent shortage of staff. To reinforce the sector with new staff, not only the practice-centredness of the training programmes needs to be ensured but also the input site needs to be increased significantly, and the headcount needs to be increased constantly. The application data of recent years, however, show that the number of applicants for healthcare programmes has been stagnating (4,200-4,600 applicants annually on average) while the number of students admitted has slightly decreased (from a peak of 2,000 it has levelled out at around 1,700-1,800 persons).

Regarding the education of **social care and auxiliary professions**, territorial coverage is also a challenge in addition to the growing demand for new personnel. In contrast to medical and health science programmes, irregularities can be seen in these fields. The extreme geographical diversity of the service area is of utmost importance in the social sector, and while in some areas aging-related problems pose a challenge, in other areas the main challenge lies in providing assistance to the youth.

Social professions and social training centres contribute not only to the training of new personnel for the health care system, but also to the completion of tasks associated with the third mission of higher education institutions, with particular regard to community organisation, support, mobilisation activities and activities reinforcing social confidence. Additionally, there are numerous special subsectors significantly expanding the professional knowledge necessary for providing health care services, acquisition of which is imperative not only in bachelor studies, but also during further training. For new staff to reinforce the sector, not only the practice-centredness, spatial coverage, specialisation of the programmes need to be ensured - which can be provided in cooperation with the health care system - but the input side needs also to be significantly increased, there is permanent need for increased headcount. Contrary to this, according to application statistics, **since 2013, there has been a drastic drop in the number of both applicants and admissions.** In 2016, the number of applicants for social worker major was less than half than three years earlier (1,000 applicants) and the number of admissions did not reach 60% of the previous level (300-400 students).

Considering the above described tendencies, continuous education within this field must be particularly emphasised, as it a) could be a solution to the mitigation of staff shortage in the social care and auxiliary professions; b) is in line with the concept of life-long learning; c) could assist people who were forced to leave the labour force for longer periods (such as those living on a carer's allowance for a significant period while caring for a child with impairments, now trying to return to the labour market) and whose qualifications are no longer in demand on the labour market to return to seeking employment.

6.1.1. Objective: Increasing the volume of medical training and reinforcing, consolidating and raising the quality of the clinical education base to assist in this purpose

Explanation: For the purpose of developing the training, a modern infrastructure needs to be created that has sufficient appeal for foreign students and that allows instructors to teach their students using the most advanced diagnostics instruments, and on the other hand, clinical capacities directly controlled by universities also needs to be increased and the role teaching hospitals play in gaining experience needs to be enlarged. The infrastructural background of preclinical education started after the trimester and the clinical infrastructure are particularly underdeveloped, but the development of the network of simulation centres and skill laboratories used for practical training must also be emphasised.

The highest level of cooperation between theoretical education and practical training are clinics where patient care departments responsible for practical training function within the institutional structure of the university. The clinicians who work here, as result of being regularly engaged in teaching and research, possess that knowledge and oversight capability that is indispensable for designing the learning material and organising the training. In addition to developing the clinics, teaching hospitals could be involved in the practicing of the learning material acquired in classrooms and skill laboratories and in skills development to an extent much higher than today.

6.1.2. Objective: Improving the personnel background of medical training

Explanation: The appearance of foreign students in medical training has doubled the headcount but the number of instructors has not kept up with it. Attracting talented young instructors back home and keeping them here can be achieved with the increasing of the wages, but it is just as important that university instructors be given a career advancement opportunity with greater support provided to research at universities. The provision of personnel requirements means the theoretical, research-methodological preparation of the professionals involved in education, and the maintaining of their knowledge. The instructors can only maintain their credibility in education if they participate in the practical healing work as well, without regular clinical work an instructor loses his/her professional credibility in front of the students, thus deteriorating the efficiency of education. However, the reverse is also true: instructors need to be in possession of adequate educational-methodological knowledge and skills to be able to pass on his or her theoretical knowledge and clinical experience in the course of a well-planned teaching process. With the help of teaching clinicians, practice beside the sick-bed will significantly increase problem-solving skills, situational awareness among students, and their competences that enable them to act swiftly and efficiently.

6.1.3. Objective: Developing higher education in health sciences, achieving a marketable training methodology that meets domestic needs and foreign demand

Explanation: In order to provide for the human resource requirements of the medical institutional system, it is necessary to a) ensure that there is continuous input for medical training courses, b) create opportunities for life-long learning for medical professionals, c) develop career opportunities for medical professionals, and, through such opportunities, the social prestige, opportunities for mobility and the career development models of medical professionals, d) foster knowledge that is modern, practically oriented, usable and presupposes the use of modern equipment. Additionally, increasing the volume of education is justified with regard to the health science education courses required for a domestic, marketable, Hungarian and English language health care system. Out of these, bachelor and master nurse training need to be highlighted. However, during the first two years of implementing the strategy, health care professional teacher and practical instructor training was launched and therefore there is no need to determine separate measures in this area.

6.1.4. Objective: Expanding and developing the adult education and further training activities in health care

Explanation: Currently, the primary aim of university adult education activities is to meet minimum professional requirements and to provide the reinforcement of professionals, but institutional commitment and activity can be enhanced in this area. Continuing medical education (CME) of physicians/dentists/pharmacists has significant market and service value, too.

6.1.5. Objective: Reinforcing the Hungarian health industry and expanding the associated pharmaceutical and diagnostics R&D capacities

Explanation: Hungarian drug development, the manufacturing of medical instruments and the development of medical ICT is not viable without ensuring the supply of new university researchers.

6.1.6. Objective: Modernising the conditions of pharmacist education and research

Explanation: The pharmaceutical industry and its regulatory institutional system requires quality-oriented transformation both in the case of infrastructure and training.

6.1.7. Objective: In the field of social services, providing the territorial coverage of the training and aligning it with the ever-changing challenges in a practice-centred manner, increased involvement of churches and civil society organisations

Explanation: With the aging of society, due to significantly differing socio-economic problems in each region, more and more attention should be paid to the functioning of the social care system, and the training of the professionals required to perform this task.

6.2. Natural sciences, technical and IT training

The mathematics, natural science, technology or informatics (hereinafter referred to as 'STEM + IT') fields of study are of **priority importance** for societies in developed countries **highly dependent on modern technology**. Regarding the future, further spreading of the processes of mechanisation, robotisation and infocommunications revolution are expected, therefore the significance of this field will only increase. To enable Hungary to cope with the challenges of the future, high level academic presence in STEM + IT disciplines, outstanding research and outstanding education are absolutely necessary. The economic and natural scientific sectors need those expert professionals who are able to find the relevant answers to problems surfacing in the technical, scientific and information technology fields. To have new experts in suitable quality and quantity, it is important to raise the awareness of the students as early as in the secondary school for these fields, and provide them with the necessary knowledge so that they can successfully start their higher education.

6.2.a Objective: Providing an input of adequately prepared students for STEM + IT training courses in order to increase students' success

Explanation: The current standards of secondary school natural science education within our country are inadequate in the majority of institutions, teaching aids and pedagogical methodology are

outdated, it bears little relation to the realities experienced by students. At the higher education entrance exams, due to the low application numbers over the quotas, for the majority of STEM + IT courses the scores required for admission are extremely low, the most talented students choose the popular programmes of the other of fields of study. The resulting composition of students has a negative impact on the efficiency of university education, and thus on the studies of talented students. Having half of the enrolled students complete their bachelor studies is a good result. This situation damages the principle of the concentrated use of state resources.

6.2.b Objective: Providing applicants for STEM + IT courses in sufficient numbers to generate a graduate output satisfying the needs of the economy and science for qualified professionals

Explanation: In recent years, Hungary has come to face the undesired phenomenon of not having youth applying in sufficient numbers for courses in mathematics, natural sciences, technology or information technology to satisfy the needs of the domestic players in the labour market, and the shortage of STEM + IT graduates - based on their feedback - is starting to jeopardise economic stability and the opportunity for continued development. The output of higher education does not fulfil the growing demand for qualified professionals. In 2015, one third of all the applicants designated STEM + IT courses, and the proportion of this field of study among admissions was only 29%. Data from recent years show that the number of applicants and admissions in this field of study is steadily declining, while their proportion is stagnating. The rate of applications over the quota is low, there is no real competition for admissions. The output figures are further reduced by the extremely high attrition rates.

6.2.1 Natural science education

In an age of knowledge-based economy, international competitiveness absolutely requires that the citizens of a country have adequate knowledge of natural sciences, the availability of qualified professionals who are well-trained and are familiar with the latest scientific developments, and the presence of a well-functioning academic sector that provides research and education in the field of natural sciences at a high level. In the absence of these factors, countries will be left behind in competition, have low innovation capacity, and their economic success may be jeopardised. Pursuing natural sciences at a high level, on the other hand, will provide an opportunity to stand out internationally, and is fundamentally important for the rest of the research and development directions, has high prestige and it has a long tradition in Hungary. Nevertheless, Hungarian higher education is currently faced with a number of unsolved problematic areas that can jeopardise the successful functioning, scientific effectiveness and international competitiveness of this field of study. Providing sufficient numbers of new professionals seems doubtful, this field of study has been unable to attract enough applicants for years, and the preparedness of youth who are admitted is uneven, the most talented students more and more often choose a programme at a Western European or American university. The standard of education deteriorated after the transition to the Bologna system, the knowledge pool is not updated at the adequate pace, the programme structure and the pedagogical methods applied in many cases require developing. The research capacity and effectiveness of natural sciences in domestic higher education need to be reinforced, and the economic deployability of the achievements needs to be improved in order to increase international competitiveness.

An instrument in ensuring competitiveness is to apply the programme requirements, training solutions and methods defined by the demands of the companies and employers, more specifically by the industry in providing new qualified professionals. It is especially true in the industries with fast-changing technologies which represent high added value.

To remedy the problems, the educational government determined the following objectives:

6.2.1.1. Objective: Increasing the standard of bachelor and master programmes in natural sciences

Explanation: Shifting to the Bologna method was performed imprudently and suddenly, in many courses the standard of teaching in the foundation subjects decreased, while too much learning material was condensed into a 3-year programme. The pedagogical and testing methods applied were in many cases outdated, and frontal teaching still dominates as opposed to individual, project-based and teamwork. The knowledge pool is not updated at adequate speeds, new scientific achievements in many cases are incorporated with an unduly long delay. Laboratory lessons and practice-centred lessons in many cases do not receive sufficient emphasis, their conditions and equipment is insufficient. Still, a fundamental prerequisite to increase the standard of training is to provide the additional costs that derive from the practical nature of natural sciences, to provide and use adequate equipment.

6.2.1.2. Objective: Improving PhD programmes: internationalisation, reinforcing the scientific character, establishing a systematic system of pre- and postdoctoral grants

Explanation: High-quality PhD programmes are one of the cornerstones of university research. There is a clear correlation between international recognition and the number of PhD degrees awarded by a university. Large-scale increase of the number and quality of PhD students is a fundamental instrument in improving international competitive positions, if necessary, through the training of foreign students, too.

6.2.1.3. Objective: Increasing research effectiveness

Explanation: The effectiveness of research is bound to personnel and material requirements. The current system is disadvantageous with regard to personnel requirements, considering that we are “giving tenure” to (employing for an indefinite period of time) assistant lecturers with no PhD qualifications or young professionals with newly acquired PhD degrees – which is unprecedented at the international level. This should be replaced by a system of fixed-term postdoctoral appointments and the instructor-researcher careers associated with this system. The internationalisation of higher education is also important from a personnel requirement consideration, as it is currently hindered by the obligation to nostrificate degrees and by slow bureaucracy. Material requirements include the development of the necessary equipment infrastructure, the transformation of the tendering system,

establishing the legal environment that supports research, and increasing the remuneration of those performing above average.

6.2.1.4. Objective: Reinforcing industry relations to allow university scientific achievements to reach the application phase as early as possible

Explanation: Although the most important function of universities is fundamental research and training to research, it is also important to prepare for applied research and innovation. It is in the public interest to have the practicable achievements emerging in fundamental research from time to time reach implementation. Industry-university relations inspire fundamental research, too, and the specialised knowledge accumulated in the course of this can be put to good use solving specific problems emerging in the industry.

Special attention must be paid to providing new professionals for the sectors highlighted in the Irinyi Plan, and integrating the programme requirements, training solutions and methods determined by these branches of the industry in the process of training new professionals.

6.2.2 Technical training

The key role and significance of technical training that supports economic development and improves the ability to produce high added value is undeniable, especially in Hungary, where such a high percentage of the gross national product is created by the industry. The technical field of study is in a special situation because due to the fast-paced technological development its pool of knowledge significantly changes every couple of years, and furthermore, prospective employers and higher education institutions should have especially tight cooperation - in education, research-development and innovation, too - to reach the desired goals.

As a result of this, syllabuses, and certain - mainly professional - subjects need to be renewed every couple of years. Students need to be prepared that for the most part of their active career they will be working with instruments and technologies that did not even exist at the time of their higher education studies. They acquire the knowledge and competences that are absolutely indispensable in this respect in the natural sciences and professional foundation subjects. The scope of specialised professional knowledge is expanded in two directions: new instruments and technologies emerge within a specific field, and also new fields are created. These characteristics can be applied well within the boundaries of the two-cycle model. It is generally accepted, and it was one of the aims when its introduction was prepared in Hungary, that bachelor studies (BSc) should provide wide-ranging knowledge, foundations in natural sciences, general engineering knowledge, and it should foster the creation of a general engineer's attitude. The specialisation rate should not be great, acquiring specialised knowledge should for the most part depend on the student's independent work. Master programmes (MSc) should offer detailed knowledge of a narrow field, students, where possible, should acquire design, implementation and assessment (testing) methodology in connection with projects.

6.2.2.1. Objective: Renewing the structure of bachelor and master programmes in the technical field of study

Explanation: It is necessary to clarify the focal points of bachelor and master programmes. Bachelor studies should provide general knowledge in a field. In master programmes, only targeted natural sciences knowledge should be required to teach, emphasis should be placed on transferring the specialised knowledge of a narrower field, on involving students in projects. In possession of a bachelor degree, greater choice should be justified from among the master programmes than there is today. Attrition rate is extremely high in the case of bachelor programmes.

6.2.2.2. Objective: Creating and regulating a new partnership between higher education institutions and companies employing graduate students

Explanation: Companies and higher education institutions cooperate in technical fields today, too, nevertheless there is no universal pattern and supporting mechanism for this. Types of cooperation are really diverse, from cooperation based on short-term interests (satisfying workforce demands) to strategic cooperation. Dual study programmes offer an opportunity for joint training and for cooperating as part of it. This can be used in (professional) bachelor studies providing proficiency knowledge. Similarly, this can be connected to (academic) bachelor and master programmes that predominantly prepare for designer-researcher professions: the higher education institution and the company cooperate in research-development, students participate in joint projects, as part of individual work, writing thesis, degree planning. Cooperation (partnership) agreements provide a predictable, mid- or long-term relationship for both parties. With centralised support, the interest of the companies can be extended to participation in supporting technical higher education beyond their own workforce requirements. Involving the professionals of the entrepreneurial sector in education can help demonstrate what needs to be taken into consideration, in addition to technical considerations, to create a successful product or service and to launch it on the market. It is also important to show that employers' expectations towards graduates differ: large enterprises look for a specialist for each task, while smaller companies typically need a universal graduate: for example, an engineer who is familiar with legal, economic and marketing fields. Among the measurement officers of laboratory workshops there is great need for those with industry experience. Despite the fast-paced renewal of professional knowledge, in technical fields currently there is no obligation for further training as is the case for medical practitioners. Making this mandatory will help keep the knowledge of earlier graduates up to date.

6.2.2.3. Objective: Increasing the efficiency of teaching methods in the technical field

Explanation: In the technical field, individual work aimed at creating the necessary competences can be applied well, though its potential amount is reduced by the high number of face-to-face lessons. In full-time education, the Act on National Higher Education requires at least 200 lessons in a semester, which, calculating with 14 weeks, is less than 14-15 lessons a week. Currently, master syllabuses contain typically twice as many face-to-face lessons, 28-30 a week. In bachelor studies, it is recommended to apply face-to-face lessons in high numbers in the first 2 semesters, then reduce it

gradually every semester. In master programmes, it is recommended to set a lower figure in the law from as early as the first semester.

In the technical field of study, distance education and e-learning can be applied well for some content. In laboratory practice, this is further helped by virtualisation that spreads ever more swiftly. Digitalisation: (i) e-learning offers an alternative to conventional “lecture-based” knowledge transfer providing foundation knowledge, or supplements that help internalise the knowledge; while (ii) virtualisation can expand the boundaries of how the assets of the infrastructure are used. Nevertheless, personal presence is an important element in quality assurance for workshops, laboratory sessions and testing, too. Block timetables at MSC and PhD levels can be a useful asset in adapting to early employment, in connection with labour market needs, along with a teaching method that places larger emphasis on independent work and tasks. In bachelor studies, however, the goal is to acquire a firm knowledge base, and that can most effectively be achieved in the framework of conventional, full-time education.

Many students participating in master or postgraduate specialisation programmes are studying while working. Still, there are few courses advertised as correspondence courses, and making them widespread, therefore, seems justified.

In many countries, it is mandatory to participate in training in a foreign - primarily English - language. Rich and successful countries that expend significant resources on higher education (e.g. South Korea, Singapore, Brazil) provide their students with significant grants for studies abroad. In Hungary, in technical fields, courses provided in a foreign language should primarily be realised in master programmes. In supporting mobility, students participating in master programmes should have priority.

In the technical programme structure there are few interdisciplinary programmes. Competences acquired there (ability to cooperate with specialists in other fields, the communication skills it requires, aptitude for teamwork) are important in other engineering fields, too. It is especially the programme entry criteria, the regulations relating to the mandatory credits to achieve in addition to the credits determined in the master syllabus, that differ from what is applicable in other programmes.

6.2.3 IT training

The emerging IT and informational revolution may be best described by the term “Internet of Things”, denoting the fact that the boundary between the physical and virtual world is thinning. In parallel with this, the role of data is continuously increasing, the ability to navigate in this vast ocean of information (the content available on the Internet doubles every year) is becoming ever more important - anyone who is able to find his bearings and use the opportunities that information offers will win in the global competition.

The trends described in the international academic literature and the latest industry analyses can be summarised as follows:

- ❖ network-dependent lifestyle will create a new digital citizenship - mobile phones take the opportunities that the Internet offers to the people;
- ❖ an explosive growth of digital business life is expected;

- ❖ new consumer habits are created based on the habits of the society of the Internet;
- ❖ the five driving forces behind technological development is utilised for socio-economic development: “big data” → “big wisdom” and real time systems; cloud-based Internet becomes general; gigabit networks; new network architectures are created as result of the change in the software environment; context-aware terminals, smart sensor capabilities; commoditisation and virtualisation.

The above transformation processes create a sense of urgency for the IT programmes of the internationally intermediately-positioned higher education of a country that is a technological follower, such as Hungary. The special situation of the IT field of study stems from the fact that scientific knowledge changes substantially faster and to a greater extent than in any other field, and it is here that technological progress exerts the most direct influence on the skills and knowledge that is relevant in the labour market. The teaching staff, as the most stable asset, slows adaptation in the first place, but the corporate integration of institutions is not developed enough to exert an unavoidable influence on the content, structure and methods of the training. Determining the following objectives seems justifiable in order to improve the adaptive capacity of IT education:

6.2.3.1. Objective: Meaningful revision of the programme and outcome requirements of IT bachelor programmes in view of industry trends, domestic corporate demands and international experiences

Explanation: The programme and outcome requirements (KKK - programme and outcome requirement) of IT bachelor programmes were established in the first two years of the strategy. The learning-based approach offers an opportunity to adapt international examples, which fundamentally regard IT as an interdisciplinary field, and to integrate domestic corporate demands. Providing a wide range of specialisation besides a firmly condensed foundation in the syllabus will increase student motivation and employment opportunities. Every specialisation today offers an outlook into society and the material world.

6.2.3.2. Objective: Regular revision and updating of the material assets of IT training. Ensuring to keep pace with the change of technology, avoiding teaching and research on outdated technology

Explanation: IT training that is internationally competitive and suited to labour market demands is unimaginable in a higher education institution that does not possess the most modern technology. Accordingly, equipment of suitable quality must be provided to the players in the domestic higher education in IT, and it must be ensured that it is upgraded regularly. When improving the supply of equipment, the field of software and IT services should also not be neglected besides the hardware.

6.2.3.3. Objective: Improving corporate relations, reinforcing cooperation with industry players in the field of both training and research

Explanation: For graduating IT professionals to truly be able to cope in the labour market, it is important to constantly revise the training programmes to comply with technological change and industry trends. The existence of close corporate relations may provide significant assistance in this respect, allowing employers' demands and expectations to be taken into consideration easily. Furthermore, in the case of scientific research, cooperating with the corporate sector may create a major source of revenue and it may help secure a greater economic utilisation of scientific results.

6.3 Economics education

In recent years, in the field of economics higher education a new financing model has been introduced, the most important element of which is that Hungarian state scholarships are only awarded to a small part of the applicants, students predominantly finance their studies by paying the prime costs, if necessary, by using student loans. Demographic changes (declining numbers in the university age group) and the strengthening of international migration of students fundamentally project a decline in the demand for domestic higher education. In the field of economics, this declining trend is counterbalanced by an increasing demand by economic entities (enterprises, companies) as well as public administration bodies, public service providers, and organisations providing community services for graduates with such a degree. Demand may also be increased with competitive programmes in foreign languages in some top institutions which could attract foreign students to Hungary.

In order to have an economics field of study that is sustainable, effective and competitive in an international comparison, the following direction changes need to be implemented:

1. Further development of master programmes that suits local needs and is more practice-focused.
2. Connecting highlighted institutions to the international education market and strengthening the ability of institutions to receive foreign students.
3. A more intensified role coordinated with employers in postgraduate specialisation programmes and adult education.
4. Optimising the programme portfolio in the institution system (determining the qualitative and quantitative parameters of launching a programme; geographical and institution-specific coordination of academic levels, specialisations).
5. Introducing and implementing a dual education system

6.3.1. Objective: Widening the portfolio of economics master programmes in cooperation with local employers regarding programme financing as well as the content of practical training and its implementation

Explanation: The goal of master programmes is to provide future economists specialisation knowledge, locality-, branch- and field-specific knowledge in a flexible interval that aligns with labour market demands. Effort must be made to offer fewer subjects but more complex knowledge in each

subject with higher credit values that will enable students to immerse in professional knowledge and to practice the use of various models and methods.

6.3.2. Objective: Utilising the opportunities offered by internationalisation, reinforcing competitive, foreign language economic training programmes primarily in master studies

Explanation: At a national level, only few institutions possess the conditions to offer internationally competitive bachelor or master programmes, therefore these institutions need to receive focus to satisfy international market demands.

6.3.3. Objective: Reinforcing an intensified role in economic postgraduate specialisation programmes and adult education in coordination with employers

Explanation: Several demands emerge on the side of employers that an economics training and development institution can satisfy well and professionally with its knowledge and capacity. The local integration, sensibility to solve current economic and social problems and sustainable financing of institutions are well served by these forms of cooperation that are widely used in international practice (instructor and developer status financed by companies and organisations, joint development of learning material and methodology, joint research, providing new qualified personnel and leaders for companies).

6.4. Agricultural education

Hungary possesses good potential in terms of agricultural production, it has several comparative advantages in international competition resulting from its climate, soil quality and traditions, furthermore, two-thirds of its area is covered by agricultural areas. Today, every activity aiming to provide input for agriculture are handled in a close relationship with agricultural production, as well the processing and marketing of products, therefore the weight of the food industry as a whole in the national economy is around 16%. Still, the agricultural sector is below the maximum capacity of its potential due to a number of factors. The low level of our productivity and the added value of our production play an important role in this.

Increasing and developing the weight, competitiveness of agriculture is unavoidable for many reasons. The safe and quality food supply of the Hungarian population, the role of the sector in rural economy and employment both justify to improve the capacity of the agricultural sector, indirectly through providing high quality agricultural professionals. There is an ongoing competition for the food supply of the world and those countries can win this competition where natural resources - especially agricultural arable land and water - the cooperation and knowledge of farmers and enterprises creates the possibility to competitive and viable food production.

At present, the age composition of those employed in agriculture is unfavourable, their qualification is below the expected level. In order to ensure the competitiveness of agricultural companies, it is

indispensable to train highly-qualified professionals with up-to-date knowledge. The demands defined by the producing companies of agriculture reflect 21st century expectations in terms of qualified agronomists, and such labour market demands pose a major challenge for agricultural higher education. The dual model between agricultural and food industry enterprises and the higher education institutions offering agricultural training progresses slowly.

Agrotechnology has a growing significance, because carrying through the “from the soil to the table” principle requires a growing level of informatics, automatisisation and robotisation.

Traditionally, agricultural higher education was fundamentally built up reflecting the geographical distribution of agricultural economy around agricultural universities in the Trans-Tisza region, West and Central Hungary regions, associated with a wider portfolio of college-level education in the faculties or as independent institutions. The branch campuses connected to the universities have gone through a lot of changes, their structure was determined by the changes in the state-run maintenance of agricultural institutions, followed by the creation of the universitas-type higher education institution system, and then the creation of multi-profile institutions functioning in the same town. While in 2014, in a fairly fragmented programme structure, 53 different tertiary vocational, bachelor and master programmes existed in the country, by 2016, the rate of fragmentation significantly decreased. At present, 12 universities offer 3 tertiary vocational, 12 bachelor and 20 master programmes in the field of agricultural education.

6.4.1. Objective: Increasing the prestige of and popularising the forms of livelihood associated with agriculture; increasing the proportion of the applicants for agricultural higher education compared to the total number of applicants in the medium-long term to 10%

Explanation: The enrolment marketing activity of the sector only partially applies the latest instruments of communication industry, it does not take into consideration the information consumption habits of the younger generations. Recruitment-focused communication campaigns are in need of major developments to eliminate scatter loss and to use instruments with the best price/quality ratio. The number of those applying for agricultural higher education is roughly half of what is necessary, and there is high attrition among those admitted. Between 2009 and 2015, the number of applicants for agricultural higher education was 4,400-5,400 annually with the average not reaching 5,000, which was less than 6% of all the applicants.

6.4.2 Objective: Introducing new dual study programme forms - proportionate to increasing foreign demand - expanding foreign language programmes

Explanation: During the rationalisation of the programme structure so far, parallel programmes with major content overlap and programmes that were less important for society, the economy and those wishing to continue their studies (land consolidation engineer, administration organiser and IT agronomist, ornamental horticulturist) were phased out, while a new master programme was established to reinforce water management (agricultural water management engineer). During the realigning, besides the specific sectors of the bachelor programme structure (general agriculture,

horticulture, agricultural engineering, food economy, forestry, veterinary) remained new training programmes (rural development, horse breeder, horse sport, environmental protection) that satisfy special demands, and training courses can be launched as single-cycle long programmes that form the basis for providing new professionals for agricultural research and innovation.

Agricultural training is a key element in rural development, however, additional, new and modern training elements are necessary to introduce to fulfil expectations. By increasing the number of programmes taught in two languages the number of foreign students and the international competitiveness of the programmes can be increased. There is significant interest in English language programmes supported by the Stipendium Hungaricum scholarship from every segment of the world. In recent years, agronomist MSc, food engineer BSc and MSc, and environmental management agronomist MSc courses have seen significant numbers of enrolment. There is also demand for agricultural manager training, too, primarily from the countries of the Eastern region. The dual study programmes in higher education facilitate economic development by reinforcing the supply side of the labour market through education. By introducing and introducing dual agricultural study programmes, relevant sectoral experience can be gained on the farms during the duration of the programmes, thus creating harmony between practical and theoretical education. There is distinctive demand for the so-called cooperative training to be launched at master level. The demand for qualified professionals by a multifunctional agriculture based on a systems approach is supported by the single-cycle long agronomist master programme. It is also necessary to realise the farmer further training, to expand the portfolio of distance education or vocational training and other short-term programmes.

6.4.3 Objective: Reinforcing agricultural education centres, clearly designating the profile of existing places of programme, rational, structural and sectoral merger of individual places of programme

Explanation: Profile realignment of higher education institutions offering agricultural education and the concentration of programmes is unavoidable. 2-3 agricultural training centres need to be created in the country to cover the full spectrum of agricultural higher education and R&D, from bachelor studies, and with the help of their teaching farms, from practical training to doctoral school and research institutions. The other higher education institutions will provide specialised higher vocational and agricultural bachelor programmes in the field best suited to the demands in the region. These regional institutions would serve the scientific and innovational activities of agricultural centres and the research institutes and doctoral schools that operate there through a carry-on function. In the division of work the task of the agricultural centres is to coordinate the research tasks between the other state institutions, and to establish and maintain cooperation. Resulting from their specific fields, veterinary and forestry training offer bachelor, master and single-cycle long programmes, maintain doctoral schools and pursue research activities away from the agricultural centres but in cooperation with them.

6.5 Teacher training

Teacher training is a specific strategic branch of higher education, where future changes must serve the renewal of **public education**. Expectations towards public education, higher education and the teaching profession in the 21st century for the most part similar to the expectations emerging in West European countries. We must face a global change that affected information societies in which education and training are becoming the most important instruments in increasing economic competitiveness, social integration, and increased quality of life. Developing the content of teacher training may bring about gradual improvement in preparing talented youth so that they can become versatile, qualified professionals with modern professional views. Teacher training provides the personnel requirements for education whose “client” in any age is public education.

Regarding the teaching, educational and vocational training tasks of public education and vocational training, in the system of teacher training, the teaching professions - the training of nursery school teachers, primary school teachers, teacher/specialised teachers, neonatal and ECEC professionals and teachers performing various development tasks - and the qualification levels are regarded as the factor that determines structure.

High-level public education and school system (both based on experience and research results) can only be maintained and developed with professionally excellent teachers who cooperate with each other and who share the attitude the practical approach for continuous professional development. Teacher training that is renewed in content and structure - regarded as the starting point of continuous professional development - will only let its true and measurable influence felt in decades' time significantly, therefore it is necessary to handle it in conjunction with the teachers' career path and teachers' further training, and reinforce the connection between teacher training, starting a career and continuous further professional training. The professionals participating in teacher training and the whole training process need to show exemplary cooperation themselves, too, during the training of (future) teachers.

It is in the interest of society as a whole that the **teachers** who teach the rising generation of youth of the future will learn from the best and the most committed and possess a broad professional knowledge and teaching competence.

The renewing teacher training within the system of teacher training is governed by recognising and reinforcing the national strategic role of the teaching profession, taking into better consideration the demand for public education and satisfying labour market requirements. With the Act on National Higher Education passed in 2011, the government decree regulating teacher training and the qualification requirements published in the pedagogical education and ministerial decrees, **the legal framework for the renewal of teacher training was created**.

Together with the public education act and the teachers' career path system, a competence framework - rooted in teacher training, controllable and traceable along the career path - was determined which provides major help in the professional development of teachers.

When entering higher education, for the purpose of increasing the prestige and recognition of the teaching career, the most talented and most knowledgeable youth apt for higher education should choose a teaching major when they apply. On the one hand, the minimum admission score required for state scholarship places was increased in 2015, on the other hand, in addition to the knowledge measured at the secondary school graduation examination, a career aptitude entrance exam was introduced that requires personal presence.

In higher education, the educational tasks relating to ethnic groups in Hungary are connected to ethnic teacher training. Certain ethnic groups significantly differ in terms of their numbers, organisation, network of institutions and language state, the 13 ethnicities in Hungary share a common characteristic, namely that they live in diaspora and as a result nursery schools and schools have a dominant role in passing on language and culture. It was a well-founded complaint of every player in public education that large numbers of those starting their career, though possess good theoretical knowledge, are hardly able to cope with **the everyday practical challenges in the school**. Undoubtedly, applicants can only be prepared for this with long practical training. In teacher training, a one-year school practice follows a 4- or 5-year training, and only after having successfully completed it can candidate teachers take their final exam and get their degree. During the year of the school practice, the candidate is helped by attendings who are teacher mentors. The expertise of teacher trainers, teachers, institutions participating in teacher training and heads of institutions need to be integrated into a cooperative practice and culture. Special attention must be paid to cooperation-based practice in the content and process of teacher training. Higher education institutions of the church also play an important role in this process, because in recent years the social role of churches, and their activity in performing public tasks have increased. While in 2010 about 110,000 students studied in a public education institution run by a church, today there are more than 200,000 students, twice as many. This trend should be taken into consideration in church-run higher education in respect of strengthening teacher training. This will ensure the personnel requirement of education in church-run public education.

In the Hungarian system of teacher training, the **practical training** in parallel to higher education programmes is internationally recognised, where - corresponding with the priority task - **the conditions of operation must be provided to practice schools, nursery schools and practice institutions** in the support provided to the higher education institution conducting teacher training. **The cooperation between teacher training institutions and creches, and the partner public education institutions receiving students for practice should be supported** - as part of this, involving more institutions with high numbers of disadvantaged children or student headcount - in the following areas:

- ❖ preparation of public education institutions to receive the students;
- ❖ preparation of jointly selected lead pedagogy mentors to receive the students;
- ❖ supporting the quality improvement aspirations of the institution and the teaching staff.

In higher education institutions where teacher training is carried out in more departments and fields, the professional, content-related, organisational and scientific tasks are harmonised, and the theoretical and practical training is organised by the teacher training centre. It should also track student progress and the career path after they started their career.

It is an important expectation for the future that the teacher training system should be more closely connected to the demand of the public education for professionals, both in terms of professions and the volume of the training. European funds supported the elaboration of recommended syllabuses of the teacher training courses in 2014/2015, with regard to the requirements of the National Curriculum, and also the network-based cooperation of institutions providing teacher training, and of these institutions and the public education institutions. The realisation of training programmes connected to teacher qualification and the school board must be tracked with parallel programme accreditation and in the graduate tracking system. In general: the adequacy of teachers working in this profession should be monitored with the system of public education measurements.

Regarding the **volume** of teacher training, it should be taken into consideration that around 50,000 teachers will reach pensioner age in the next 10 years; half of this number works in primary school teacher or nursery school teacher positions. Creche care givers with tertiary qualification are included in the teacher career path model, therefore the demand for creche places and neonatal and ECEC training is significantly increasing. The picture is put in a different light by the fact that in the public education system the decrease of the number of children is expected for years, therefore the total number of those taking their pension presumably will not have to be replaced, but we can state that in the coming years at least 2,000-2,500 graduates from teacher training, junior school and nursery school training on average annually will need to take up their profession. In ethnic teacher training, due to the low number of students, launching and maintaining ethnic courses with small numbers should still be supported. During the admissions procedure, this demand of the clients should be taken into consideration, which should be defined as accurately as possible (even at the level of majors and regions) by the system of public education, however, higher education should consider this when determining training capacities.

Rethinking the organisational framework of the system of teachers' further training has also been launched. The task can be carried out most efficiently when allocated to the higher education institutions. The content-related and organisational coordination of teacher training and teachers' further training can be carried out by the teacher training centres of higher education institutions active in teacher training, building on the cooperation of the parties, contributors interested in the training programmes, in light of the fact that the infrastructure and instructor capacity necessary for the further training is available in the institutions already providing training.

The **Klebelsberg Training Scholarship** was established in 2013, which was motivated by increasing the appeal of field in shortage (teaching natural sciences, professional, arts subjects), providing dedicated new teachers with sufficient experience, reinforcing the supply of teachers with public education specialisation in Hungary, increasing the number of candidate teachers pursuing their studies in single-cycle long teacher training, and helping talented students start their career, finding permanent employment for them in their profession, and providing a position for them after graduation. Its positive effect was felt in the applications registered in recent years: the number of applicants for single-cycle long teacher training in natural sciences fields has increased significantly.

6.5.1. Objective: Continuing the renewal of teacher training, with special regard to the renewal of its content and methodology, with the application of modern, pedagogical methodology instruments (complex basic programme)

Explanation: To educate people who successfully make their stand in life requires the continual development of public education. This supposes that teacher training and teachers' further training are renewed on a continual basis. Out of the factors that education policy can influence, it is primarily the quality of the teacher, and the teacher's work that determines the academic performance of students.³ In order to ensure that there are skilled teachers entering the career path, in addition to

³ Report on Hungarian public education [Jelentés a magyar közoktatásról]; Matild Sági-Júlia Varga: Teachers http://ofi.hu/sites/default/files/attachments/jelentes_2010_1004_vegleges.pdf

attracting teacher training students with suitable abilities, there must also be a teacher training system that incentivises a practice and culture of cooperation, the application of the principle of continuous professional development and of practical approaches, which also covers methodological development. A review of primary school teacher, nursery school teacher, neonatal and ECEC professional, special education teacher, conductor and teacher majors that belong to teacher training in respect of public education, redefining the programme and outcome requirements. Additionally, as regards single-cycle long teacher training, the preparation for one-year internship programmes must be prioritised, along with the training of chief mentors within public education institutions accepting students, and the preparation of as many disadvantaged schools as possible for accepting potential teachers.

6.5.2. Objective: Developing a system-level relationship between higher education and public education by establishing a partnership between the two branches of education; in relation to this, professional development of teacher training higher education institutions, increased involvement of church and civil organisations

Explanation: It is necessary to involve the teacher training establishments in the teacher career path beyond the higher education with actual tasks so that they will have factual knowledge about the requirements and realities of the teaching career and the public education sector and to have first-hand information on the professional suitability of teachers starting their career. Training and further training should reflect on teacher/pedagogical preparation and preparation in the discipline, so that the public and higher education relevance of training and further training can be increased.

6.5.3. Objective: Creating teacher training development and adaptation tasks, organisational responsibilities, methodology at institutional level

Explanation: Teacher training centres have no direct influence on the quality and organisation of teacher training. For effective management, organising the training in teacher training programmes along the same principles necessitates the institutional development of this type of organisation.

The practical role played by teacher training institutions in regional public education and higher education must be enhanced through higher education institution networks and the combined networks of higher education institutions and public education institutions.

ANNEX - A DETAILED ANALYSIS OF CERTAIN ELEMENTS OF HUNGARIAN HIGHER EDUCATION

Situation analysis

a detailed analysis of certain elements of Hungarian higher education

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The vision and the objectives are clear, but to reach the envisioned state, we must have an accurate picture of the current situation of Hungarian higher education, since **measures implemented within the system of higher education are only realised later, in the medium-term**. In order to achieve the desired results and effects, both the socio-economic conditionality and the international position of the Hungarian higher education system must be examined within the following dimensions of interpretation.

1. Connecting to the economic subsystem

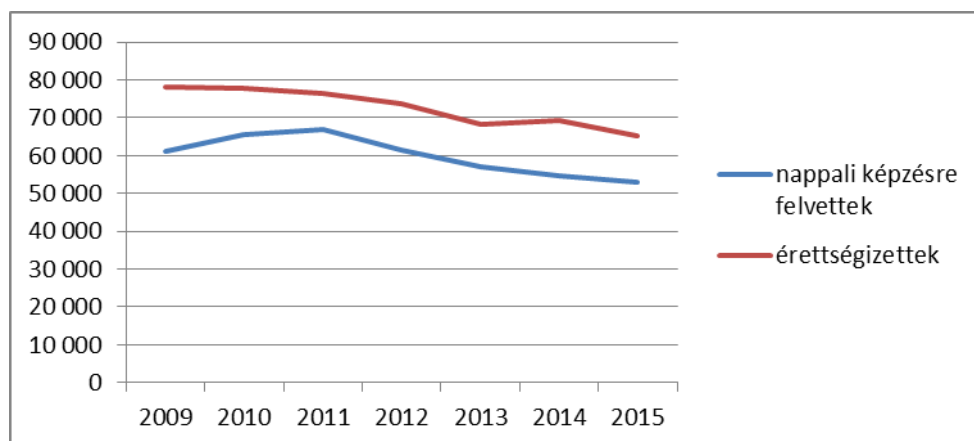
In addition to its social impacts, **higher education also plays a significant economic role**. The methodology of the Global Competitiveness Report issued by the World Economic Forum annually divides the development of national economies into three typical phases based on the annual per capita GDP: resource-driven, efficiency-driven and innovation-driven phases. According to the report, Hungary is currently in the phase of **transitioning from the efficiency-driven to the innovation-driven phase**, so the decisive issue of the economic development of the coming decade will be whether this transition – a significant factor of which is the availability of a highly skilled workforce – can be realised on firm grounds. The above-mentioned development phases can also be described by the fact a higher proportion of the labour force is employed by levels higher up in the value chain, i.e. where jobs produce greater added value. This is only possible with adequately qualified employees, however. It follows that the **key issue of Hungary's economic development is the provisioning of a higher education institutional system of sufficient size and quality**

2. Demographic trends

During the restructuring of higher education, attention must be paid to another problem also related to enrolment numbers. In the previous years, the **reduction resulting from a drastic drop in the past in the number of births** has started affecting higher education: according to the data of the HCSO, in 2010, the statistical count of 18-year olds was approximately 126 000, while in, 2015, members of this age group numbered at around 105 000, meaning an almost 20% decrease within a few years. This trend has significantly reduced and **will continue to reduce the demand for higher education in Hungary** in the coming years, at least in this age group.

When interpreting **student number** developments, the number of secondary school graduates, who form the talent pool, must be considered. From 2009 to 2015, the number of students accepted for full-

time studies in higher education has only decreased by 13%⁴; at the same time, the number of full-time students graduating from secondary school has dropped by more than 16% within the same period⁵.



However, upon examining the total number of students, the rate of the decrease in comparison to the previous year has declined after 2012: 2012 - 5.9%; 2013 - 5.4%; 2014 - 4.2%; 2015 - 3.7%⁶.

The presumably declining student numbers are in fact a resource, too: the freed up capacities can be utilised well in the quality transformation of higher education. At the same time, the proportion of people in Hungary with tertiary qualifications among 30-34-year olds is continuously rising, with the country already achieving the 30.3% threshold set as national goal in the Europe 2020 strategy with 34.3% in the year 2015.

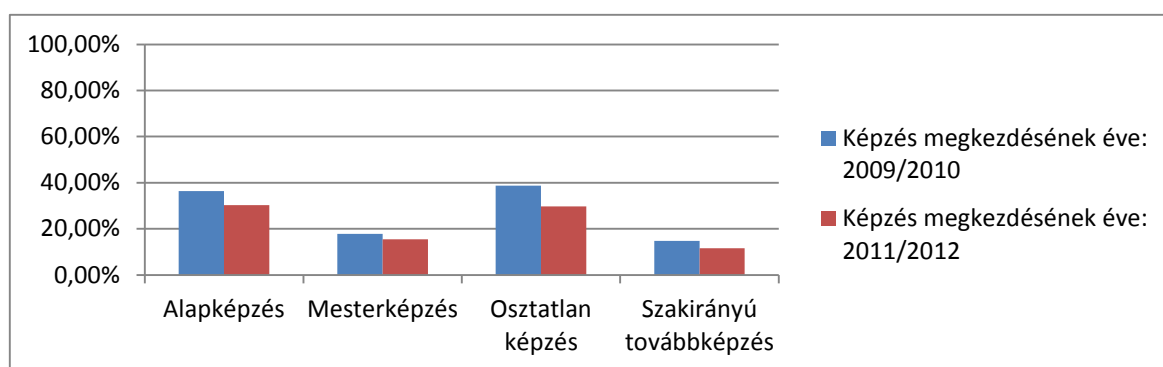
⁴ https://www.ksh.hu/docs/hun/xstadat/xstadat_eves/i_zoi006.html

⁵ https://www.ksh.hu/docs/hun/xstadat/xstadat_eves/i_wdsi002a.html

⁶ http://www.kormany.hu/download/f/c9/80000/Gyorstajekoztato_20151015_20151102.pdf

3. Attrition

The primary factor impacting the **development of student numbers** is **attrition**. According to calculations based on the data of the Higher Education Information System (HEIS), a comparison of educational courses started in the 2009/10 academic year and those started in the 2011/12 academic year shows a clear trend upwards.



As regards **academic levels**, there is a significant rate of attrition (36-38%) in the case of bachelor and single-cycle long programmes – where the duration of the programmes is longer and participants are usually working to acquire their first professional qualifications. Attrition is much lower in the case of master and postgraduate specialisation programmes (14-17%).

As regards fields of study – *irrespective of academic level* –, there is typically high attrition in the **agricultural, technical and IT fields, as well as in medical and health sciences**. Also, irrespective of academic level, **arts, teacher training, and, to a lesser extent, humanities** programmes are characterised by low attrition rates. Upon comparing the data, it is apparent that attrition is below average in the case of academic courses where the admission procedure can be highly selective (art, single-cycle long architectural programmes, public administration, police, military).

4. Access to higher education – regional and social disadvantages

4.1. Disadvantaged groups within higher education – identifying the groups in question

As regards the composition of student, according to international practice, **groups that are underrepresented** with regard to access to and participation in higher education are defined in accordance with the unique conditions of each country. In Hungary, such groups primarily include the socially disadvantaged and the Roma people.

The concept of a disadvantaged student has been regularised by Act CCIV of 2011 on National Higher Education (hereinafter referred to as 'Act on National Higher Education'). Accordingly, in the course of the enrolment process, **students** and applicants **personally experiencing disadvantage** are granted extra points, in accordance with the provisions of the Act on National Higher Education, in order to compensate for their disadvantaged situation; such students include:

- ❖ socially disadvantaged students,
- ❖ students with impairments,
- ❖ students with young children,
- ❖ ethnic Hungarians from neighbouring countries.

Up to 40 extra points may be granted in the course of the enrolment process to compensate for a disadvantaged situation. Considering the total number of points available (currently 500 points), 40 potential extra points mean significant assistance.

The other group of disadvantaged students are **students from disadvantaged subregions (beneficiary districts)**.

4.2. Students with impairments

The Act on National Higher Education regularises the concept of applicants with impairments. The EUROSTUDENT V project has examined both students with impairments and student with long-standing health problems. The data shows that 8 percent of students live with some kind of an impairment or suffer from a chronic illness.

Based on Paragraph (2) of Section 7 of the Act on National Higher Education, higher education institutions are entitled to an additional per pupil capita grant in accordance with the number of students with impairments, which may be utilised to finance the works necessary to establish conditions that meet the unique needs of students with impairments. As regards the non-financial support of student with impairments, the implementing regulation of the Act on National Higher Education (Government Decree 87/2015) lays down detailed rules on the exemptions and advantages available to students with various impairments in the course of their higher education studies.

Since 1999, additional grants must be provided to higher education institutions for students with impairments. The amount of this greatly increased between 2015-2017.

Since 1 September, 2002, it has been mandatory for higher education institutions to appoint disability coordinators to ensure that the conditions for providing equal opportunities to students with impairments are met as necessary for them to complete their education.

4.3. Students with young children

The definition of the Act on National Higher Education: applicants on unpaid parental leave, receiving pregnancy benefit or birth allowance, childcare allowance, child-raising allowance or childcare fee shall be entitled to 40 additional points when applying to any bachelor, single-cycle long master, or tertiary vocational programme. According to the research, the chance of members of this group to be admitted for higher education is in line with the average.⁷

4.4. Ethnic Hungarians from neighbouring countries

Ethnic Hungarian student from neighbouring countries: the group of Hungarian-speaking students born in neighbouring countries (Ukraine, Slovakia, Romania, Serbia, Croatia).

In 2015, 70.6% of applicants from non-EU countries, and 64.5% of applicants from EU countries were admitted. This is proportionate to the 69% average acceptance rate of the total applicants.

4.5. Roma students

There is no official definition, laid down by law, of the Roma people as a social group. Neither is the concept of a Roma applicant/student defined by legislation on higher education, and the only form of relevant grant named by the Act on National Higher Education concerns Roma colleges for advanced studies. For reasons of anti-discrimination outlined by Fundamental Law, enrolment information systems may not record any data concerning the admission of Roma people to higher education.

Information on tertiary qualifications is available from census data: this shows that – despite an increase – the proportion of Roma people with tertiary qualifications is far below that of the total population. According to the 2001 and 2011 census data of the HCSO, the proportion of people above

⁷ <http://tka.hu/docs/palyazatok/a-felsooktatás-szociális-dimenziója.pdf>

25 with tertiary qualifications within the total population was 12.6%, then 19.0%⁸, while in the case of Roma people, the same rate was at 0.37% (2001) and 0.83% (2011)⁹.

However, as regards the Roma participation in higher education, it is particularly important to consider the talent pool, which consists of secondary school graduates. According to the research report entitled “Targeted investigation of poverty and social exclusion in the Roma population” [“A szegénység és a társadalmi kirekesztés célzott vizsgálata a roma lakosság körében”] published by the National Institute for Family and Social Policy in 2013, **development of qualification levels in the Roma population is slow and primarily realised in the form of higher elementary school graduation rates.** This means that **the rate of secondary school graduation**, as a prerequisite of higher education, **is also increasing very slowly.** According to the census data, said rate among people above 18 within the Roma population was 1.39% in 2001, and rose only to 3.41% by 2011 (while the same data considered with regard to total population shows 38.2% and 49% proportions respectively)¹⁰.

During secondary school studies, the rate of attrition is much higher than in the case of non-Roma students; however, **Roma students graduating from secondary school have a higher chance of continuing their studies** in higher education.¹¹

The Hungarian National Social Inclusion Strategy and the inclusion practice helps the inclusion of Roma youth with a package of measures including several components. When considering the social inclusion policy, it is important to highlight the “Útravaló” Scholarship Programme, particularly its “Út a Diplomához” sub-programme.

The “Útravaló” Scholarship Programme is a higher education component of the “Út a diplomához” empowerment scholarship and self-financing subsidy programme, active since 2012. The goal of the empowerment scholarship and self-financing subsidy programme is to provide equal opportunity in higher education for disadvantaged and severely disadvantaged students, particularly Roma/Romani students, and to support such students in acquiring tertiary qualifications. In the 2015/2016 academic year, it has provided support for 1031 students.

⁸ http://www.ksh.hu/docs/hun/xftp/idoszaki/nepsz2011/nepsz_orosz_2011.pdf

⁹ Ágnes Tóth – János Vékás, MTA - Centre for Social Sciences, Institute for Minority Studies: The development of basic demographic indicators concerning ethnicities in Hungary, 2001-2011 [A magyarországi nemzetiségek alapvető demográfiai mutatóinak változásai 2001-2011]
http://nemzetisegek.hu/repertorium/2013/03/belivek_23-55.pdf

¹⁰ Ágnes Tóth – János Vékás, MTA - Centre for Social Sciences, Institute for Minority Studies: The development of basic demographic indicators concerning ethnicities in Hungary, 2001-2011 [A magyarországi nemzetiségek alapvető demográfiai mutatóinak változásai 2001-2011]
http://nemzetisegek.hu/repertorium/2013/03/belivek_23-55.pdf

¹¹ Katalin Kardos: On the relationship between ethnic Roma/Romani students and higher education talent development institutions [Roma/cigány származású hallgatók és a felsőoktatási tehetséggondozó intézmények kapcsolata] ncssz.hu/download.php?file_id=1495

In the case of higher education, the system of Roma colleges for advanced studies has established a nationwide network, including state and ecclesiastical participants in the cities of Budapest, Pécs, Debrecen, Nyíregyháza, Miskolc, Eger.

4.6. Features of the national support system

The financial and non-financial support provided for admission/access and the continuation/advancement of studies is detailed in Chapter “Features of the legislative framework and the national support system” [“A jogszabályi háttér, valamint az országos szintű támogató-rendszer jellemzői”] of the research handbook “The higher education access and participation of disadvantaged groups” [“Hátrányos helyzetű csoportok hozzáférése és részvétele a felsőoktatásban”] published in 2016 and available at: <http://tka.hu/docs/palyazatok/a-felsooktatas-szocialis-dimenzioja.pdf>

4.7. Family background index

However, there are numerous limitations affecting the analysis of quantifiable data based on legal definition. Due to an amendment of the legal definition, after 2013, the group of disadvantaged people became smaller; application for extra points available for disadvantaged people is based on the personal decision of applicants. Additionally, **similar extra points** provided on the basis of “affirmative action”, that is based on disadvantage, impairment, childcare, **may not be aggregated**; a total of 40 points is currently available, but there may be overlap between certain groups. Therefore, even if an applicant is entitled to extra points based on multiple claims, it is certain that he/she will choose the title based on which it is the easiest for him/her (e.g. because of easier administration) to acquire the points¹².

It is fact, evidenced by data, that **family background is a strong determining factor in the educational achievement of students** within the Hungarian education system, even in international comparison.¹³ Results of the international PISA survey indicate that in Hungary, the differences in educational performance based on social status are already very apparent in secondary school. According to 2014, **among the survey 63 OECD member states, social status had the fourth highest impact on mathematics test results in Hungary**.¹⁴ The determining force of the parents’ socio-economic status has remained dominant even at later stages in the educational careers of students. As result, socially disadvantaged students participate in higher education at much lower rates than their peers living in better conditions.

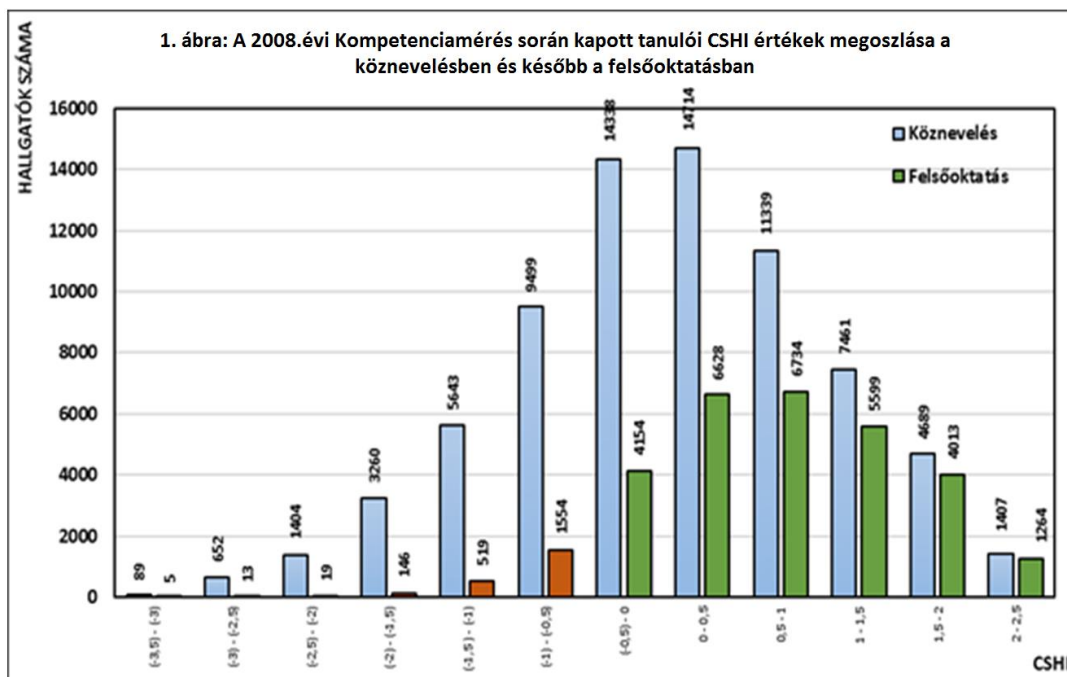
¹² <http://tka.hu/docs/palyazatok/a-felsooktatas-szocialis-dimenzioja.pdf>

¹³ OECD Education at a Glance 2012, Page 102

¹⁴ OECD Education at a Glance 2014, Page 194

We can get a clearer picture of the differences in the rate of participation resulting from social status by comparing figures for the family background index (FB Index) of students participating in the National Assessment of Basic Competencies within the framework of public education and admission to higher education. In 2008, 28% of grade 10 students had FB Index results lower than -0.5, 39% results had results in the intermediate category, between -0.5 and +0.5, and 33% was in the group with the best family background, in the group with an FB Index between 0.5 and 4.5.

The 41% of the base group of secondary school students was admitted to higher education by 2016, but the results are fairly uneven when considering family background. Based on the family background index applied in the National Assessment of Basic Competencies, only 11% of students with the worst family background continue their studies in higher education, while in the middle and the top segments, the continuation rate is 37% and 71%, respectively. **As family background has a significant impact on the rate of students continuing their studies, the social composition of students in public education and higher education greatly differs.** Figure 1 illustrates a displacement in student composition towards groups with better social status at the time of the transfer from public education to higher education. Thus, the **talent pool** available to Hungarian higher education is limited to **the middle class**, therefore it is necessary to further reinforce the social mobility related function of the higher education institutional system.



4.8. Regional disadvantages

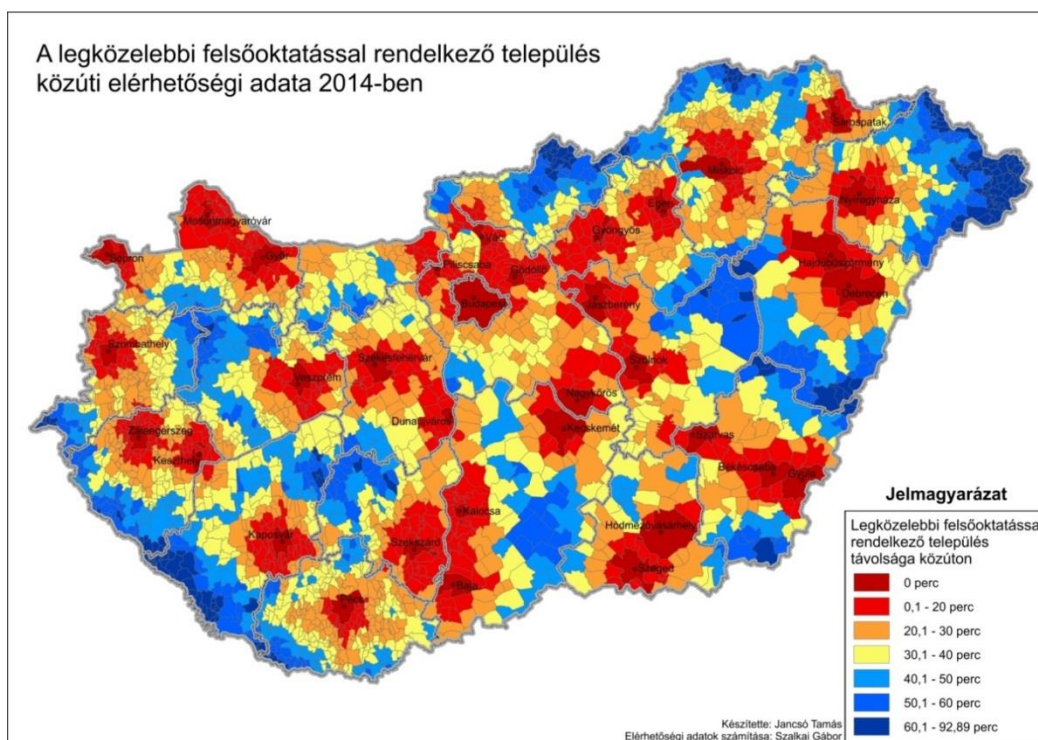
The mission of modern higher education institutions is the socio-economic utilisation of education, research and wealth of knowledge. By accomplishing its complex mission, higher education serves the community in a number of ways; nevertheless, facilitating social mobility has an even greater significance among its important functions. **Considering that the promotion of social mobility is a**

core requirement for any given academic level, it follows that in the process of reconstructing the higher education institutional system, special attention must be paid to ensure availability in all areas, but particularly in disadvantaged regions.

Upon examining the correlations of regional disadvantage and higher education in Hungary, it can be concluded that **residential location significantly impacts the propensity of applying for college**. It is apparent that there are significant differences in the availability of higher education between various settlements/subregions. While the residents of certain settlements – typically Budapest and the large cities – have numerous opportunities for continuing their studies in higher education locally, others must travel more than 60 minutes by public road to reach the nearest higher education institution. This significant disparity in accessibility is a defining factor in the cost of participating in higher education for individual students, which decreases the willingness to apply among people in settlements located farther from universities and colleges.

If we examine the data on enrolment in the population of Hungarian districts in 2014, the emerging spatial pattern clearly shows the **decisive power of territorial disparities in accessibility to higher education**. The enrolment rate, in comparison to the total population, is typically above 1.3% in subregions with university towns and their direct agglomerations. For example: The subregion of Pilisvörösvár: 1.75%, Budaörs: 1.73%, Nyíregyháza: 1.7%, Pécs: 1.54%, Budapest: 1.41%.¹⁵ However, the situation in subregions located far from higher education institutions is radically different; the enrolment rate calculated for such regions is much lower, typically no more than 0.69-0.9%. For example, in the Devecser subregion: 0.69%, in the Kisbér subregion: 0.74%, while in the Balatonföldvár subregion: 0.75%. While the average enrolment rate, in comparison to total population, was on average 0.96% in the 47 subregions considered the most disadvantaged and having decisively substandard access to higher education, the same rate was at 1.15% in the rest of the country.

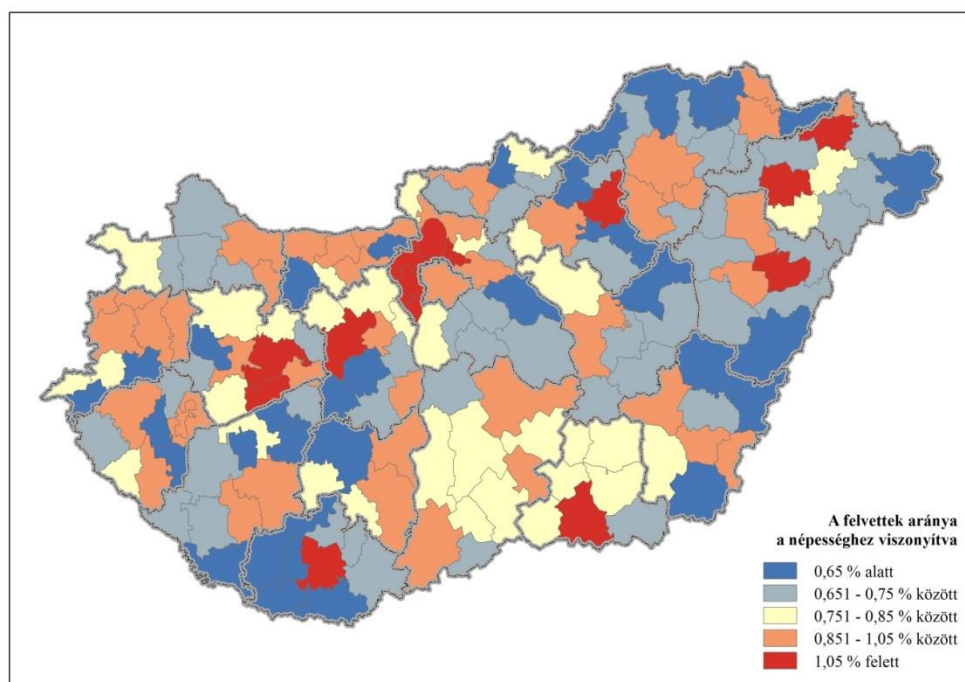
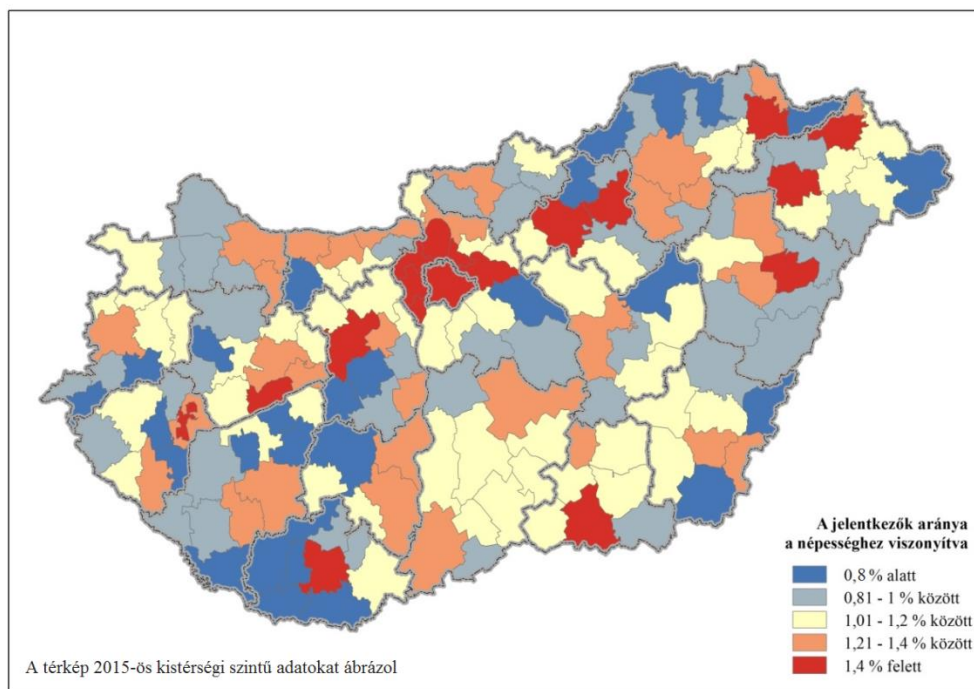
¹⁵ Source of the data: Higher Education Information System, HEIS



When **considering the number of students admitted in each subregion, we see a similar disparity as in the case of enrolment.** While the rate of admission is more than 1% in subregions located near higher education institutions, the same rate, in comparison to the total population, is much lower among people who are disadvantaged in terms of access to higher education institutions (0.48-0.7%). The rate of admission, in comparison to total population, was on average 0.66% in the most disadvantaged regions, while the same rate stood at an average of 0.84% in the rest of the subregions of the country.

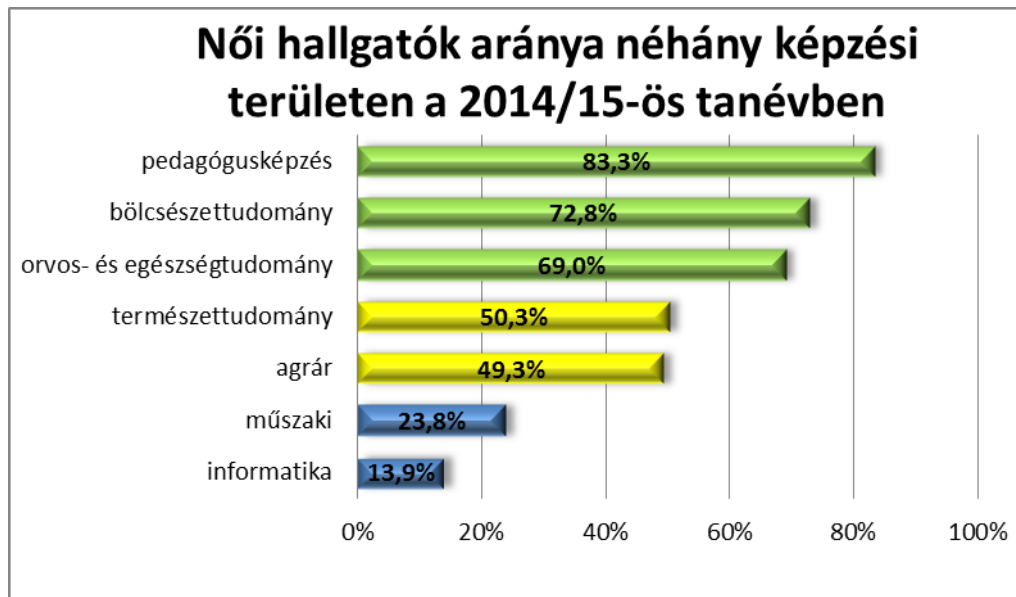
Considering the above data, differences in regional accessibility significantly affect the willingness to continue education. In regions located farther from higher education institutions, **the potential expenses of a learning period are increased due to travel and housing expenses**, which negatively affects individual decisions concerning investments in human capital. Those from geographically disadvantaged settlements who do continue their education have a sort of **self-selection mechanism**, which results in higher rates of application to **academic courses that are easier to access, but which have worse labour market potential according to graduate career tracking data** (e.g. teacher training, agricultural studies)¹⁶. Differences in accessibility have significant social consequences, therefore governmental intervention seems necessary in order to reduce inequality.

¹⁶ László Kiss: The enrolment strategies of applicants from disadvantaged subregions [A hátrányos helyzetű kistérségek jelentkezőinek jelentkezési stratégiái], Felsőoktatási Műhely, 2013/2. pp. 69-80



5. Female and male students in higher education

Female students have been in a constant majority since the nineties, by the 2005/2006 academic year, female students were in a 58.2% majority, which has slightly decreased to 54.8% by the 2013/2014 academic year.¹⁷ The intensity of female participation is even more apparent if we consider that in the 18-26 age group, the most significant societal base of higher education, men are in the majority (51.4%).¹⁸ The rate of female participation in Hungarian higher education is high even in international comparison; in 2014, it was more than a percentage point higher than the European Union's average.¹⁹ **In the gender distribution of students acquiring tertiary qualifications, female overrepresentation is even higher: In 2014, 62% of graduates were women, which shows that women complete the higher education studies at a higher rate.**²⁰



The breakdown by fields of study presents a more complex picture. The **fifteen fields of study can basically be divided into three groups based on gender composition.** In two fields of study, in the technical and IT areas, there is a significant, more than triple majority of male students. In an additional six fields, sports studies, agricultural studies, natural sciences, religious studies, public administration, police and military studies, and also in artistic studies, the genders are distributed evenly, neither being in a majority with a rate of more than 60%. Finally, in the remaining seven fields of study, there is a significant female majority, with 61.7-83.3% of participants being women. As this

¹⁷ Statistical Yearbook of Education, 2013/2014 [Statistikai Tájékoztató Oktatási Évkönyv 2013/2014]
http://www.kormany.hu/download/c/48/50000/Oktat%C3%A1si_%C3%89vk%C3%B6nyv_2013_2014.pdf

¹⁸ HCSO data

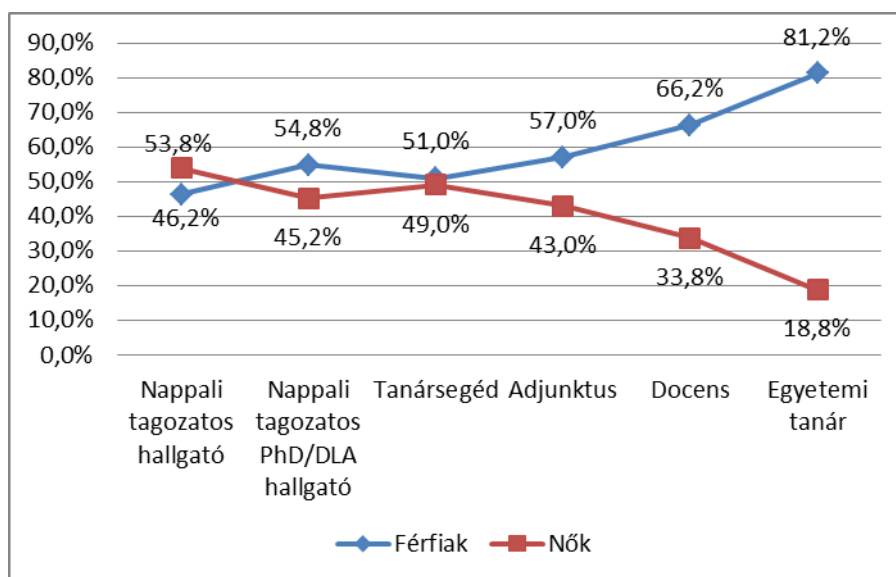
¹⁹ Eurostat data (2014): the average rate of female students typical of EU-28 was: 54.1%, while the Hungarian rate was 55.2%.

²⁰ Based on HEIS data

data shows, gender distribution among fields of study is quite extreme. In order to reduce the disparity, a reasonable measure would be to promote the increase of female participation in the technical and IT areas, while in other fields, including teacher training, the humanities, the medical and health sciences, social science and law, to promote men's willingness to enrol.

With regard to gender distribution among fields of study, it can also be said that men are in the majority in fields where the highest possible income can be achieved after graduation (IT, technical field), while the rate of participation by women is typically the highest in fields of study with less substantial financial opportunities (e.g. teacher training, humanities, art mediation).²¹

Although there has been a female majority among people acquiring tertiary qualifications for decades, **there is a significant gap between men and women at the higher levels of the scientific hierarchy.** The disparity within the university hierarchy continuously increases as we head toward the top, as clearly illustrated by the following figure. According to 2005 data, while there was a female majority among full-time students, only a third of associate professors, and only 18.8% of university teachers were women²². The phenomenon can be explained in two ways. On one hand, female participation in higher education was lower among older age groups, so the male talent group is somewhat larger for higher scientific and pedagogical positions. On the other hand, the obvious reasons for the inequality are discrimination and the glass ceiling phenomenon. In order to compensate for the vertically growing inequality, women should be encouraged to start scientific careers and discrimination must be approached more aggressively.



²¹2013 graduate career tracking data, Graduate tracking – integration of administrative data, 2014
https://www.felvi.hu/diploman_tul/karriertervezes/alapszakok_karrierlehetosegei

²²Source: Dóra Groó (2007): The role of women in research and development [Nők szerepe a kutatás-fejlesztésben], Hungarian Science and Technology Foundation

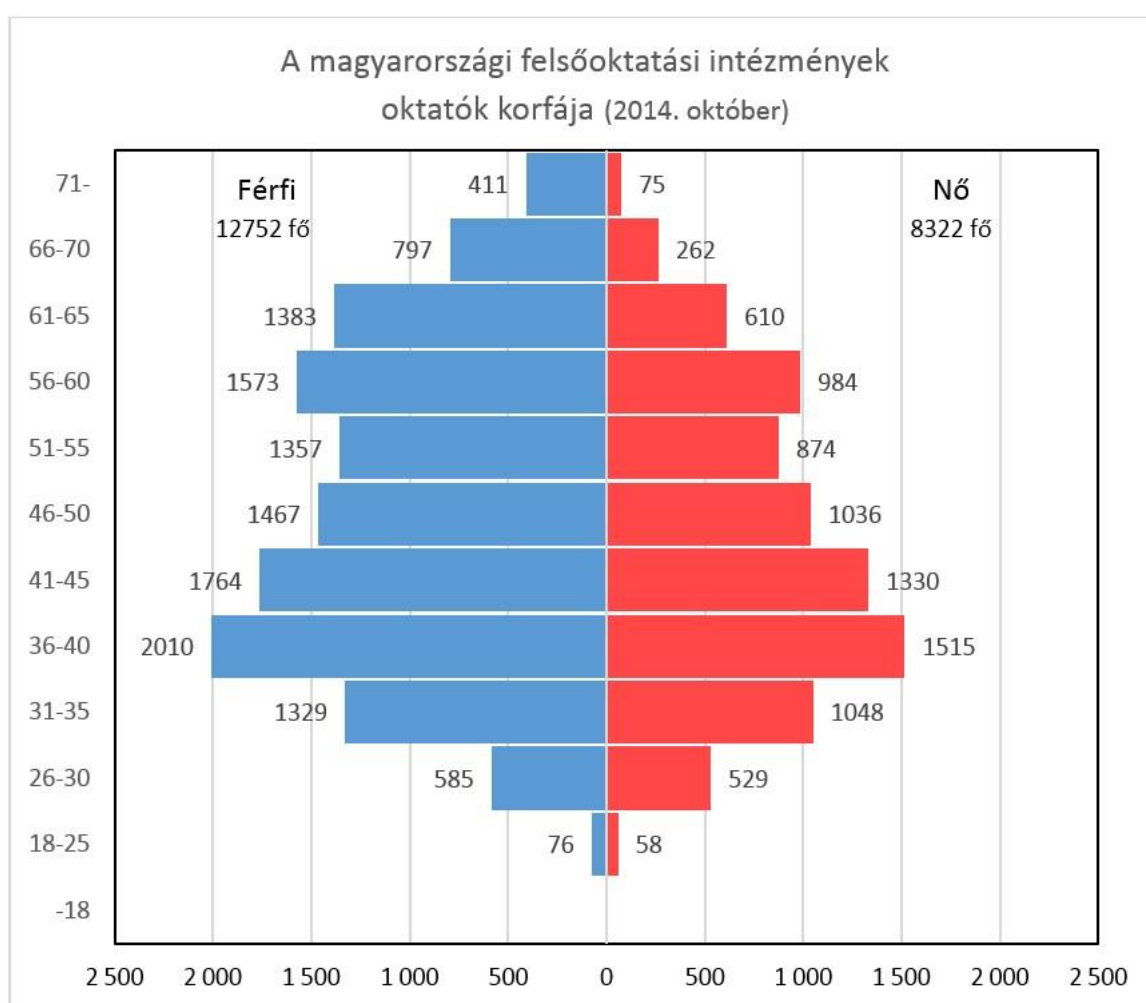
Gender distribution at the levels of the university hierarchy (based on 2005 data) [Nemi arányok az egyetemi hierarchia lépcsőin (2005-ös adatok alapján)]²³

²³ Dóra Groó (2007): The role of women in research and development [Nők szerepe a kutatás-fejlesztésben], Hungarian Science and Technology Foundation

6. Age-based analysis of instructors in Hungarian higher education institutions

The average age of instructors in Hungarian higher education is 47.5, or 48.6 when considering only men and 45.7 when considering only women. The proportion of instructors above the age of fifty is 39.5% (men: 43.3%, women: 33.5%. Of which the proportion of instructors above the age of sixty is 16.8% (men: 20.3%, women: 11.4%).

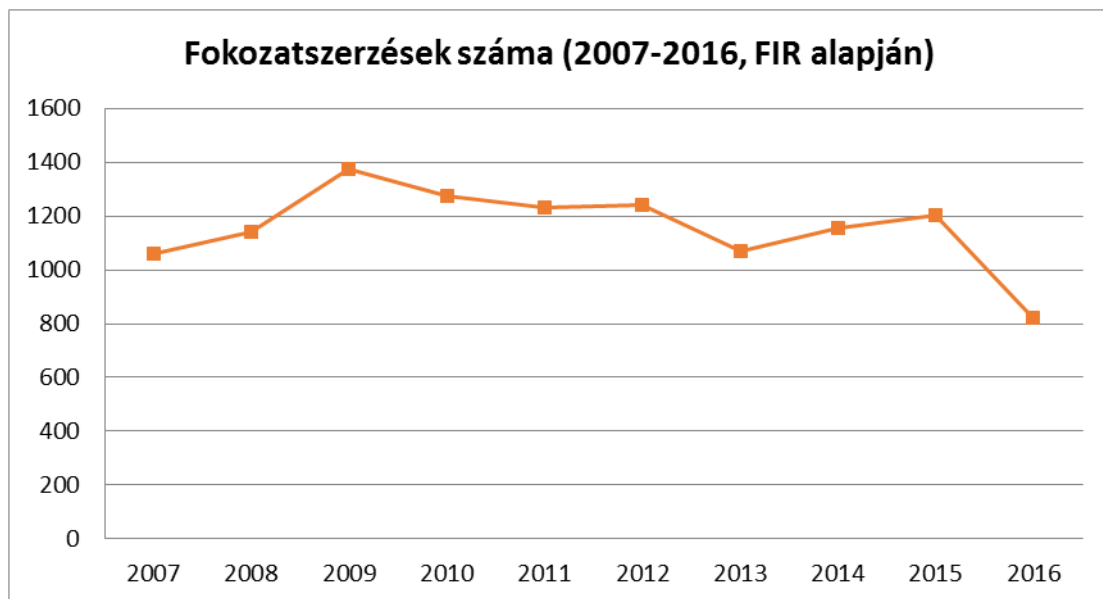
The age pyramid of instructors within the entirety of Hungary's higher education:



New instructors and research personnel – doctoral degrees

It should be noted that according to indicators established to measure the innovation capacity of countries, **Hungary performs negatively in the field of doctoral studies**: in the 25-34-year old age

group, PhD degrees are issued to 0.8 in a thousand inhabitants, while the EU average, using the same measure, is at 1.69. Hungarian results are low not only in comparison to developed countries such as Germany (2.65), Sweden (2.9) or Switzerland (3.68), but also in comparison to Central and Eastern European countries acting as competitors in the competition for international research centres. In this area, there has been no significant developments since 2008, as the number of students acquiring PhD degrees are stagnating at 1200 per year, which number is insufficient for ensuring a proper **supply of new instructors and researchers** and for improving the international competitiveness of our country. **For this reason, increasing the headcount of doctoral students and their qualification graduation rates seems indispensable for meeting the demand for new academic personnel.** It is also important to note that it is absolutely necessary to increase the involvement of economic partners and the proportion of topics determined by economic operators in doctoral programmes, too.



7. Higher education programme structure

Institution	Yearly changes in total	Average admissions	Proportion of the field of study	Number of institution within the field of study	Average admissions per institution
Agricultural sciences	105.40%	4793	5.07%	11	436
Humanities	88.53%	10 141	10.72%	23	441
Economics	96.25%	19 758	20.89%	33	599
IT	98.71%	6178	6.53%	19	325
Law /public administration	91.46%	8327	8.80%	10	833
Technical	97.56%	15 091	15.95%	20	755
Art	111.10%	1357	1.43%	19	71
Art mediation	105.16%	604	0.64%	9	67
Medical and health sciences	104.57%	5243	5.54%	7	749
Teacher training	106.16%	8482	8.97%	35	242
Sport sciences	105.87%	1821	1.93%	8	228
Social sciences	84.15%	7668	8.11%	31	247
Natural sciences	95.28%	5124	5.42%	13	394

It is apparent that among fields of study, the total number of admissions within the agricultural, technical, life and medical sciences, natural sciences fields is 38% of the number of total admissions, while 62% of total admissions are in liberal arts (economics, law, social science, humanities, art).

8. Reinventing the academic course

8.1 Structural characteristics, student skills development

In the field of tertiary education, a number of criticisms have been raised by clients-employers: the comments concerned **the programme structure, the quality of the programmes, the content of the programmes and the number of the graduates** as well. The government is responsible for creating a better planned and organised tertiary education system consistent with strategic objectives.

In the past quarter century, adapting to the needs of the converging economy and modernising society, the number of students and educational establishments engaged in courses and programme specialisations **training students for the tasks of the tertiary sector has significantly increased**. The relatively lower prime costs of such programmes contributed to the fact that a wide range of the higher education institutions announced such programmes. **This fragmented programme portfolio in some cases raises questions about the uncertainty of the quality and of the professional output**. It may be a consequence that in several institutions the number highly-qualified instructors and researchers has decreased.

The correction of the programme structure was realised while also retaining academic levels. **Today, the evaluation of academic courses can be based on relevant information**, as, on the basis of the **findings of the Graduate Career Tracking System**, we have a clearer picture of students graduating from courses introduced in the Bologna Process, while **data series concerning further education and attrition** and the **societal needs** made apparent by applications for admission are available from the **Higher Education Information System**. Based on these measures, the labour market focus of the programmes can greatly be improved, career orientation activity may become more successful and clearer, and at the level of the institutions the concentration of the resources can be successfully implemented.

Professional consensus shows that measures must also be taken concerning the quality of the courses, which presupposes further improvements for the **stricter control of quality management and accreditation requirements, the development of the quality of education and the preparedness of instructors, and the more stringent control of admission criteria**, therefore the prescription of advanced level secondary school graduation examinations and foreign language proficiency are considered medium-term concepts. At the start and at the end of an academic course, **the level of the relevant competences of students must be evaluated** in order to determine to what extent the given course contributed to developing the students' skills and knowledge. Data collected at the start of the course is used to determine which students require more mentoring and remedial assistance, while the totality of the data provides an accurate picture of the given institution's ability to develop the skills and knowledge in question. The data will provide an intervention opportunity for the maintainer, but also for the programme organisers and instructors of the institution, too. It is foreseeable that more prepared students, more motivated instructors and a more strictly controlled quality management system will guarantee to improve the quality of the training.

Modernising the programme and outcome requirements of academic courses, the contents of courses in a broader sense, and, in certain cases, the reconstruction of internal focus points requires continuous cooperation between higher education institutions and socio-economic players. Thanks to this, the relevance of the programmes in the labour market, the extent of graduates' knowledge and the applicability of this knowledge can improve significantly.

The **new enrolment process system based on departmental capacity** can ensure that expectations concerning the number of graduates, primarily those voiced by economic players, are met. Since the Hungarian economy, which is on a growth trajectory, requires a large number of well-trained professionals, **it is necessary to increase the number of those holding a tertiary qualification in a structure that corresponds to the needs of the economy**. It is particularly important to reduce the

rate of attrition and initiate further interventions in the development of the supply capacities of certain fields of study. It is apparent that the growth of the Hungarian economy is limited in several fields of study – primarily the technical and IT sectors – by a lack of skilled professionals in certain departments, while the interest for certain other departments – particularly the economics and humanities sectors – is unreasonably high with regard to labour market prospects, meaning that the educational supply is not in line with the actual demand.

Traditionally, the most popular fields of study in Hungarian higher education are related to the disciplines of humanities and social sciences. (In the past two years, the only change was the greatly increased popularity of technical education and teacher training.) In these fields, the students' interest is outstanding not only in terms of numbers but quality, as well: half of those continuing their education with the highest academic results went on to these fields of study. The **economic significance of the competences provided by humanities programmes is also continuously increasing in the industry and innovation sectors**. However, it is also true that the students in these fields of study in many cases do not acquire the skills and knowledge required by real economy.

Today, the establishment of a more open educational supply and research portfolio is, in many cases, also hindered by an **outdated, rigid institutional structure**. When rethinking the capacities relating to specific programmes at the level of the institution, it is necessary to explore and activate the currently unused infrastructural and human resources potential - one example for this is the low rate of female students in technical and information technology programmes - and it is worth repositioning the institutional profiles.

The regulation and the quality assessment of **programme and outcome requirements** has until now focused on programme input (application/admission criteria, history), the content of its building blocks (subject, field of knowledge) and size (number of lessons, credits), phases (grounding, core training, differentiating) and organisation (mandatory, chosen, optional). **The new approach focuses on the outcome: the results that need to be achieved at the end of the process**. This system defines the knowledge, abilities and other competence elements required for the issuing of a specific qualification at the academic level. This approach does not focus on "input", as students may arrive from various places with diverse knowledge, abilities, competences, it defines instead the level and the structure of these that will be created by the end of the learning process.

In the course of the review of programme and outcome requirements, the enhancement of the education of **transversal skills**, including **entrepreneurship, digital skills and foreign language proficiency**, has also been provided for. There are characteristics, competences applicable to any degree acquired in tertiary vocational, bachelor or master programmes, that is characteristics and competences that are relevant to all academic courses within the given level, including – but not limited to – critical thinking, independent but cooperative problem-solving, civic education, digital skills and foreign language proficiency, ability, attitude, and the competences of autonomy and personal responsibility. The characteristics of the common module of tertiary vocational programmes define further particular transversal competences and skills.

8.2. New form of training servicing the demands of the labour market

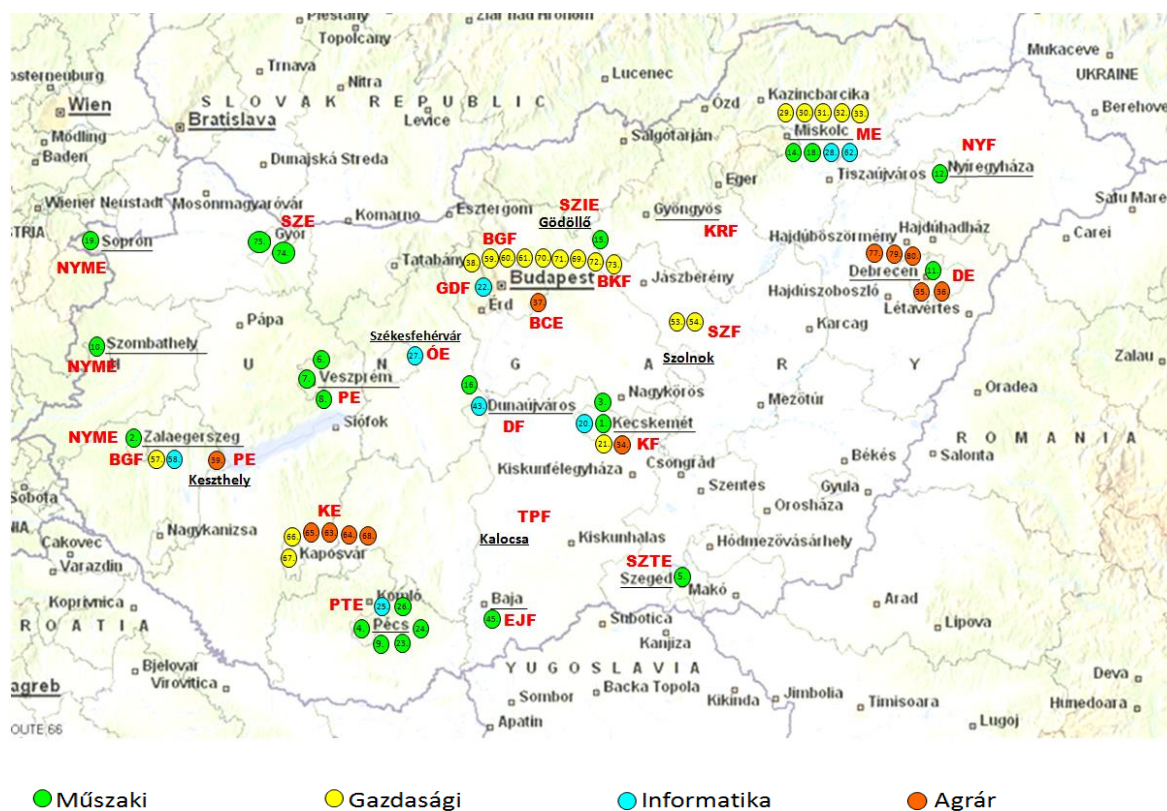
Due to positive domestic and international experiences with the system of training of higher education, and also due to increasing labour market demand, it is now necessary to introduce not only

practically oriented courses, but a special form of practically oriented courses, **wherein the government further promotes cooperative training implemented through the inclusion of business organisations within the system of training**, and, for this purpose, also the introduction, control of dual study programmes as defined by the Act on National Higher Education. The **amendment of the legislation defines dual study programmes as a form of full-time training**. The amendment to the act provided an authorisation, furthermore, for the operation and the competences of the Council for Dual Education.

In the 2015/2016 academic year, dual higher education study programmes **were launched within the technical, IT, agricultural and economics fields of study** by institutions cooperating with corporate partners and other organisations. In September 2015, 440 dual students could begin their practical training in 19 higher education institutions at 198 dual corporate partners.

By the **2016/2017 academic year**, there was a significant expansion in dual study programme opportunities: 24 higher education institutions announced dual study programmes in 6 fields of study (agriculture, technical, economic sciences, information technology, social science, natural sciences) in 49 different programmes (40 BSc and 9 MSc), with more than 500 dual partner companies cooperating with the institutions. According to the data of the National Statistical Data Collection Programme, in the 2016/2017 academic year, a total of 1,051 students learned in dual study programmes, 644 of whom began their studies in the 2016/2017 academic year.

Dual study programmes and educational establishments, 2015/16



9. Institutional system

9.1. Government institutions

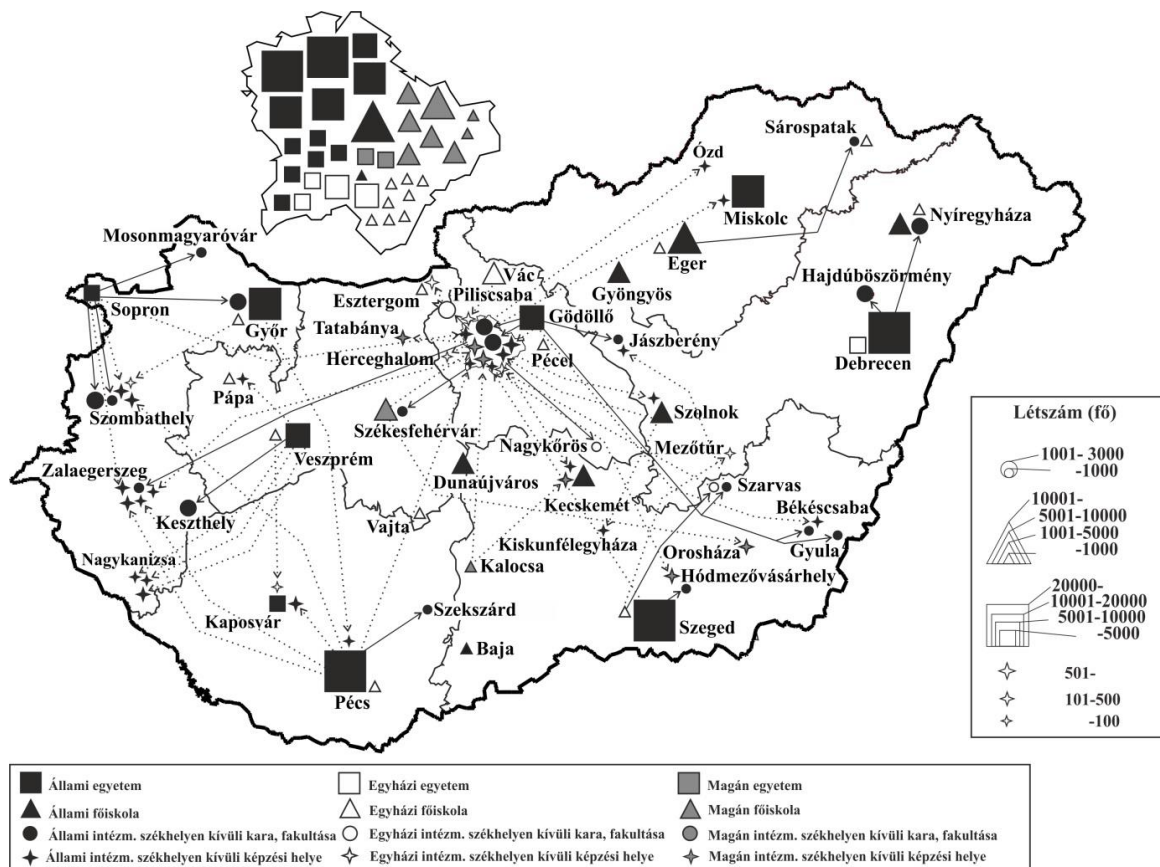
The university seats, branch campuses and outsourced courses of domestic higher education institutions currently have the following configuration²⁴. (The following figure is based on the maps of the National Development and Territorial Development Concept).

From a geographical perspective, Hungarian higher education institutions are Budapest-centric, which, however, stems from Hungary's spatial configurations, so it should be treated not as a problem but as an attribute.

A half of training capacity is provided within Budapest, half of students are studying in the Central Hungary Region, and half of these students are from less developed regions, meaning that the higher education institutions of Budapest and Pest county provide significant educational services to the less developed regions.

²⁴ Situation as at the time of the first version of the strategy in 2014, institutional transformations taking place since then are not shown on the map. Eszterházy Károly College and Károly Róbert College have merged under the name Eszterházy Károly University, Kecskemét College and Szolnok University College have merged under the name Pallas Athena University, while the Sopron-based University Of West Hungary has transferred its Mosonmagyaróvár and Győr campuses to Széchenyi István University. The University of Veterinary Medicine separated from Szent István University.

The map does not show higher education institutions located in the border regions, in some cases across the border, that offer programmes available in Hungarian. Adding Révkomárom, Beregszász, Ungvár, Nagyvárad, Szabadka and Zombor to the map would somewhat improve the situation and transform the framework of the analysis.



The following are considered problem regions with regard to the **availability of higher education**.

Regions that are underserved from a higher education perspective, where centres are only available at longer distances.

- Nógrád county, particularly Salgótarján and its environs.
- Szabolcs-Szatmár-Bereg county, upper-Tisza-Bereg region, Kisvárd and the territories east of Kisvárd.
- Ózd and the surrounding region.

During the first two years of the implementation of the strategy, regional problems were addressed in Salgótarján and Ózd through the foundation of branch campuses, and in Kisvárd through the foundation of a community-based higher education centre.

The distribution of branch campuses and off-seat courses between institutions has been solved, while in the case of similar courses in Békés, the strategy's next implementation period will resolve the realignment.

Certain regions adjoining the catchment areas of Budapest, such as the Esztergom-Tatabánya-Hatvan line, can be considered an empty zone. In such places also, complete higher education coverage can be

ensured through the expansion of branch campuses and the establishment of community-based higher education centres.

In the case of the **Central Transdanubia and Western Transdanubia** regions, R&D expenditure is at a moderate (moderately low) level, with both regions being dominated by company expenditure. There is no exceptional international research output by the higher education centres operating here, as the R&D activities of both regions are concentrated on the technical and IT fields. A strong industrial presence is coupled with the knowledge provider and knowledge user features of higher education; existing industrial relationships must be further reinforced.

There is additional institutional and regional concentration necessary with regard to the field of teacher training (Sopron, Győr, Pápa, Veszprém, Szombathely) in the two regions; at the same time, the development of complementarity profiles, in line with industrial demand, in the technical education fields of Zala and Vas counties has been completed within the first two years of the implementation.

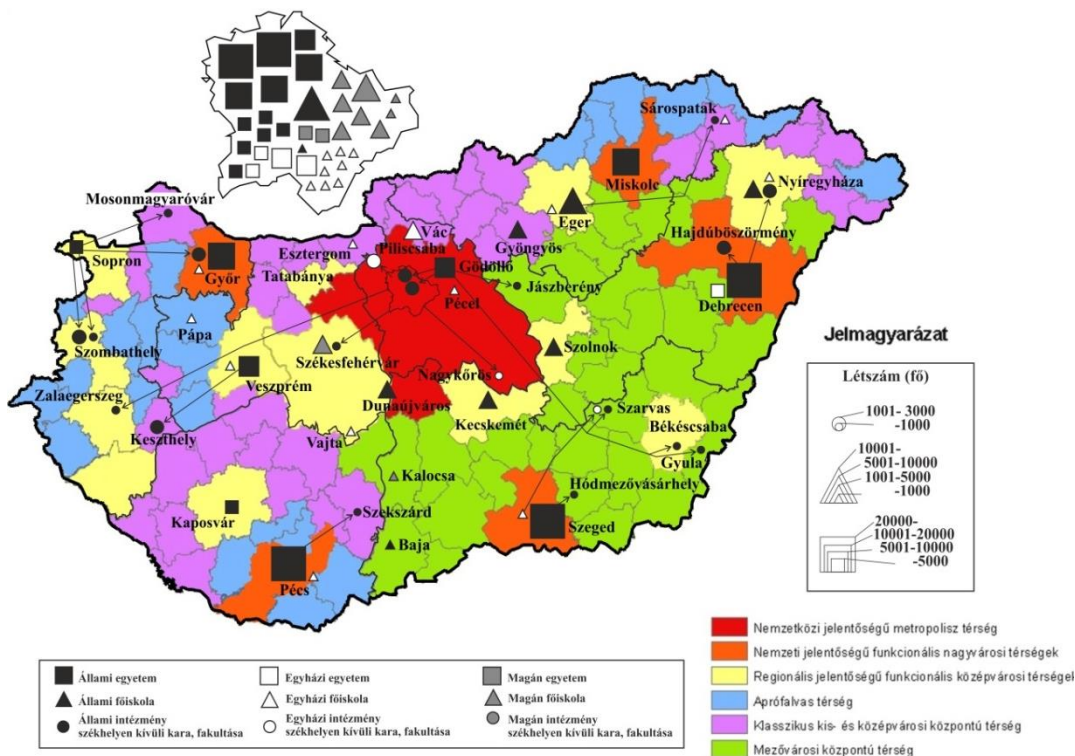
In the case of the **Northern Great Plain and Southern Great Plain** regions, R&D expenditure is at a moderately low level, but it is dominated by expenditure in higher education. Research and scientific performance in these two regions are influenced by the University of Debrecen and the University of Szeged, and any actions aimed at R&D and economic development can be based on the capacities of these institutions. Thanks to said institutions, the life and medical sciences portfolio of these regions is very potent. In addition to these two large universities, there are two large former college centres operating in Kecskemét and Nyíregyháza, several smaller training centres operating in Baja and Szolnok, as well as some branch campuses. There are some correlations between the fulfilment of regional functions and the distribution of institutions, so research university and applied scientific, as well as vocational training and adult education roles must be restructured with regard to the two large universities and the two large former college centres, while the issue of the higher education catchment areas of the two regions of the Great Plain must be solved, considering the grey areas in regional coverage, and with regard to community-based higher education centres and campus branches, and the restructuring of the Jászszág and Békés courses.

The **Southern Transdanubia** region is in a special position due to its scarcer resources and significant outgoing migration figures. The R&D performance of the region as a whole is mostly defined by the University of Pécs and its medical and pharmaceutical research capacity; the majority of R&D expenditure is also public, meaning that reducing state R&D grants could have a significant impact on economics and employment in the region. The educational portfolios of the University of Pécs and the Kaposvár University are basically complementary; however, there are some deficiencies in education and research in both institutions, therefore interventions are possible with regard to university and applied science functions, and to pedagogical, technical and artistic courses. In order to provide educational coverage in the Southern Transdanubia region, the University of Dunaújváros and the Eötvös József College of Baja must be reconnected to the system.

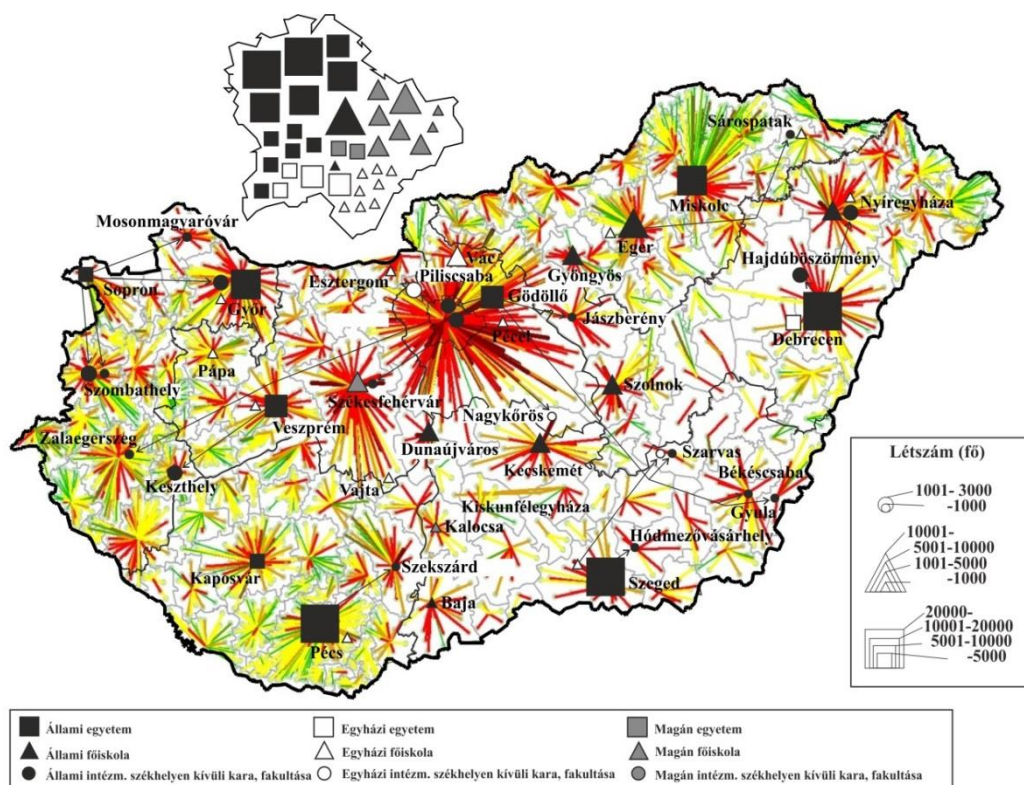
In the case of the region of **Northern Hungary**, both the level of economic development and R&D expenditure are low, although there have been more and more investments in past years increasing industrial demand for higher education programmes and research. R&D expenditure is dominated by company expenditure. No Northern Hungarian institution has an exceptional scientific output at the international or research university level, although two institutions, the University of Miskolc, and the Eszterházy Károly University, established through the merger of the Gyöngyös Károly Róbert Campus

and the Eszterházy Károly Colleges operating in Eger and Sárospatak, conduct research activities significant at the international level. There is a problem with duplications and “half-profiles” in certain fields, where associated educational or research areas are covered by two separate universities. The most significant problem of the region is the high number of areas with no involvement in higher education, such as Nógrád county and Northern Borsod. A solution for creating new academic courses in Nógrád is the establishment of the new training centre, which combines the practical courses launched by certain institutions and the local government of Salgótarján with preparatory functions.

The **relationships between higher education institutions, branch campuses and functional economic areas** show the potential certain higher education institutions are able to realise when participating in the development of the educational and labour market portfolio of each region (functional urban area, county, region or country).



Regions covered and not covered by higher education services are shown by higher education institutions and their branch campuses, as well as by land use, with regard to catchment areas and actual land use and economic processes.



9.2. Ecclesiastical and private institutions

An important element of the reconstruction of the institutional system is to supplement the system established by the state for the purpose of higher education with the training and research capacity of institutions maintained by ecclesiastical and private organisations, as such institutions form an important part of Hungarian higher education.

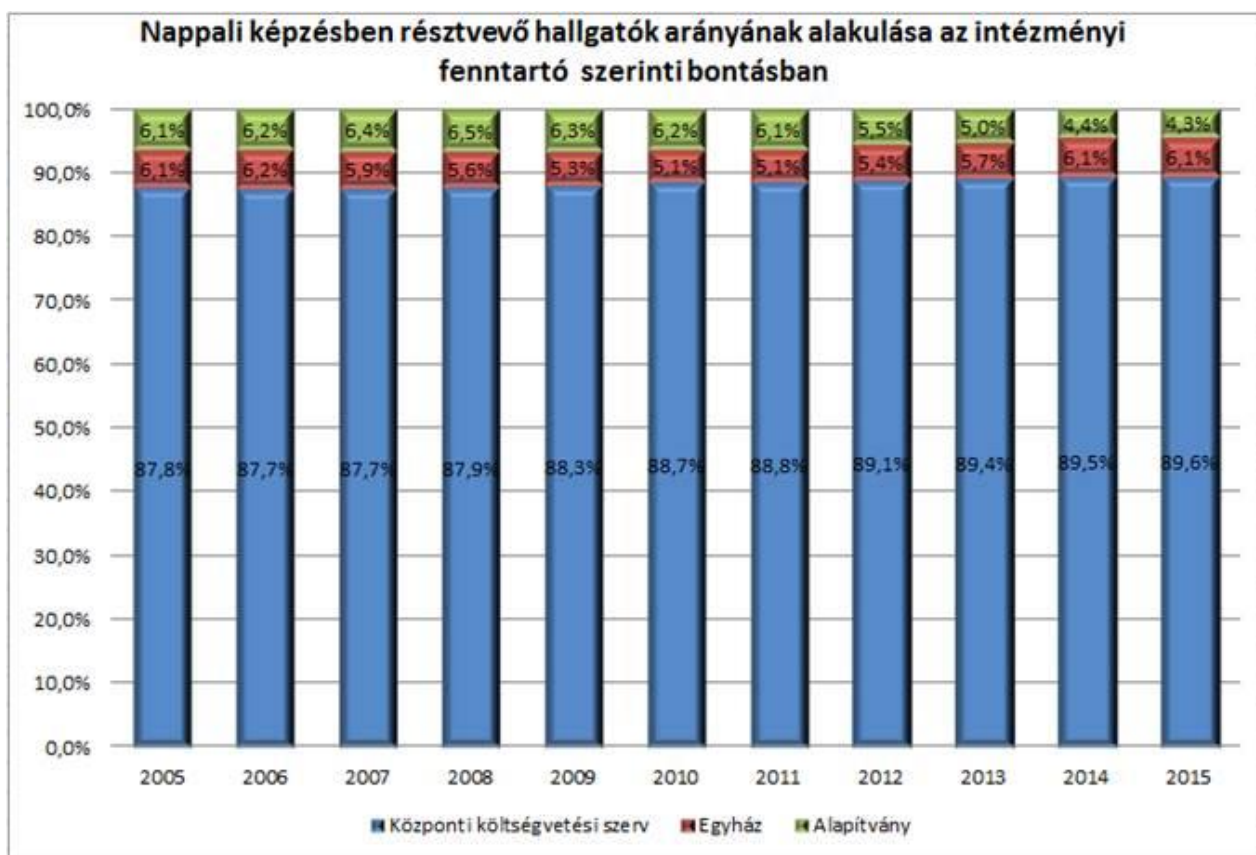
The Government's goal is to further reinforce the role of religious institutions in public services, for which goal it is justifiable to further support ecclesiastical higher education institutions, the purpose of which is, among other things, to provide a future supply of religiously trained workforce for existing institutions providing public services and for such institutions founded, taken over in the future, with regard to social education and teacher training.

Special tasks concerning religious education are only fulfilled, based on a centuries-long tradition, by ecclesiastical institutions. In the spirit of the Act on National Higher Education, the government most determine the conditions, specific tasks undertaken by a given institution, as well as the role such institutions can play in secular training within Hungarian higher education, in the form of an **agreement concluded** with ecclesiastical and privately funded institutions. For this purpose, the government must decide, in the form of special procedures, what institutions, majors, scholarship related capacities will the agreements concluded with ecclesiastical and private institutions cover – naturally, with religious courses treated as a separate issue. When making such decisions, one must consider the replacement of retiring personnel provided at the national or regional level by the given course, as well as the expansion of existing public capacities, provided that it is reasonable with regard to the given field, region. It may also be justified to ensure that Hungarian state scholarships are

available even for courses in which the requirements for admittance with scholarship has been set particularly high by the government, thus guaranteeing the highest possible level of competition with regard to these fields.

The social role of religious organisations has increased, which, in turn, also enhances the role of public education institutions operated by them, due to which the role played by ecclesiastical institutions in teacher training has also increased.

Since 2010, the proportion of students in higher education institutions operated by ecclesiastical organisations has been increasing with regard to total student numbers. The proportion of full-time students studying in ecclesiastical institutions was 5.1% in 2010, which has increased by one percentage point, to 6.1%, by 2015.



Private institutions are also essential participants of the system of higher education with regard to meeting regional educational demand and to special corporate courses for further training, but quality must be improved in this field as well.

9.3. Community-based higher education centres – increasing the availability of higher education

In order to improve the competitive situation of disadvantaged regions, the introduction of community-based higher education centres will enable communities in disadvantaged regions to access competitive knowledge, which will in turn allow them firstly to prosper at the local level, and also to have sufficient, widespread access to competences providing a sufficient basis for success in the

knowledge economy. The new organisational form established through the amendment of the Act on National Higher Education introduced in July, 2015, that is the community-based higher education centre, is an organisation operating outside of the seat of a higher education institution and not considered a higher education in and by itself, which is entitled to conduct educational activities with regard to the field of study and maximum number of students based on an agreement concluded with a higher education having an appropriate operating licence and a sufficient faculty staff; according to the agreement, the centre provides for the higher education institution and its students the conditions for the primary higher education activities, and the material and facility-related – and, in accordance with the specific agreement concluded with the higher education institution, the financial – conditions. The community-based higher education centre as a type of institution is not new to higher education; it is an external organisation, which provides, based on local societal and economic needs, a location and other infrastructure for the operation of academic courses offered by higher education institutions; the maintainer is a local government, economic organisation dedicated to establishing local higher education, or, in some cases, the church.

Following the entry into force of the legal regulation, 7 higher education institutions and organisations/settlements intending to operate community-based higher education centres have submitted to the Education Authority sets of petitions and memorandums of understanding concerning the launching of academic courses in 2016; in four cases, the Education Authority has authorised the establishment of a community-based higher education centre and the September, 2016 launch of associated academic courses.

10. Institutional management

The restructuring of the higher education institution management system has been on the agenda continuously, practically since the fall of communism, but, apart from partially developed and introduced components – e.g. the establishment and elimination of Economic Councils –, it has not been implemented until the amendment of the Act on National Higher Education introduced in July, 2014. Through the introduction of legal regulation, the government has established the **chancellery model of the management of public higher education**, which ensures more efficient cooperation between maintainers and institutions, and the comprehensive control of the efficient use of funds expended in higher education. The chancellor has right to consent based on statutory entitlements with regard to decisions of economic consequence made by the senate.

According to Fundamental Law, higher education institutions are independent with regard to the content, methods of research and education, but their organisational structure is regulated by law. The system of management of public higher education institutions is established by the Government in accordance with the law, and their actual management is also monitored by the Government. In consideration of these facts, a proper relationship must be established between academic autonomy, which is important for ensuring the freedom of research and education, and the professional economic and organisational management of public funds. It is important, with regard to the freedom of research and education, to implement the municipal operation of institutions through elected bodies and

rectors. Learning from the negative experiences of the past 20-25 years, as regards the broad interpretation of university autonomy, it is just as important to ensure that the management of institutions, which, in certain cases, operate with a budget of tens of billions of forints and thousands of employees, is transparent and professional, which can be realised through well-prepared professional managers – chancellors – appointed by the Government for this specific purpose.

Developing the professional and economic management of higher education institutions and ensuring the responsible, efficient and accountable economic management of public funds have remained issues to be tackled within Hungarian higher education for a long time. As regards the powers of chancellors, a chancellor is entitled to exercise not only professional supervision, but also employer rights with regard to public employees within organisational units that primarily conduct tasks unrelated to education or research. On the other hand, the chancellor's approval and countersignature is necessary for the validity, entry into force of strategic decisions and measures introduced by the rector and the senate and affecting the economic management of the institution or having economic consequences.

The new organisational form established through the amendment of the Act on National Higher Education The amendment of July, 2015, has established **consistories** in public higher education institutions. The duties of such consistories are **doing preparatory work for the strategic decisions of institutions, as well as providing professional support and oversight for economic management activities**. Three of the five members of the consistory are delegated by the minister responsible for higher education based on the recommendations of organisations significant to the higher education institution's socio-economic environment, the given higher education institution itself, as well as the student council of the higher education institution. The rector and the chancellor are ex officio members of the consistory. The prior agreement of the consistory is necessary for any decisions of economic consequence made by the senate to become valid. Accordingly, the agreement of the consistory is necessary for the approval of a medium-term institution development plan or a research, development and innovation strategy, the approval of an institution's budgetary plan or budget report, the establishment of an institution's asset management plan, and for the foundation of a business organisation and the acquisition of stake in a business organisation.

11. Digitalisation

A detailed analysis of the state of digitalisation in higher education is outlined in the chapter on higher education of the *Digital Education Strategy*. **The following quotes are relevant segments of the document approved by the Hungarian Government.**

11.1. The state, condition of digital public service, infrastructure²⁵

The basic ICT infrastructure of higher education is exceptional, world-class in certain areas, but it is below the EU average in others.

Basic network infrastructure (HBONE+ system) is particularly good. Based on Government Decree 5/2011 (II. 3.) On the National Information Infrastructure Development Programme, the National Information Infrastructure Development Institute provides for the coordinated development of the information infrastructure and the national computer network services of the higher education and public education institutions, research and development organisations, public collections and other – educational, scientific and cultural – organisations on the HBONE+ Backbone Network. Broadband internet access is provided to higher education institutions with regard to existing, fully developed branch campuses. New branch campuses are connected to the network through the Social Infrastructure Operational Programme. However, there is a shortage in WiFi services available within the institutions, as many institutions have serious issues with the wireless coverage of broadband internet, as result of which broadband internet is underutilised. However, it is important to note that there few funds available for development in the Central Hungary Region, which will lead to the network devices becoming obsolete within a few years. The standardisation of the network is an important consideration for future developments.

A system of virtual collaboration laboratories (VIRCA) is also operated with participation from higher education institution, but on the base provided by MTA SZTAKI.

The services of the National Information Infrastructure Development Institute include EDUROAM, a virtual European university area. In the fields of research and higher education, the National Information Infrastructure Development Institute has already established federal identification and access administration (eduID, eduGAIN), – which complies with international systems and provides a sufficient basis – for system-level identification. The Kempelen Farkas Digital Textbook Library, which provides higher education content, currently has almost 13 000 titles and it used daily by 20-25 thousand users.

The Electronic Information Service National Programme, operational since 2001, provides access to scientific databases, in the form of a central system with a yearly subscription. Thanks to SROP

²⁵ National Digital Development Programme - Concept proposal for the higher education sector;

development, in addition to the 6 larger databases, more than 20 additional database is available for students, instructors, researchers.

11.2. ICT asset supply and usage²⁶

Almost 100% of students entering higher education have appropriate digital work tools (laptop, smart phone, desktop computer). However, institutions have not developed opportunities to integrate these private workstations into the educational process.

The digital services of institutions are currently and continuously being developed; one of the most frequent directions of development is the establishment of wireless (WiFi) network coverage in institutions – at this point, in the case of larger institutions, this has only been implemented in a couple of dormitories. At the same time, the replacement of IT infrastructure – particularly machinery – and the acquisition of legal software licenses are critical areas. The central prohibition on procurement, in force since four years, and the loss of the vocational training levy have led to the quick deterioration of assets in higher education. Another area with shortfall is the acquisition of instruments and software that are necessary only in small numbers, for special education and research purposes (e.g. for laboratories, practical training).

Based on the survey conducted by the National Information Infrastructure Development Institute in the autumn of 2015, telephony related expenses count relatively high among the expenditure of institutions, which issue may be alleviated through the introduction of the sector-level Voice over IP, or VoIP. Surveyed institutions are generally open to the introduction of technologies considered well-established in today's world; however, implementing such a service requires the development of the organisational and IT infrastructural background for numerous institutions.²⁷

According to the 2015/2016 data of the NSDCP (National Statistical Data Collection Programme), there are significant differences between institutions in the number of computers available per student, with the average number of computers being a quarter of the number of students in most institutions²⁸. Practically every computer has a broadband internet connection; it is not available only in the case of 174 of the more than 77 thousand workstations.

As regards software, it is important to note that the use of legal software licenses is not common practice; students in particular have little access to legal versions of professional software in the course of their studies²⁹. Thus, the launching of new grant schemes may be justified in order to establish support for the use of professional software within higher education, which schemes can be based on cooperation between software developers and institutions.

²⁶ Survey of IT and student service areas in higher education – Final study, MKIK GVI; 2014; page 42;

²⁷ Survey of IT services employed by higher education member institutions conducted within the framework of a supply contract – preparation of study and statistics for the National Information Infrastructure Development Institute; September, 2015;

²⁸ The student number data includes students engaged in part-time studies and correspondence education.

²⁹ Although there are some positive examples; for example, at the Corvinus University of Budapest, almost 100 programmes can be accessed legally via Neptun System student code.

Cloud-based technologies are not common in higher education; although there are many instances of institutions using such technologies, this use is typically not conscious (e.g. Google Drive, etc.). It is recommended, based on the survey of the National Information Infrastructure Development Institute, that various types of services are made available for institutions through the establishment of cloud-based services (IaaS, PaaS, SaaS).

11.3. Digital competences and attitudes (instructors, students, employees, managers)³⁰

Domestic demographic processes and the relatively low outcome of secondary schools providing secondary school certificates are not advantageous with regard to the achievement of strategic goals undertaken as part of the EU 2020 Strategy; however, the expected decline in student numbers can also act as a resource: the capacity released can be utilised during the high-quality reconstruction of higher education.

The following connections can be identified with regard to the development of digital competences in higher education:

- Development of ICT instruments relevant to professional training / improving digital proficiency by building on existing / previously acquired basic competences;
- Providing access to instruments connected to vocational training courses;
- In the case of IT training, the qualitative and quantitative increase of output.

As regards people with no digital competences joining higher education within the framework of life-long learning, special pedagogical interventions are necessary in higher education for older students and instructors in older age groups.

There is a qualitative and quantitative shortage of IT personnel on the Hungarian labour market, which affects both the ICT sector itself, and the sectors utilising ICTs, and which also significantly limits the growth of the sector. Additionally, in Hungary, the number of professionals with manufacturing qualifications is low, therefore the quantitative and qualitative improvement of ICT training courses and the replacement of retiring personnel must both be emphasised.

Significant advancements have been made in this area in the previous period. A competence centre is operated at the Óbuda University developed in cooperation with large ICT companies, a practically oriented restructuring of ICT and related courses in Northern Hungary is underway within the framework of the SROP 4.1.2/F project, while in the field of ICT research, ELTE is an EIT ICT KIC member.

Therefore, for numerous institutions, the integration of the current demands of the ICT sector into the academic courses is provided for at a daily level through competence centres cooperating with companies; as for institutions which have or had shortcomings, development programmes are being launched or have been launched.

³⁰ National Digital Development Programme - Concept proposal for the higher education sector;

There has been a significant advancement in the area of academic courses and higher education research supporting the R&D segment of the ICT sector, as a Trust and Security centre, a Future Internet centre and a Future ICT centre has been established in Veszprém (PE), Debrecen (DE) and Szeged (SZTE) as part of SROP projects for the Digital Agenda for Europe and Future Emerging Technologies (FET) programmes.

There is an increasing – number of programmes targeting younger age groups and popularising – ICT with participation from higher education institutions. Programmes targeting the 12-18 age group and introducing programming and STEM professions in a playful manner have been very successful.

11.4. The methodological background, penetration of digital education, learning31

When considering the international comparison of higher education programmes, it can be said that descriptions of domestic academic courses rarely contain forms of work deviating from the traditional (lecture, seminar, practical training). The main obstacle to modernisation within academic courses is the central control of educational work, which, for paid working hours, only recognises the most traditional “face to face” activities.

The national and institutional accreditation of (and, consequently, independent student work in a foreign language within) domestic and international online programmes (online courses open to the public) has been made impossible because of exit requirements and the Hungarian Accreditation Committee’s (HAC) programme accreditation procedure. Institutional experiments are already underway in another educational arena: through the conversion of existing university career guidance centres into competence centres, where personal career guidance, vocational orientation, international mobility and language training can be performed partly on a digital basis (in which the Videotorium established by the National Information Infrastructure Development Institute may play an important role). Special attention should be paid to the contradictory and critical state of language training in higher education, which cannot be advanced without online education.

Student surveys show that in most cases, the level of digital support provided during courses is very low. The amount and quality of digitally available course descriptions, requirements, content, library guides, tests vary between departments in each institution. Despite initiatives for development by institutions, there is no standard student support to speak of in this area. The partial digitalisation of university libraries relevant to departments have has helped to overcome some of the disadvantage – through serious effort –, but this field is still not competitive on the international level.

Previous institutional developments had modest results with regard to digital competences, even though there are internationally accepted training systems (corporate academies) and enterprises (Cisco, Corning, Huawei, IBM, Microsoft, Alapítvány, Oracle, Codecool, etc.) perfectly calibrated for the labour market operating in part besides and in part within higher education institutions.

One of the major obstacles to the spread of digital culture in higher education is that digital education develops slowly, in an isolated manner. Another important methodological flaw lies in the fact that only a small share of teachers has training development competences which enable them to realise the

31 National Digital Development Programme - Concept proposal for the higher education sector, Page 43;

courses they teach in an electronic learning environment. Since in 2016, no domestic public higher education institution had an internal system for further training (involving all instructors), the instructor-side development of digital competences cannot currently be initiated at the necessary level.

11.5. The state of digital content development and service

Digital content development has been present in public education for more than a decade, as this field acted as kind of a pioneer in this regard, while in higher education it was fully realised by the end of the 2000s, during the period of the SROP. Accordingly, most institutions are involved, although to various extents, in electronic content development.

The results of institutional content development come together in the Kempelen Farkas Digital Textbook Library, which, by the spring of 2016, contained more than 13000 titles, more than 4300 of which is available in book form. However, past research has shown that a significant portion of uploaded course material can only be considered “real” e-learning material to a certain extent, as a great deal of notes have been uploaded in files downloadable only in PDF form.

According to research, use of the digital library – and e-learning materials – is not common³², even though, by 2014, more than 86% of students had laptops (since then, this figure has almost reached 100%). They search for various current content using their own devices, – particularly during the examination period, – and use their own social networks to share information with one another. The digital library is used regularly by 13% of students.

The other content related service considered a central development is the knowledge base made available through the Electronic Information Service National Programme, which is intended for the centralised purchase of electronic sources of information essential to higher education and scientific research, made available based on national licence; as result, considerably more information can be provided than individual higher education and research institutions would otherwise be able to acquire.

In 2016, 148 institutions have subscribed to the Electronic Information Service National Programme and have thus received access to a total of 26 international databases. The Electronic Information Service National Programme is operated under the Library and Information Centre organisation of the MTA.³³

11.6. Digitalisation in higher education management - national, institutional practice

The Higher Education Information System (HEIS) operated by the Education Authority is a legally consistent system. It has numerous modules, which assist institution management, as well as the national control of educational policy. Several nationwide developments have been implemented and

32 Final study - “Qualitative analysis of higher education e-learning material” WITHIN THE FRAMEWORK OF SROP PROJECT NO. 7.2.1-11/K-2012-0005; Education Authority 2014.

33 Final study, SROP 4.2.5-09/1-2010-0002, Electronic content development and service in the fields of research and higher education

successfully completed in the past period; such developments often provide a base of reference for analyses concerning higher education, even if their operation has not been integrated into everyday practice.

In conclusion, higher education is at the forefront of the field of e-government services, as such services cover the entire target group.

12. Internationalisation

12.1. The internationalisation of Hungarian higher education

With respect to Hungarian higher education, increasing the internationalisation of higher education, supporting the two-way mobility of students and – pedagogical, research and professional – personnel, are essential **national strategic actions** in light of global trends. Subsidy instruments include not only scholarship programmes, but also the conscious international marketing of higher education and the promotion of outgoing mobility for part-time training: the mobility of Hungarian students, instructors and professional personnel assists institutions in preparing for taking on international roles, and also provides new educational opportunities and lays the groundwork for innovations in development.

There have been **important results** in the past decade in the breaking down of barriers limiting mobility: the reformation of the programme structure, the qualifications framework, the ECTS becoming commonplace, the introduction of a quality assurance system based on uniform principles, the establishment of the portability of scholarships and loans.

The two basic types of student mobility:

- ❖ credit mobility: part-time training and internship,
- ❖ graduation mobility.

The increase of the outgoing mobility figures of higher education students can be achieved directly and most efficiently by **granting scholarships**. According to the common European goal outlined in Leuven, the level of mobility must be increased to affect at least 20 percent of students by 2020. The duration of credit mobility must be at least 3 months, 90 days, or a minimum of 15 ECTS credits must be completed.

In higher education, the pool of potential students diminishing due to downward demographic trends may be offset by **increasing internationalisation**, attracting more and more foreign students to our country. Between 2010 and 2015, the number of foreign students among full-time students grew by 53%, their proportion grew by 4.9 percentage points. **In 2015, there were approximately 23 thousand foreign students**, which is 12% of the **total number** of students participating in **full-time education**, excluding foreign students participating in PhD and tertiary vocational programmes. According to 2014 data, most of them came from Germany, but relatively many - around one thousand per country of origin - arrived from Brazil, Iran, Norway and Nigeria.

The number of Hungarian citizens pursuing their studies abroad in OECD countries according to 2012 data was 6110, no notable Hungarian student community can be identified in countries outside the OECD. The number of Hungarian students participating in bachelor and master programmes in the OECD member states is between 6-8,000. Since 2012, the **mobility of Hungarian students travelling abroad** has been improving continuously, but not at a considerable rate. One of the reasons for this is

Hungary's growing involvement in bilateral, then international and EU programmes (Tempus, CEEPUS, Socrates/Erasmus, LLP, Erasmus+ etc.). The number of Hungarian students travelling in the framework of the Erasmus programme between 2007 and 2013 was 28,275 in total, although Hungary did not use up the Erasmus quotas in any of the years. Connecting the Campus Mundi Programme with the "Erasmus+ zero grant" scholarship resulted in the two funds operating in harmony.

12.2. The Campus Hungary Programme

International mobility

The Campus Hungary mobility programme was launched in 2012 with the main objective of providing scholarships for part-time studies abroad to as many students in Hungarian higher education institutions as possible. Thanks to the eight tendering stages completed since the autumn of 2012, the Balassi Institute has provided grants to more than 10 000 individuals (8899 students, 1870 employees in higher education) in 98 countries all over the world, due to which the level of domestic student mobility has been doubled.

The types of scholarship offered by the programme enabled not only long-term study, but also short study trips for individuals and research and study groups. More than a quarter of students (2758) has participated in short study trips (1-28 days). Almost half of the applicants, 4350 people have participated in group trips.

Thanks to various mobility scholarships, the **attitude for outgoing student, instructor and personnel mobility has improved** at the national level in the past 10-15 years, but the number of students from institutions in rural areas travelling abroad has decreased. In previous years, most of the students travelling abroad to gain experience were from the social sciences, law and economics fields. In order to improve on the above described tendencies, the Campus Hungary Programme was focused primarily on the mobility of students, instructors and employees in higher education institutions located in the convergence region, favouring students and researchers in the technical and natural sciences fields.³⁴

³⁴ <http://www.tka.hu/konyv/327/a-felsooktatasi-mobilitast-akadalyozo-es-osztonzo-tenyezok-magyarorszagon>

The R&D aspects of Campus Hungary

The Campus Hungary Programme is closely connected with the principle also outlined by the EU 2020 Strategy, according to which in order to reach intelligent growth, member states are liable for the “reformation of national and regional R&D and innovation systems in order to ensure that such systems support excellence”. Through **international experiences, it has enhanced** the efficiency of R&D and innovations activities conducted within the framework of higher education, boosting the development of more isolated regions.

The other primary goal of the Campus Hungary Programme is to ensure that **as many foreign students as possible choose Hungarian higher education institutions as their place of study**. The Study Finder programme available on the English language website of the scholarship programme functions as a searchable database including more than 500 English language and other foreign language courses available in Hungary.

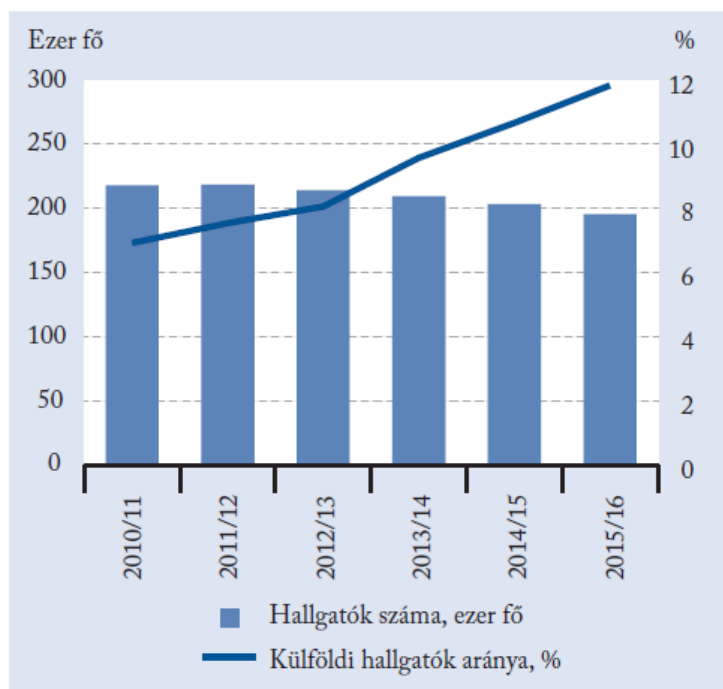
In order to promote mobility toward domestic higher education institutions, Campus Hungary has participated, in cooperation with approximately 30 Hungarian higher education institutions, in 37 international educational fairs and conferences all around the world.

From 2005 to 2014, among full-time students attending bachelor and master programmes in higher education, **the number and proportion of foreign students has more than doubled**. In the current academic year, there were more than 22 thousand foreign students, 8.4% more than in the previous year. Most come from Germany and regions from neighbouring countries with high Hungarian populations, but a relatively high number of students have come, for example, from Brazil, Iran, Norway and Nigeria – around one thousand students per country of origin.³⁵

Between 2010 and 2015, the number of foreign students among full-time students grew by 53%, their proportion grew by 4.9 percentage points. In 2015, there were approximately 23 thousand foreign students, which is 12% of the total number of students participating in full-time education (excluding those participating in PhD and tertiary vocational programmes). According to 2014 data, most come from Germany and regions from neighbouring countries with high Hungarian populations, but a relatively high number of students have come, for example, from Brazil, Iran, Norway and Nigeria – around one thousand students per country of origin.

³⁵ <https://www.ksh.hu/docs/hun/xftp/idoszaki/mo/mo2014.pdf>

A hallgatók* számának és a külföldi hallgatók arányának alakulása a nappali képzésben



* Felsőfokú alap- és mesterképzésben részt vevő hallgatók száma az egyetemi, főiskolai, és osztatlan képzésben részt vevőkkel együtt.

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12.3. The role of the Stipendium Hungaricum programme in the internationalisation of higher education

The educational policy related objective of the programme is to promote, in accordance with the directives of the European Union, the internationalisation of Hungarian higher education, to improve the cultural diversity of institutions, to popularise Hungarian higher education at the global level, and to reinforce the international relationships of the Hungarian scientific elite. An important consideration is that – by increasing potential solvent demand – self-financing students studying in Hungary have reinforced the self-sufficiency of institutions.

If the programme proceeds according to schedule, in a few years, Hungary will be accepting around 4500 students per year from 90 countries. These relationships are manifested in mutually beneficial interinstitutional cooperation, joint projects, or even double degree programmes.

³⁶ <https://www.ksh.hu/docs/hun/xftp/idoszaki/mo/mo2015.pdf>

The headline target is the conscious coupling of mobility programmes, the institution-level enhancement of the synergies between various tender instruments (Erasmus+, Stipendium Hungaricum, Campus Hungary/Campus Mundi). The programme was started with 47 participants in the autumn of 2013; by the 2015/2016 academic year, 1653 foreign students were involved.

Eligibility for the Stipendium Hungaricum scholarship is dependent on the availability of a current intergovernmental framework agreement with the given partner covering the field of education. **Currently**, there are agreements including Stipendium Hungaricum scholarship eligibility **in force with 49 partners**.

As part of the programme, in accordance with the general rule, Hungary provides bachelor, master, single-cycle long and doctoral programmes, and, if there is demand, it may even accept students for part-time training. What scientific fields are the students of a given partner able to access is outlined in the cooperation agreements. **In certain scientific areas, all publicly financed courses of Hungarian higher education institutions are available to applicants.**

13. R & D & I

In the Hungarian economy, the amount of money spent on **research and development and innovation** has been constantly on the rise since the economic crisis; this, however, is fundamentally the result of corporate spending. While academic and university R&D&I expenditure has practically stagnated, companies have been increasing their expenditure in these areas at a rate of more than 10% per year, demonstrating that Hungary is transitioning at an increasing rate from its past manufacturing centre, producing the traditional products of the region, to production with high added value, requiring research and development.

Both the community of the European Union and the community of Hungary have defined **R&D&I** and its funding as **areas of strategic importance** and have allocated the necessary funds. The efficient utilisation of such funds providing economic and social development is the fundamental interest of the country. For this reason, the Government approved the document titled: “Investment in the Future: National Research and Development and Innovation Strategy 2020” and devised an action plan with which the shortcomings of knowledge bases and knowledge production can be eliminated, which can manage problems of knowledge flow, knowledge and technology transfer and the cooperation mechanisms of corporate and community sectors performing knowledge utilisation, too.

However, there are numerous **problem areas** within higher education R&D&I, which may hinder the efficient, sustainable operation of the system.

- ❖ Expenditure in higher education R&D&I activities have not changed until the 2014 development of the strategy; GDP proportional expenditure has been around 0.24% for a decade, with only minor fluctuations. However, in the past two years, there has been a significant shift thanks to the establishment of the NRDI Office and the EDIOP, CCHOP and NRDI Fund programmes it has started.
- ❖ Higher education does not provide a sufficient supply of new researchers, in a major part due to the shortcomings of doctoral programmes experienced earlier. Since the introduction of the current PhD system, only 43% of the students in regular education have attained a scientific degree, and this is what led to the structural transformation of doctoral programmes.
- ❖ There are too many independent doctoral schools; as their activities are not focused on areas important to R&D&I, there is, at the same time, only a low number of doctoral programmes and doctorands being recorded in the technical, natural sciences.
- ❖ The proportion of direct R&D&I funds, that is R&D&I financed not through public grants, but primarily by corporations, is relatively low in comparison to the total income of institutions.
- ❖ The structures established to provide the necessary conditions for direct cooperation between institutions and companies have been developed in a non-sustainable, inefficient way.
- ❖ The R&D&I activities of institutions are often paired with an inefficient use of resources; the rate of professional cooperation between doctoral programmes and the institutions is low.

- ❖ The European Union's R&D&I funding programmes have resulted in a unique situation, as the lack of community resources has an adverse effect on the excellent institutions active in the central region.

The utilisation of the R&D&I potential available in higher education institutions is a key question for the economic development of the country. A major problem in the Hungarian innovation system is, namely, that it is structurally composed of two conflicting parts. On the one hand, Hungary ranks **excellently** on the list that measures the economic impacts of innovation – among the countries of the region –, thanks in a large part to the level of innovation culture and technology represented by international **enterprises**. On the other hand, we are the **last** according to indicators measuring innovation within the **SME sector**. It is clear, therefore, that the government efforts aiming at developing Hungarian companies that are competitive on both domestic and international markets (hereinafter referred to as 'SMEs') can only prove successful in the long term if the **innovation intensity of companies** can be **increased**, which, however, can only be achieved efficiently by utilising the potential that is available in higher education.

Therefore, one of the most significant intervention areas of higher education strategy is the development of a grant and control system which encourages higher education institutions, through the reasoned use of innovation funds, to provide R&D&I support to the corporate sector, particularly the SME sector, and vice versa, ensures that higher education institutions play a significant role in the utilisation of the targeted grants provided to the SME sector.

Thanks to the common sections of the documents on the Investment in the future National R&D&I strategy, the Smart specialisation strategy, and the Shifting of Gears in Higher Education strategy, as well as to ongoing programmes, the joint efforts of the programmes of the NRDI Office (Economic Development and Innovation Operational Programme, National Competitive and Excellence Programme, etc.) and other higher education programmes (budgetary developments in support of the replacement of retiring research personnel co-financed by the European Union) and regulatory changes (including the separation of R&D service within the framework of university activities, recording the research related obligations of instructors) were sufficient to cause a shift in the initial position outlined above.

14. The third mission

In the last decade, decade and a half, **higher education**, by fulfilling its **third mission**, has become an important economic factor all throughout the world. Domestic institutions are yet to properly emphasise certain activities considered to be part of the sector's third mission, such as **social responsibility, the popularisation of science and the dissemination of knowledge**. There has been some good examples since the start of the development of the field, but their influence and prevalence are not at the desirable level. The development of domestic higher education institutions in this area is unavoidable, as the challenges presented by the global competitive situation, the evolving social needs and the necessity of life-long learning all show that in the future, no system of higher education will be possible without fulfilling these needs.

15. Life-long learning

To provide the human resources which can serve as a basis for an internationally competitive economy, Hungary has one more important problem to face. The **further training and retraining of the workforce** is realised through various forms of life-long learning; the **indicators** for our country in this area are very **negative**. This can be illustrated clearly using data on participation in non-formal training. In Hungary, 10% of the 25-34 age group and 23% of the 55-64 age group participate in non-formal training, which is barely a fourth of the OECD average (37% and 23%, respectively). Solving problems with life-long learning is not among the primary duties of higher education, but, in the course of the structural reconstruction, even higher education must answer this challenge.

³⁷ This piece of data disrupted by a data recording problem; registration, reporting of non-formal training courses, and data aggregation must be improved.

2. ANNEX - ACTIONS

EDUCATIONAL-TRAINING ACTIONS

2.1.1 Objective: Supporting student achievement

Actions:

- ❖ Based on the competence level assessments of students admitted to higher education institutions, remedial courses will be launched, within the sphere of competence of maintainers, with regard to the studies of students with results in the lower third in order to reduce attrition and to improve the level of specialised knowledge necessary for a given course.
- ❖ Competence assessments conducted at the start and at the end of the course enable the measurement of educational results, illustrating what level of development have students achieved in the course of their tertiary studies thanks to the institution's education.
- ❖ The introduction of institutional systems in support of student achievement, which systems must cover the identification of success criteria, the establishment of a learning-centred environment and the increase of student motivation.
- ❖ The higher than before rate of inclusion of higher education institutions in the development of basic natural sciences courses for secondary schools, the prevention of attrition through appropriate talent development.
- ❖ Launching programmes to reduce attrition as well as student services and extracurricular courses to develop language and professional skills.
- ❖ Representing the components facilitating the support of students' success in the allocation methodology of performance-based grants.

2.1.2 Objective: Creating an education system that ensures equal opportunities, social advancement, broad access

Actions:

- ❖ Steps are taken by maintainers in order to improve data upload to the Higher Education Information System by higher education institutions in order to ensure more intensive tracking of concerned students. The connection of HEIS to registries relevant to the field of public education will also be implemented.
- ❖ By maintaining all current places of programme and by establishing the framework represented by community-based higher education centres, nationwide coverage can be implemented with regard to the field of tertiary programmes; the establishment of special purpose training centres and branch campuses can expand the regional, territorial supply of tertiary programmes.

- ❖ Reconstruction of the social scholarship system in order to ensure that it more efficiently promotes the accessibility of higher education among disadvantaged, vulnerable students, therefore contributing to social mobility.
- ❖ Launching career guidance and talent development programmes as early as grade 6, with particular attention to the preparation of female students for STEM studies.
- ❖ Executions of investments promoting distance education opportunities for female students, and implementing family-friendly solutions at branch campuses (baby changing and nursing areas, playrooms, day-cares), and also investments to fill gaps in the student services of certain university campuses.
- ❖ The introduction of preparatory courses ("grade 0") as a form of training, developmental training, 60-180-hour courses that bring together practical training methods a) for students who have not been admitted to higher education, have not started higher education studies, but have successfully graduated from secondary school, and b) for students in grades 11-12 of their secondary school education
- ❖ In line with the concept of life-long learning, providing educational courses, classes, clubs, educational lecture series, study groups, vocational lecture series, free universities, preparatory training for students intending to apply for higher education, which programmes do not provide formal degrees and are based on personal motivation and social needs
- ❖ The expansion, extension and development of Roma colleges.

Measures of the *Hungarian National Social Inclusion Strategy II (2011-2020)* and the *National Disability Programme (2015-2025)*, as well as the *Framework strategy for the life-long learning policy in the 2014/2020 period* are associated with this objective.

2.1.3 Objective: Increasing the interoperability and outcome alternatives of higher education programme outcomes

Actions:

- ❖ It is necessary to establish, at the sectoral regulatory level, a bachelor programme outcome (and, as such, the programme outcome necessary for the plant engineer, plant administrator functions) based on vocational training and work experience, while at the same time providing multiple forms of outcome for further training and master programmes.
- ❖ The development of dual study programmes, the expansion of their content, the launching of short-cycle programmes, as well as tertiary further training and requalification programmes within the higher education system and in the sphere of competence of institutional and sectoral regulation.
- ❖ The system and outcome of master programmes must be made more flexible; at the same time, in addition to the 4-semester master programmes providing a specialisation or preparing students for doctoral programmes, 2-6-semester practically oriented master programmes must also be established, preparing students not for doctoral programmes, but, by providing higher quality education, for performing specialised work, work with higher added value, and developmental activities.

Measures of the *Framework strategy for the life-long learning policy in the 2014/2020 period* are also associated with this objective.

2.1.4 Objective: Making scientific, postgraduate specialisation programmes more flexible so that higher education institutions will be the location of life-long learning

Actions:

- ❖ Strengthening a harmonised role with employers in postgraduate specialisation programmes.
- ❖ Encouragement of joint course and methodology development with companies.
- ❖ Development of e-learning materials and the adaption of such materials for courses, support of relevant digital content and teaching aid development.

Measures of the *Framework strategy for the life-long learning policy in the 2014/2020 period* as well as certain measures of the *Hungarian Digital Education Strategy* are also associated with this objective.

2.2.1. Objective: Employer (company, entrepreneur) relations must be reinforced at the national and institutional level, and, in order to ensure the restructuring of the content of tertiary programmes, training needs must be represented in the courses, with particular regard to specialised language training

Actions:

- ❖ The maintenance of regular and intensive relations must be ensured between all public higher education institutions and the economic and professional organisations considered stakeholders with regard to the courses offered by an institution. This must be supported through measures by maintainers.
- ❖ The implementation of the legal provision prescribing the course credit with regard to all courses – except for short-cycle courses –, 10% of which is foreign language credit, must be supported and monitored.
- ❖ Initiatives for foreign language courses, implementation of which is in the institutional sphere of competence, must be promoted and encouraged. The development of foreign language credits is a mandatory element of HDOP's education and content development programmes.
- ❖ In the nationwide international mobility programme, financed partly from HDOP and CCHOP funds, there is a strong focus on participation, during normal studies, in part-time studies abroad, providing credit recognition, with particular regard to the completion of internships. Both programme and outcome requirements and the review of curricula must be systematised, in the course of which the continuous participation of the employment sector must be ensured in order for the educational content to remain continuously relevant to evolving needs.

2.2.2 Objective: Preparation for active citizenship

Actions:

- ❖ The active and responsible citizen is characterised by an open approach, critical thinking, and the ability to take initiative and cooperate with peers. With regard to such skills, pedagogical methods and the examination system must be developed in a direction that ensures that students are able to acquire them at the highest possible level. (E.g. more regular application of the instruments of group work, interactive lectures and scientific debate as opposed to the dominance of face-to-face education)
- ❖ Students must be provided with the knowledge, skills and attitudes connecting their given profession with a specific field of civic education. Social sensitivity and tolerance, general awareness and an understanding of the processes of the global world and the society we live in are skills every young person acquiring tertiary qualifications must have. For this purpose, it is essential that the information which can be used by students to acquire these skills are present in the curricula and in pedagogical practice.
- ❖ Additional steps are necessary in order to enhance, restore trust toward institutions associated with university and student autonomy. Institutions and their student councils must be fully accountable with regard to their finances, data management practices, the services provided by the institutions and student events. Their operation must be transparent, their decisions, rules and publications must be made publicly available for the citizens of universities, the students they represent, as well as for the general public itself. Responsibilities must be clearly defined with regard to finances and operational issues, as well as to student services and student events.
- ❖ In order to enhance the legitimacy of the decision-maker bodies and the Student Councils of higher education institutions, participation in elections for university bodies and student councils must be promoted. Citizens of universities, including students, must be incentivised to exercise their voting rights, participation in elections must be facilitated, appropriate publicity must be provided with regard to the date and exact procedure of the election. Public availability of candidates' manifestos must be made mandatory.
- ❖ In order to increase engagement in volunteer work, students must be encouraged through incentives to participate in social affairs, work for the common good and help the downtrodden, thus helping them in acquiring responsible civic attitudes. The institutional consideration of participation in volunteer activities must be promoted.

2.2.3 Objective: Increasing the international mobility of students and instructors, researchers

Actions:

- ❖ Launching of programmes intended to promote the internationalisation of higher education institutions and the ability of such institutions to attract foreign students (from within Europe as well as from outside of Europe)
- ❖ Promotion of the mobility of students, instructors and researchers, primarily through the further development of the Campus Mundi and Stipendium Hungaricum scholarship programmes.

- ❖ Increasing the number of educational programmes in foreign languages, and introducing mobility windows in the programme syllabuses.
- ❖ The scope of international equivalence contracts must be further expanded in order to reduce the administrative burden resulting from the return of students.
- ❖ In order to further break down the obstacles in front of those participating in terms abroad, institutional reduction of the administrative barriers of credit recognition must be encouraged.

2.2.4 Objective: The teaching methodology used in higher education, in the field of education innovation, should be centred on practice and student work.

Actions:

- ❖ Promotion of the practice of recognising the completion of projects within the courses in the form of credit.
- ❖ Indicators measuring student advancement must be integrated into the instructor activity evaluation system.
- ❖ At regulatory level, transversal skills, including the modules aiming to develop entrepreneurial spirit, have been integrated into KKK. In this regard, syllabuses must be reconstructed based on learning outcomes.
- ❖ The use, development of high-quality e-learning materials and digital teaching aids specific to higher education institutions, in line with their programme portfolios and programme services, and the creation, operation of interfaces for the online publication of such materials.
- ❖ Using community funds to train instructors and to launch certain teaching-methodology programmes.
- ❖ The number of master instructors involved in education must be increased, which may be enabled by the amendment of relevant legislation.
- ❖ Providing ‘train the trainers’ programmes in order to facilitate the application of new teaching methods and teaching technology.
- ❖ Initiating an investment programme for educational infrastructure – covering instruments for remote learning – using HDOP funds in less-developed regions, and budgetary resources in the Central Hungary Region.
- ❖ Providing infocommunications accessibility as a horizontal element.

2.2.5 Objective: In order to increase instructor excellence, the performance-based promotion system of instructors need to be strengthened and the related conditions of competitive salaries need to be created

Actions:

- ❖ The number of contact hours must be reduced with regard to the instructor profession, while the rate of research and mentoring activities, as well as e-learning and consultation activities must be increased.

- ❖ The consideration of the results of the Student Review of Teacher Work has already been realised as a legislative element in the evaluation of instructors. Practical application must be reviewed.
- ❖ Development of career planning and motivation tools in higher education.
- ❖ Increasing the appeal of the teaching career by providing career paths, broadening the set of possibilities available to employers to reduce migration.
- ❖ In order to ensure the professional replacement of retiring personnel, the Government provides a special grant to all institutions for the 1-2-year appointment, “continuing employment” of doctoral candidates and pre-doctors.
- ❖ Direct, targeted grants must also be provided – in line with the objective of the Investment in the Future Strategy – for the replacement of retiring instructors-researchers using relevant ESF funds (HDOP, CCHOP).

2.2.6 Objective: Increasing the number of women instructors and researchers in underrepresented fields and positions.

Actions:

- ❖ As regards operations intended to ensure the replacement of retiring research personnel, special attention must be paid to gender equality in order to reduce the career disadvantages experienced by female researchers after the postdoctoral phase
- ❖ Initiating the infrastructural and organisational developments necessary for the promotion of part-time work.
- ❖ Launching the infrastructural and organisational developments necessary for creating child-friendly workplaces. (In order to increase the supply of new female instructors and researchers, investments facilitating the participation of instructors that facilitate the part-time, teleworking opportunities of women, and implement child-friendly solutions at the campuses (baby changing and nursing areas, kids’ corner, day-care) which investments fill gaps in the service areas for instructors in some university establishments (campuses).)

2.2.6. Objective: The development of educational cooperations between institutions must be promoted, along with the launching of joint courses, the reinforcement of the mentoring role of influential institutions, and the establishment of networks promoting the faster development of students

Actions:

- ❖ The implementation of joint courses, initiated by higher education institutions with the same maintainer and by relying on the infrastructures of one another, must be monitored.
- ❖ The rational direction of further education must be made clear upon the coordinated institutional announcement of tertiary vocational, bachelor and master programmes, which obligation falls within the sphere of competence of sectoral policy.
- ❖ High-quality programme portfolio can also be broadened within the infrastructural framework provided by community-based higher education centres in regions with

currently limited higher education opportunities; for this purpose, sectoral policy must encourage institutions to outsource training courses.

2.2.7. Objective: The systems of quality assurance, quality control and accreditation must effectively contribute to the improvement of the quality of courses.

Actions:

- ❖ In the course of the reinvention of the accreditation system, the inspection of compliance with prescribed programme and outcome requirements conducted by the Hungarian Accreditation Committee (HAC) during accreditation in accordance with the new structure of programme and outcome requirements.
- ❖ Continuous and stricter control, tracking of programmes during studies and at outcome

ACTIONS CONCERNING RESEARCH OBJECTIVES

3.1 Objective: Higher education will take up an increased role in building up the innovation competences of technology-intensive companies, mainly SMEs

Actions:

- ❖ By industry management, the further improvement, of the conditions of cooperation between the industry and universities, the establishment of a system of “University-Industry Cooperation Centres”, and the maintenance of an innovation incubation environment for SMEs.
- ❖ Establishing adequate internal processes and structure of the higher education institutions in the competence of the maintainer, in cooperation with the institutions.
- ❖ Modifying the system of criteria for the financial management of higher education institutions in order to ensure cooperation with companies.
- ❖ By decision-makers, prioritisation, in the course of the allocation of public R&D&I funds, of developments, projects realised with the involvement of higher education research institutes.

3.2 Objective: The system of research financing should support internationally competitive quality and resource concentration, and it should more intensively build on funding acquired by the institutions outside the state finances

Actions:

- ❖ The separation and clarification of the financing of academic type and practically oriented research with regard to actual funds.
- ❖ Unification of the institutional regulation relating to R&D&I financing and R&D&I revenues and integrating incentives to increase revenues.
- ❖ Though its own instruments, the government enables higher education institutions to increase R&D&I income (involvement of higher education institutions in large governmental R&D&I projects, the increase of R&D&I cooperation related content of strategical partnership agreements and the expansion of such content to cover specific higher education projects).
- ❖ Making corporate decisions that involve the utilisation, development of the national research network’s R&D&I capacity more attractive through various benefits that will require the amendment of legislation.
- ❖ The harmonisation of accessibility to domestic and EU funds in order to ensure that regional rules do not inhibit the effective exploitation of the country’s R&D&I capacity.
- ❖ Simplifying the administrative measures and procedures attached to R&D&I activities, making them more flexible at operative level.
- ❖ Adding provisions promoting the operation of the national research network to legislation on research-development and technological innovation, and on taxation and various contributions.

- ❖ Creating a closer relationship between the research establishments of the Hungarian Academy of Sciences and publicly financed research establishments with higher education institutions.

3.3 Objective: Creating R&D&I networks between institutions and strengthening the focus on institutional R&D&I

Actions:

- ❖ A system for knowledge- and tool-sharing must be developed in the place of the fragmented, often parallel developments. This presupposes sectoral coordination.
- ❖ Creating cooperation systems in every step of the innovation value chain (fundamental research, applied research, experimental research, market innovation, social innovation). The financing of fundamental research is a communal obligation, while other fields are provided for through mixed financing, with the presence of industrial resources increasing as we advance the process.
- ❖ Identification of areas of high competence at the sectoral management level based on the competence map of higher education institutions.
- ❖ Reinforcement of excellence in research at the level of specific disciplines through development, financing and maintenance measures.
- ❖ Launching of programmes supporting research in service of the management of social, economic, environmental problems, challenges in Hungary and in the Carpathian Basin.
- ❖ Launching programmes to further social innovation.

3.4 Target: World-class R&D&I universities; increasing the international integration of higher education research

Actions:

- ❖ Concentration of resources to support internationally competitive fundamental research projects.
- ❖ Using HDOP funds for providing targeted support grants for joining Horizon2020 as well as other ERA programmes (e.g. EIT KIC).
- ❖ Supporting the accession to European competence centres, research university associations, and also to international programmes.
- ❖ By strengthening of international research technology relations, ensuring the international exchange of experiences, and designing and conducting popular science programmes, training programmes, training courses.
- ❖ The Government actively promotes the internationalisation of higher education through international organisations (EU, OECD, UNESCO) and the diplomatic faculty.
- ❖ The increase of higher education institutions' ability to draw funds, the increase of the number of research groups and the intensification of successful tender activities must be developed and supported through all available means.
- ❖ Ongoing bilateral and international projects, professional cooperations (ERASMUS, Fulbright, CEEPUS, TEMPUS, OMAA, MFIA, etc.) must be continued and reinforced.

- ❖ Integrating the mandatory activities that strengthen international research technology relations into HDOP institutional tenders.

3.5 Objective: Providing human resources to R&D&I in the long term

Actions:

- ❖ Tracking of restructuring affecting the system of doctoral programmes – should further reconstruction be necessary – in the following areas: (a) increase of scientific performance, (b) expanding the system of training into a two-step programme (2+2 years, with support to students with better performance in the course of the second step), (c) prioritisation of the tutoring system over school system based education.
- ❖ Establishing a system of exploratory research projects based on the interests of the research organisation and the measurable performance conducted there, but financed with regard to its personnel (doctorands and young researchers). As part of this, supporting the most outstanding young talents who conduct fundamental research mostly in the STEM + IT field, with 10% additional funding compared to the current state financing of higher education.
- ❖ Establishment of an incentive system for the temporary – or perhaps long-term – inclusion of corporate experts in doctoral programmes, as well as in the research of higher education and research institutes, which requires measures at the institutional level.
- ❖ Reinforcement of the research, tutorial aspects of doctoral programmes in place of the contact hour centric content typical of many institutions.
- ❖ Prescribing a higher research performance for doctorands graduating in a doctoral scholarship form, and in conjunction with this, limiting the teaching workload, therefore increasing the proportion of those gaining qualification.
- ❖ To facilitate the gathering of professional experiences, it is supported to attain bachelor, master and doctoral degrees in different institutions in the long term.

3.6 Objective: Renewing the R&D&I infrastructure

Actions:

- ❖ The targeted, planned, efficient use of community resources in convergence regions, and budgetary and Research and Technology Innovation Fund grants in the regions of Central Hungary for the measured modernisation of R&D&I infrastructure. For this purpose, providing infrastructural developments targeting education in HDOP, and infrastructural developments targeting research in EDIOP, launching an independent, scheduled higher education infrastructural development programme based on separate governmental decisions in the Central Hungary Region.
- ❖ Establishment and development of central service infrastructures (National Information Infrastructure Development, Electronic Information Service) using HDOP and EDIOP funds.

3.7. Objective: Reinforcing the industrial connections of higher education institutions, establishment of University-Industry Cooperation Centres

Actions:

- ❖ Establishment of University-Industry Cooperation Centres using EDIOP funds in convergence regions and NRDI Fund grants in the regions of Central Hungary

ACTIONS IN SERVICES OF THE THIRD MISSION

4.1 Objective: Strengthening the influence that higher education exerts on local economic development

Actions:

- ❖ Incorporation of economic players into the strategic decision-making processes of higher education institutions, primarily through organisational and regulatory instruments.
- ❖ Channelling the intellectual potential higher education possesses into designing and implementing the smart specialisation strategy, and the local economic strategies.
- ❖ Securing the participation of higher education institution in the planning and implementation of TOP programmes.
- ❖ Development of the incubation services of higher education institutions using the human resources development funds of HDOP, and ensuring that a connection is established with the economic and R&D development projects of the EDIOP and TOP programmes.
- ❖ Assisting the technology transfer processes of higher education with support from the human resources development funds of HDOP.
- ❖ Increasing the economic revival and regional development role by actively participating in the implementation of the Smart City concepts.

4.2 Objective: Increasing the activity of higher education institutions in managing social challenges and in the spreading of social innovation

Actions:

- ❖ Targeted support, in the form of special programmes and orders, for research intended to answer environmental, economic and social challenges.
- ❖ As regards research topics, future and problem oriented topics, as well as gender issues are to be integrated as focus points or horizontal considerations.
- ❖ The themes of sustainability and reflection on environmental, economic and social challenges are to be integrated, as obligatory elements, into courses through regulatory and developmental interventions.
- ❖ Sample projects are to be initiated in higher education in such fields as the economical and efficient – primary and secondary – use of natural resources (water, energy, raw materials), the scientific modelling of the potential medium- and long-term effects of climate change, with particular regard to its effects on quality of life, the expected performance of agricultural production and the food industry, within the framework of the public institution constructs of the Energy Efficiency OP (e.g. demonstrative passive buildings).

4.3 Objective: Expanding science popularisation, informative and opinion shaping services, and extending free access to higher education knowledge bases

Actions:

- ❖ Active support and expansion of science promotion programmes both within the institutional framework and in cooperation with cultural institutions and public collections.
- ❖ Mandatory inclusion of awareness-raising, demonstrative elements as horizontal element of higher education investments.
- ❖ Launching knowledge base development and expansion programmes as part of the HDOP.
- ❖ Providing infocommunications accessibility as a horizontal element.

4.4. Objective: Creation of modern information content and provisioning of widespread access
Actions:

- ❖ Expansion of educational content created in an electronic format and by building on new methodologies, methodological developments.
- ❖ Inclusion of grants for the coordinated digitalisation of valuable traditional textbooks, periodical publications, educational materials in institutional developments.
- ❖ Establishing a targeted and easily usable service environment for the educational material aimed at students, either proprietary or acquired, as part of the institutional developments.
- ❖ Providing infocommunications accessibility as a horizontal element.
- ❖ Support of the dissemination of research results by utilising increasingly varied channels of scientific communication.
- ❖ Developing an environment to permanently safeguard the results included in the publications, as part of the institutional developments.
- ❖ Developments to manage, publish and safeguard the data, sets of data generated during research.
- ❖ Incorporating activities in the institutional developments that support the generating and providing of science metrics.

Measures of the *Framework strategy for the life-long learning policy in the 2014/2020 period* as well as certain measures of the *Hungarian Digital Education Strategy* are also associated with this objective.

4.5. Objective: Reinforcement of the service provider functions of higher education for both students and local society
Actions:

- ❖ Continuation and expansion of previously started higher education sports development programmes, and, as result, the establishment of a high-quality sports infrastructure and the development of recreational and sports service systems promoting regular physical activity and exercise.
- ❖ Introduction of cultural dissemination activities as horizontal elements to higher education HDOP developments.

- ❖ Promotion of the establishment of “health-enhancing universities” within the framework of cross-sectoral cooperation.
- ❖
- ❖ Encouraging catering services supporting a healthy lifestyle in the premises of higher education institutions.

4.6 Objective: Qualitative and quantitative development of Hungarian education beyond our borders

Actions:

- ❖ A system for the delegation of teachers must be operated in order to solve staff shortages. By introducing scholarships to young Hungarian instructors beyond our borders, the Hungarian government fostered the increase in the number of young, qualified instructors holding a scientific degree in the Hungarian higher education beyond the borders in a medium term (3-6 years). In the followings, the scope of those covered by the scholarship programme needs to be widened with 1-5 year long foreign assignments for associate professors, professors, during which the institutions beyond the borders can employ excellent instructors in the areas where they suffer shortage, in a manner that the affected persons will continue to be full-time employed in Hungary during the foreign assignment, they do not leave to quit their own institution.
- ❖ The cross-border mobility of students pursuing studies in Hungarian programmes should be strengthened and supported with 1-5 month-long terms abroad.
- ❖ Broadening the Hungarian higher education programme portfolio offered in the mother land is also an important task. Taking into consideration the situation of the Hungarian higher education beyond the borders, the reinforcement of the homeland intelligentsia is most effectively supported by broadening the homeland higher education programme portfolio offered in Hungarian, however, this requires a larger number of Hungarian higher education institutions, faculties, departments, instructors teaching (also) in Hungarian, and the development of the off-site programmes of the Hungary-based institutions, covering the shortage areas, in some cases creating new places of programme. While expanding the programme portfolio, special emphasis should be placed on the so-called dual language training programmes provided both in Hungarian and in the state language, of which SEMTE’s dual language legal education in Transylvania provides an excellent example.
- ❖ Regarding education in the mother tongue beyond our borders, it is of utmost importance to widen master level higher education with international master programmes. In and by itself, the quantitative expansion of bachelor studies is not enough for intellectual reproduction, therefore it is necessary to hold master level Hungarian language or dual language courses, in certain cases in cooperation with institutions in Hungary.

INSTITUTIONAL MANAGEMENT AND FINANCING ACTIONS

5.1 Objective: In the financing of training, research and scientific performance, a stable, predictable, task- and performance-based system based on realistic specific cost must be established that can adapt to labour market requirements and the relevant budgetary resources

Actions:

- ❖ The financing of the courses is based on overhead calculation using shared principles, with the sums differentiated for each institution, and corrected based on predefined performance indicators.
- ❖ Autonomous support must be developed, in accordance with the order of financing, for research performance, scientific performance.
- ❖ Budgetary financing provides for the recognised costs of required public services (primarily training, research, public education, health care, cultural services, the protection and maintenance of national values, sports activities, provisioning of dormitories, community involvement, etc.) “ordered” by the state and associated with the activities of the given higher education institution. The financing of public services must cover all recognised costs – calculated using common methodology – incurred in the course of the performance of such activities. Public services to be performed, their respective performance indicators and the principles and methodology of the associated financing must be developed so as to provide for institutions the conditions of secure financial management that is foreseeable at the medium-length and is of the expected quality.
- ❖ Special tasks and tasks with special national economic or social important (e.g. regional role, outsourcing of courses to community-based higher education centre or establishing new branch campuses, priority research disciplines) may receive special grants.
- ❖ A regulatory and control environment must be developed, wherein the stabilisation of the operation, economic management of institutions can be achieved, the dependency of institutions on state and public funds can be decreased, and the conditions necessary for the introduction of new business models can be established.
- ❖ A system of standards must be developed for elements of project-based financing in order to improve the ability of institutions to attract funds on the long-term.
- ❖ The regulatory environment of institutional economic and asset management must be developed so as to ensure that institutions have an interest in significantly increasing the rate of their own incomes and in establishing an efficient economic management system.

5.2 Objective: Constant monitoring of the higher education institutional network, correction towards a hierarchical system of institutions adapted to Hungary's geographical structure which leads to quality improvement and creates competition

Actions: Three areas must be investigated with regard to the spatial configuration of higher education, on the basis of which interventions must be enacted:

- ❖ within the framework of smart specialisation, the potential certain higher education institutions are able to realise when participating in the development of the educational and labour market portfolio of each region (functional urban area, county, region or country),
- ❖ regions covered and not covered by higher education services with regard to catchment areas and actual land use and economic processes,
- ❖ territorial overlap or complementation of institutional profiles and potential realignments and cooperations.

5.3 Objective: Efficient provision of central sectoral services

Actions:

- ❖ Establishment and development of basic infrastructure in accordance with the content of the relevant chapter.
- ❖ Ensuring yearly data integration while including all relevant registries (FIR, AVIR, DPR, HCSO database).
- ❖ Launching a methodological programme with nationwide coverage and HDOP-CCHOP funding in order to provide measurement evaluation systems and career tracking systems centrally.

5.4 Objective The exposure of institutions to resources originating from the EU needs to be reduced, their market-based fundraising ability and social and economic roles need to be improved

Actions:

- ❖ Activities enabling universities to outsource, the reinforcement of fundraising and R&D&I activities, and the development of the human capacities necessary for these purposes must be made commonplace through additional educational capacity.

PRIORITY FIELDS OF STUDY

6.1 Medical, health science and social training

6.1.1. Objective: Increasing the volume of medical science programmes and reinforcing, consolidating and raising the quality of the clinical education base to assist in this purpose

Actions:

- ❖ Establishment of organisational structures in line with international best practices, foundation of medical training centres, if necessary.
- ❖ Doubling the clinical capacities at the four universities affected, significant modernisation of the infrastructure of university clinical programmes.
- ❖ Expansion of educational capacity. This may be implemented by increasing the number of doctors and the number of beds in universities and/or through cooperation with affiliated or teaching hospitals.
- ❖ The organisational and operational framework of the health care provider maintained by the institution must be established.
- ❖ In order to expand the infrastructure of clinical programmes, partial or complete integration of *certain public hospitals* operating in the catchment area of universities offering medical training, thus creating university health care service providers offering the full range of patient care and programme portfolio.
- ❖ Ensuring cooperation between university hospitals (clinics) and teaching hospitals with regard to the field of practical training.
- ❖ Introducing and expanding interprofessional education in the field of study (experiencing what it is like to work in a doctor-nurse team, and practicing teamwork).
- ❖ Reinforcing practical training: expanding skill laboratories and involving them in education in as many disciplines as possible.
- ❖ Application of information technology platforms in theoretical and practical education, research and medicine; increasing the number of online educational (e-learning) materials.
- ❖ Improving student service infrastructure at the four universities in question in order to increase the ability to attract foreign students, as well as to expand medical tourism potential.

6.1.2. Objective: Improving the personnel background of medical training

Actions:

- ❖ Developing a grant system for special medical and pharmaceutical research.
- ❖ Continuous training, at a high professional level, of clinicians acting as instructors in universities and public hospitals
- ❖ Developing a system of evaluation based on objective criteria for clinicians acting as instructors in universities and public hospitals.

6.1.3. Objective: Developing higher education in health sciences, achieving a marketable training methodology that meets domestic needs and foreign demand

Actions:

- ❖ Assigning professional university oversight to vocational medical training.
- ❖ In higher education, the implementation of dual study programmes must be promoted to support health and social work through the inclusion of the social service system (employers) at educational establishments with a background in medical training.
- ❖ Developing the content and methodology of the educational programmes of health science departments, supporting the availability and efficiency of doctoral programmes with regard to instructor staff.
- ❖ Developing foreign language bachelor and master programmes in the health sciences
- ❖ Providing high-level leadership training in the field of health care to adapt to the continuously changing challenges.
- ❖ Regularly increasing the number of those in state scholarship and increasing the subsidised self-financing.
- ❖ University integration of the professional category based further training mandatory for health care professionals, and, in this regard, the continuous support of the development of educational programmes within the framework of annual or biannual development programmes.
- ❖ Supplementing currently existing international, short-term further training programmes with additional Far Eastern, Western European and North American relations.
- ❖ The effects of measures taken with regard to courses in tertiary vocational health science training must be continuously monitored, with special regard to ensuring that the courses are in line with current scientific and technical standards, as well as with the requirements of the health care system; training and content development programmes must also be launched annually and biannually in order to update special thematic areas.
- ❖ Elaborating the network of the human patient simulation system of health sciences and the methodology of the education.
- ❖ Launching of an expanded master model programme covering anaesthesiology, as well as emergency, intensive and perioperative care

6.1.4. Objective: Expanding and developing the adult education and further training activities in health care

Actions:

- ❖ Launching new training courses pertaining to adult education activities in compliance with the provisions of the law on adult education.
- ❖ Organising further training aimed at groups of professions where credits can be earned.
- ❖ Modernising the system of continuous optional and mandatory further training aimed at groups of professions, for professionals with a health science degree, for their familiarisation with modern technologies and procedures.
- ❖ Improving the infrastructural conditions of adult education.

6.1.5. Objective: Reinforcing the Hungarian health industry and expanding the associated pharmaceutical and diagnostics R&D capacities

Actions:

- ❖ Establishment of a single-phase test laboratory, so that part of the medication test procedures currently conducted mostly in Germany and France can be performed in Hungary.
- ❖ Reinforcing the research capacities necessary for manufacturing medical diagnostic instruments in Hungary, integrating the testing of medical diagnostic research and instruments into the training process in cooperation with relevant companies
- ❖ Developing medical information technology: with particular regard to the fields of “big data” files generated in the course of patient care, and to the analysis of epidemiological and pathological data.
- ❖ Developing procedures, instruments supporting modern care technology, with particular regard to home care services and the treatment of chronic diseases.
- ❖ In order to increase patient safety, it is justified to create the foundations for the development of information technology-based wirelessly communicating health documentation (treatment documentation) in addition to modern instruments and procedures.

6.1.6. Objective: Modernising the conditions of pharmacist education and research

Actions:

- ❖ Territorial expansion and modernisation of pharmaceutical blocks.
- ❖ Significant renewal of pharmaceutical teaching and research laboratory staff in cooperation with corporate players.
- ❖ Within a university framework, creating a state-run manufacturing capacity to the extent required by strategic, military and national security drug manufacturing.
- ❖ Gradual increase of the number of students granted state scholarships.
- ❖ Launching pharmacovigilance and EU inspector postgraduate specialisation programmes in cooperation with the National Institute of Pharmacy and Nutrition [OGYÉI, that is the Országos Gyógyszerészeti és Élelmezés-egészségügyi Intézet] and the European Medicines Agency (EMA)
- ❖ Increasing opportunities for the replacement of retiring professionals and providing a professional background with regard to the European Medicines Agency’s (EMA) expected move to the continent

6.1.7. Objective: Ensuring the adequate geographical coverage of courses in the field of social care, ensuring that such courses can meet continuously evolving challenges in a practically oriented manner, and increased inclusion of ecclesiastical and civil organisations

Actions:

- ❖ In the case of social care training and auxiliary professions, ensuring full geographical coverage
- ❖ Perfectly aligning the vocational training system of social care training and auxiliary professions with higher education programmes.

- ❖ Improving the prestige of social education and auxiliary professions, attracting people interested in the field.
- ❖ In the social field, providing high-level leadership training in order to adapt to the ever-changing challenges.
- ❖ Integration of local problems into the course and the skills development in the course of the conversion of the educational content.
- ❖ Enhancing the education of community organisation, remedial training, mobilisation and social trust reinforcement skills in social care training, with special regard to local needs and the third mission related activities of the institution providing the training
- ❖ Regularly increasing the number of those in state scholarship and increasing the subsidised self-financing.
- ❖ In the case of social and care professions, establishing a priority system of grants for retraining.
- ❖ Actively and formally involving the social services and the church and civil organisations operating in the area in the provision of the training programmes.
- ❖ Launching the related training and content development programmes published annually or biennially in order to update the specialised subject fields.

6.2. Natural sciences, technical and IT training

6.2.a Objective: Providing an input of adequately prepared students for STEM + IT training courses in order to increase students' success

Actions:

- ❖ Qualitative development of secondary school natural sciences education: through the reconstruction of the syllabus, the development of textbooks and teaching aids, the expansion of experimental opportunities available within classes, asset development. Ensuring that what the students learn in class is fully connected to the realities surrounding them.
- ❖ Priority support of natural sciences teacher training (already started) in order to stop the rapid decrease in the number of secondary school teachers and to increase the quality of the teaching staff. Further training of the instructors already working for the more widespread application of innovative pedagogical methods, and for updating professional knowledge.
- ❖ In the medium term it is recommended to introduce the mandatory requirement of an advanced level secondary school graduation examination in one subject related to the training.
- ❖ Providing preparatory courses for students interested in joining courses on natural sciences. A kind of basic training to ensure successful graduation and the decrease of later attrition. (The introduction of a preparatory "grade 0" as a form of training, developmental training, 60-180-hour courses that bring together practical training methods for STEM studies)
- ❖ Continuing the Bridge to the world of higher education [Híd a felsőoktatás világa felé] grant programme with support for socially disadvantaged students from public funds.

6.2.b Objective: Providing applicants for STEM + IT courses in sufficient numbers to generate a graduate output satisfying the needs of the economy and science for qualified professionals

Actions:

- ❖ Implementing science promotion and awareness-raising activities in order to increase willingness to apply for STEM courses. Organising career orientation programmes to introduce and popularise natural science, technical and information technology professions and research careers among secondary school students.
- ❖ With regard to the previous item, it is especially important to encourage application for STEM fields of study among student groups with previously low willingness to apply in these areas. For this purpose, talent development and communication, orientation programmes will be launched, targeting as young as the 10-12 age groups.

- In the case of the IT and technical fields of study, the participation of women is significantly lower (a total of only 14% and 24%, respectively)³⁸ than that of men. To involve talented women in these two fields in higher numbers, it is justified to support the involvement of women.
- Students with territorial and/or social disadvantages apply for STEM + IT courses at typically lower rates than their peers without disadvantages.³⁹ Due to a kind of self-selection mechanism, as soon as the application stage, they show more willingness to apply for fields of study with “lower statuses” and fewer opportunities on the labour market. To remedy this, these groups should receive support to elevate their aspirations for STEM + IT fields.
- ❖ Intensive support of secondary school talent management in novel ways, such as, for example, (a) the expansion of the “Student Researchers” (“Kutató Diákok”) movement to 3-4 weeks long summer internships, where students become familiar with the details of scientific fields in the course of 15-20 days of intensive work; or (b) the creation of employment opportunities in community service within institutes engaged in STEM scientific fields (organisation, cleaning, maintenance of equipment rooms, collections, exhibitions, laboratories).

6.2.1 Natural science education

6.2.1.1. Objective: Increasing the standard of bachelor and master programmes in natural sciences

Actions:

- ❖ The number of contact hours for students of faculties of natural sciences must be significantly reduced, with more independent tasks (“project work”) in their stead. On the instructors’ side, not less, but more types of tasks (master-pupil relationship) are required than performed today. In the course of project work, students are familiarised with research methods, while also actively contributing to the university’s scientific research. Spreading team-based and pair work, applying modern pedagogical principles in education and testing.
- ❖ The additional costs deriving from the nature of natural science education (practical training, laboratories) need to be taken into consideration. Realistic prime costs should be calculated to this end. Encouragement to use the existing laboratory assets more intensively, emphasising the practical side of training.

³⁸ The 2014/2015 academic year, based on HEIS data

³⁹ László Kiss (2013), The enrolment strategies of applicants from disadvantaged subregions [A hátrányos helyzetű kistérségek jelentkezőinek jelentkezési stratégiái]

- ❖ Protection of the educational portfolio. Courses within faculties of natural sciences must be well-founded, and must include material concerning related fields at an appropriate level. For this reason, a full spectrum of natural sciences education is necessary at the places of programme.
- ❖ Protecting majors with small headcount. In the case of certain majors, it is particularly true that although they are essential, only the training of a very limited number of students is actually necessary (e.g. meteorologist, astronomer). These programmes require a special financing structure.

6.2.1.2. Objective: Improving PhD programmes: internationalisation, reinforcing the scientific character, establishing a systematic system of pre- and postdoctoral grants

Actions:

- ❖ Getting ahead in international competition. Grants to non-domestic doctorands, students with great talent should be attracted from the Carpathian Basin, and even from further away, and, in addition to high-quality English language training, they should be involved in intensive research work, too.
- ❖ Less attendance, more credits awarded in the organisation of the programmes.
- ❖ Improving the methodology of doctoral programmes, implementing a module-based curricular reform.
- ❖ Encouraging professional cooperation of doctoral schools.
- ❖

6.2.1.3. Objective: Increasing research effectiveness

Actions:

- ❖ Making the postdoctoral system of scholarships universal, encouraging postdoctoral and instructor positions to be awarded based on tenders. Providing increased remuneration to the best of the instructor-researcher staff based on objective assessment.
- ❖ Establishing a system for considering the duration of the student status of doctorand students for periods of service.

6.2.1.4. Objective: Reinforcing industry relations to allow university scientific achievements to reach the application phase as early as possible

Actions:

- ❖ Stimulating direct industrial relationships and industrial-economical education, where relevant.
- ❖ The researcher training must include familiarisation with the industrial research environment, too, on the one hand, to satisfy the workforce demands of industrial research establishments, and so that every graduate will be familiar with the culture of industrial research/development that is different from fundamental research.

- ❖ Establishment and reinforcement of technology transfer offices, as the industry increasingly relies on the academic sphere in its research.

6.2.2 Technical training

6.2.2.1. Objective: Renewing the structure of bachelor and master programmes in the technical field of study

Actions:

- ❖ The “top heavy” nature of bachelor programmes should be mitigated, i.e. teaching material should be modified to eliminate the exclusivity of professional foundation subjects in the beginning, and spread them more evenly in the programme plan to reduce attrition.
- ❖ Fostering harmony among the bachelor and master programmes built upon one another through the supervision of the syllabuses.

6.2.2.2. Objective: Creating and regulating a new partnership between higher education institutions and companies employing graduate students

Actions:

- ❖ Elaborating regulation that encourages a new partnership between companies and higher education institutions.
- ❖ Developing and spreading the dual education system. Involving new partners. Based on experiences from earlier years, fine-tuning the structure and content of education, improving the organisation of the programmes. Permanent quality control regarding the existing dual study programmes.
- ❖ Elaborating the details of involving practical experts into education: what is the participation rate and the pool of knowledge with which they can help technical higher education, this should be taken into consideration during the adequacy check of the courses by HAC.
- ❖ Elaborating and applying an effective and mandatory system of further training for graduates in technical fields.

6.2.2.3. Objective: Increasing the efficiency of teaching methods in the technical field

Actions:

- ❖ Reducing the number of weekly face-to-face lessons, increasing the ratio of independent work.
- ❖ Assisting participation in foreign language courses, in exchange programmes, supporting mobility.
- ❖ Encouraging and supporting the launching of master programmes in a foreign (primarily English) language and / or as a correspondence course.
- ❖ Development of regulation considering the special qualities of interdisciplinary courses.

6.2.3 IT training

6.2.3.1. Objective: Meaningful revision of the programme and outcome requirements of IT bachelor programmes in view of industry trends, domestic corporate demands and international experiences

Actions:

- ❖ Within the IT bachelor programmes, the weight of the subjects that have an attrition effect must be reduced. In the semesters following the basic training, highly gifted students may be granted access to the advanced level mathematics, physics, etc. knowledge, which will enable them to develop broad-minded perspectives, research skills.
- ❖ Practical projects must be present in syllabuses as soon as the first year. On one hand, this motivates more practically-minded students, on the other, it channels some of the energy spent on at-home study and private projects back to institutions.
- ❖ Students affected by attrition require tertiary vocational programmes, which prepare them for web/hardware maintenance tasks not requiring deep mathematical and statistical knowledge, and which enable them to successfully finish their bachelor studies.
- ❖ Establishing a wide range of optional subjects from the first year. To this end, the teaching staff need to be diversified with inter-institutional partnerships and partnerships with research institutes and the industry. The expensive and legally cumbersome inclusion of instructors can in part be replaced by MOOC programmes.
- ❖ Specialisations must be developed based not on traditional hardware-software logic, but rather on competence analyses or even higher abstraction layer considerations (e.g. human-machine interaction).
- ❖ In the period of specialisation, average performers should be offered dual study programmes, outstanding performers should be offered innovation laboratories and business incubators.
- ❖ In addition to the syllabus and programme structure, the examination system must also be modernised in order to ensure that students are able to acquire the competences necessary on the labour market with a high level of understanding.

6.2.3.2. Objective: Regular revision and updating of the material assets of IT training. Ensuring to keep pace with the change of technology, avoiding teaching and research on outdated technology

Actions:

- ❖ Due to the special nature of the field, IT training courses are especially sensitive to the stoppage of investments, which has been in force for years, therefore, it is justifiable to suspend the prohibition.
- ❖ Development resources should be provided to regularly upgrade the equipment of institutions conducting training in the field of IT (including software and IT services).
- ❖ Corporate investment and sponsorship should be encouraged in support of the asset procurement of higher education institutions.

6.2.3.3. Objective: Improving corporate relations, reinforcing cooperation with industry players in the field of both training and research

Actions:

- ❖ Developing and spreading the dual education system. Involving new partners. Based on experiences from earlier years, fine-tuning the structure and content of education, improving the organisation of the programmes. Permanent quality control regarding the existing dual study programmes.
- ❖ Encouraging research cooperation between the corporate and academic sectors, providing development funds that can be drawn jointly in order to generate interest.
- ❖ Establishment and reinforcement of technology transfer offices, as the industry increasingly relies on the academic sphere in its research.

6.3 Economics education

6.3.1. Objective: Widening the portfolio of economics master programmes in cooperation with local employers regarding programme financing as well as the content of practical training and its implementation

Actions:

- ❖ Regular revision of the development programme of the master programme portfolio adjusted to local labour market demands in terms of content, launching new specialisations.
- ❖ Establishing the possibility for highly-experienced professionals from the market who have no academic career background to have instructor status.

6.3.2. Objective: Utilising the opportunities offered by internationalisation, reinforcing competitive, foreign language economic training programmes primarily in master studies

Actions:

- ❖ Promotion of foreign language education development, content development.
- ❖ Launching online foreign language education programmes at special institutions.

6.3.3. Objective: Reinforcing an intensified role in economic postgraduate specialisation programmes and adult education in coordination with employers

Actions:

- ❖ Accurately defining the field-specific role of economics higher education institutions in further training and adult education, and establishing the associated conditions it requires.
- ❖ Promotion of structured, target-oriented forms of cooperation with employers.

6.4. Agricultural education

6.4.1. Objective: Increasing the prestige of and popularising the forms of livelihood associated with agriculture; increasing the proportion of the applicants for agricultural higher education compared to the total number of applicants in the medium-long term to 10%

Actions:

- ❖ Creating and circulating a handbook for communication campaigns aiming recruiting and image-building among the PR and communication employees of the affected higher education institutions.
- ❖ Supporting communication campaigns aiming at popularising agricultural higher education programmes, facilitating cooperation between the Hungarian Chamber of Agriculture and higher education institutions.

6.4.2 Objective: Introducing new dual study programme forms - proportionate to increasing foreign demand -, expanding foreign language programmes

Actions:

- ❖ Tracking the introduction of the agricultural engineer course, reinforcing agricultural bachelor studies, and the specialisations within, and also the practice oriented nature of tertiary vocational programmes.
- ❖ If there is increased interest among foreign students: expanding the foreign language agriculture programme portfolio.
- ❖ Broader introduction and expansion of dual study programmes in the field of agricultural higher education.

6.4.3 Objective: Reinforcing agricultural education centres, clearly designating the profile of existing places of programme, rational, structural and sectoral merger of individual places of programme

Actions:

- ❖ Reinforcing the agricultural centres professionally, and to concentrate the programme portfolio.
- ❖ Determining regional specifications, and the profile realignment of the affected institutions on the basis of this.

6.5 Teacher training

6.5.1. Objective: Continuing the renewal of teacher training, with special regard to the renewal of its content and methodology, with the application of modern, pedagogical methodology instruments (complex basic programme)

Actions:

- ❖ Leaving the currently effective programme structure intact until 2020, when the students graduating from the new single-cycle long teacher training (and the new, single-cycle long form of programme) can be assessed:
 - after the phase-in of single-cycle long teacher training, initiating a parallel accreditation in cooperation with the Hungarian Higher Education Accreditation Committee;
 - in addition to the relevance of a scientific degree, reinforcing the involvement of instructors with professional experience in the training in practical studies;
 - in the training element of teacher preparation, reinforcing the task division of organisational units with pedagogical function, practice institutions providing professional practice, partner institutions.
- ❖ The conditions should be created for the practice year to be financed by the students.
- ❖ During the realignment of institutional profiles, the activity and programme portfolio of institutions conducting teacher training should be revised, further improving the conditions of training. In order to decelerate the assimilation process of domestic ethnicities, ethnic teacher training should be supported and the efficiency of teaching ethnic languages should be increased.
- ❖ Determining the tasks of higher education institutions in teachers' further training:
 - compiling a centrally-determined, listed, mandatory further training register of the courses offered by the teacher training establishments operating in the region – in cooperation with the locally competent teacher training centres of the Education Authority,
 - creating an optional, upgradeable (elective) teacher training portfolio in a network cooperation of teacher training establishments and public education institutions, potentially project-based;
 - reviewing the system of postgraduate specialisation programmes and the teacher certification exams with the purpose of aiding preparation for career phases, public education duties;
 - priority support to public education leadership training with system-level sector management, financing and organisation development knowledge, leadership knowledge, continuous professional development for leaders and would-be public education leaders.
- ❖ Renewing and emphasising the methodology training module of teacher training, by supplementing it with the elements of modern pedagogical methodology instruments (complex basic programme) and preparing for improving the digital competences of students, including the methodology training of the instructors in higher education institutions providing teacher training

6.5.2. Objective: Developing a system-level relationship between higher education and public education by establishing a partnership between the two branches of education; in relation to this, professional development of teacher training higher education institutions, increased involvement of church and civil organisations

Actions:

- ❖ Determining the tasks beyond higher education programmes in the cooperation of public education and higher education at system level. The management functions related to new tasks should be limited, having regard to the professional service tasks of the Pedagogical Education Centres of the Education Authority (EA-PEC).
- ❖ In addition to the central coordination of teacher training institutions appointed for priority projects, a possibility should be provided to every teacher training institution to participate in regional further training.
- ❖ With regard to the different budget support of education sectors, the financing of tasks carried out in public education should be provided to the teacher training segment of the higher education sector, with special regard to the task that the teacher training institutions and their instructors should better familiarise themselves with the world of public education institutions (nursery schools, schools) and deal with relevant issues of pedagogy, public education institution development and teachers' further training.
- ❖ A new system of further training for teachers should be created with established financing conditions, determining the role and spheres of competence of the places of programme. Churches and teacher training establishments should be involved in the following public education tasks:
 - regular revision and adaptation of teacher training, teachers' further training based on the experiences of teacher qualifications, institution development activities and teachers' further training;
 - training the attending mentors of the partner institutions participating in related public education practice of students;
 - in connection with the professional practice of the training, professional support in the task performance of lead teachers of practice institutions, attending mentors of partner institutions, and, during the employment, the teachers mentoring the apprentice teachers in the public education institution, collecting the comments related to teacher training, and, on the basis of this, improving teacher training;
 - professional support to research teacher and master teacher roles (supporting, lead consultant and innovator master teachers), supporting subject-related consulting;
 - providing scientific, methodological support at system level to master teacher consultants;
 - regular further training and peer-learning for professional consultants with the purpose that the best institutional practices and new scientific knowledge that can be utilised in education and training be implemented with the support of the professional knowledge of the higher education institutions;
 - in the schools in the area of authority of a specific teacher training institutions, active participation in the development of public education institutions performing below average in the national competence assessments, with the coordination of EA-PECs;
 - providing relevant teacher further education programmes to the public education sector based on the preliminary needs surveys of EA-PECs, the policies of the state

- education management, and scientific novelties and education innovations, with the inclusion of ecclesiastical and civil organisations;
- involving the persons working in public education and contributing to teacher training (mentors, practice school lead teachers, attending mentors, apprentice supporting mentors) and ecclesiastical and civil organisations in the following tasks:
 - methodological activity in teacher training,
 - participation in the institutional development of public education institutions supported by teacher training establishments,
 - participation in the regular revision of teacher training.
- ❖ As regards the first employment of teachers graduating from single-cycle long teacher training programmes and acquiring teaching qualifications, if the teaching job is established directly after graduation, a legislative amendment must be adopted – with regard to the recognition of acquired professional practice – to recognise any practice acquired while having a student status.

6.5.3. Objective: Creating teacher training development and adaptation tasks, organisational responsibilities, methodology at institutional level

Actions:

- ❖ The task performance of teacher training centres requires a matrix organisation in which the leader of the teacher training centre is provided the right and responsibility for coordinating the content and organisation of teacher training.
- ❖ For the central coordination of teacher training institutions appointed for priority projects, a service provider public education institution should be established next to the teacher training centres to coordinate the tasks of teachers' further education in these higher education institutions.
- ❖ it is necessary to further develop the institution of the Klebelsberg Training Scholarship, and to connect and prepare the subsequent tracking thereof, and the system-level territorial signals of specialised teacher shortage emerging in the coming decades and the possibility of supplying new personnel - the institution of the Klebelsberg Training Scholarship.