Shifting of Gears in Higher Education Mid-Term Policy Strategy 2016

Action Plan 2016-2020.

MINISTRY FOR
INNOVATION AND TECHNOLOGY

Shifting of gears in higher education mid-term policy strategy
ACTION PLAN
2016-2020

Contents

1. Executive summary

In the past 25 years, Hungary paid the decades long debt of higher education to society. Access to higher education widened, groups excluded from education in the previous decades could acquire their desired qualifications, freedom of teaching became a reality, the institutional system and programme structure of the unified Hungarian higher education were created, the unity of education and research was restored, and a need to improve quality in higher education appeared. In one word: a change of regime in higher education was concluded.

Transforming higher education is a complex task and also enormous responsibility, since its significance is undisputable both from social and economic aspects. We are standing at the beginning of an era where the necessary financial conditions are available so that by using the available resources efficiently, with unchanged state participation, while attracting external additional funding, the domestic system of higher education can stand on its own feet. By 2030, we could see the realisation of a higher education that relies on firm foundations, not only using merely community funding, which will be able to finance its activities by attracting external sources, thanks to quality education and competitive training.

Nevertheless, it is not only the increasing scarcity of funds, but also the megatrends seen globally - globalisation, fast-paced technological change, demographic processes and changing social requirements - also pose a challenge to higher education. The system has to simultaneously adapt to economic and labour market demands, expectations surfacing as a consequence of aging society, as well as research-development and innovation processes.

The transformation of higher education therefore aims at nothing else but to create a more structured and organised system of higher education in the following decade that corresponds with the long-term economic and social objectives defined by the Government. The path to the economic and social welfare of the country is through quality education, for which the only possible way is increasing performance, and the creation of a genuine competitive situation, in other words, "the shifting of gears in higher education". The key words of the higher education of the future: competition, quality, performance and success.

By 2030, a system of higher education will have to be created where the available state funds can be focused in demonstrably strong areas in international competition, i.e. the sectoral approach that has proven itself in economic policy will have to be adapted to higher education, too. A key to quality education is differentiation, which, however, will also need to be applied, in addition to the fields of study, in terms of the profile of higher education institutions and the ability of students, too. In the future, every university and college will need to focus on its own, clearly defined field of study, i.e. institutions will need to have a solid programme profile and will need to provide world-class education in the fields they represent. Contributing to this fact is the cession of unnecessary rivalry among institutions, replaced by a healthy competition between training programmes and therefore the higher education institutions of the country will be able to cover any and every field of study and level of knowledge.

Differentiating between the performance of the students is just as important. More motivated and more resilient students will need to be provided the possibility to advance in their studies while inspiring each other, i.e. those making a greater effort will in return be rewarded with higher quality education. Applying this principle will mean that every student will be provided the training suited to his or her abilities, which, in addition to having more motivated and successful students, will decrease attrition rates, too. In parallel to this, a solution needs to be found to improve the competitive status of less advanced regions: permanent marginalisation of less developed regions may be prevented by introducing a new form of institution, community college. Introducing the programme model of community colleges will mean that communities in less developed regions may also have access to that competitive knowledge that will enable them to succeed primarily in their local environment. Higher education indeed has a prominent role in terms of social mobility, too, but its mission also involves providing knowledge to students which has relevance in the labour market and research results have utility both for society and for the national economy. The higher education that is needed is one where the knowledge providing adequate foundations for succeeding in a knowledge economy is widely available and is of high quality.

An institution system will need to be created where every student is able to develop his or her own talents, skills, knowledge, and do this in a manner that by graduating from the programme they will be able to enter the labour market. For this purpose, training programmes will need to be adjusted to the genuine needs of the labour market, as this is the only way for higher education institutions to be able to acquire a prominent role in economic development. It is necessary to make that knowledge widely available and in high quality that will provide adequate basis to succeed in the domestic and international economies, in other words, the skills required by society and the economy must be synchronised with the knowledge base provided in bachelor studies.

Finally, research and development, innovation play a significant role in the future of both higher education and our competitiveness, therefore particular focus must be placed on Hungarian higher education to be able to make a stand in the international education and research space. For this purpose, it is necessary, among others, to increase the capacity of doctoral programmes, and, in parallel to this, to increase the graduation rates. Expectations defined by economic partners and companies must also be presented in the system, while it must be ensured that the small and medium enterprises also have access to the results of research and development and innovation offered by higher education institutions. By concentrating research and development activities, certain fields will be able to attract the most outstanding international talents to Hungarian institutions, while fundamental research carried out in Hungary will catapult our scientists in the global elite once again.

To sum up: The key to the development of Hungary is having a domestic higher education of adequate size and quality that is able to respond to both social and economic challenges. Everything that is required for the fulfilment of our ambitious goals is available in Hungarian higher education. The task for the next decade, therefore, will be to use our strengths, opportunities, resources and existing experiences to create the most outstanding system of

higher education in the region which is centred on performance, high quality, competitive knowledge and the joint success of instructors and students.

2. Introduction

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 are highly recognised in the labour market.

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 government incentives are also necessary to help institutions, while the role of the government slightly increases despite the declining student numbers, so that they can supplement community resources by attracting external resources gained from their operations.

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.

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 genuine requirements in the light of the experiences of the past decade so that Hungarian higher education can become 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.

Government Decision No. 1785/2017 (XII. 16.) on approving "Shifting of gears in higher education mid-term policy strategy 2016" defined the development goals, directions relating to higher education, this action plan contains the actual measures and tasks for the three years, with the allocation of the necessary funds and by presenting the responsible parties and the deadlines.

3. Situation report, target group

3.1. 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. 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**.

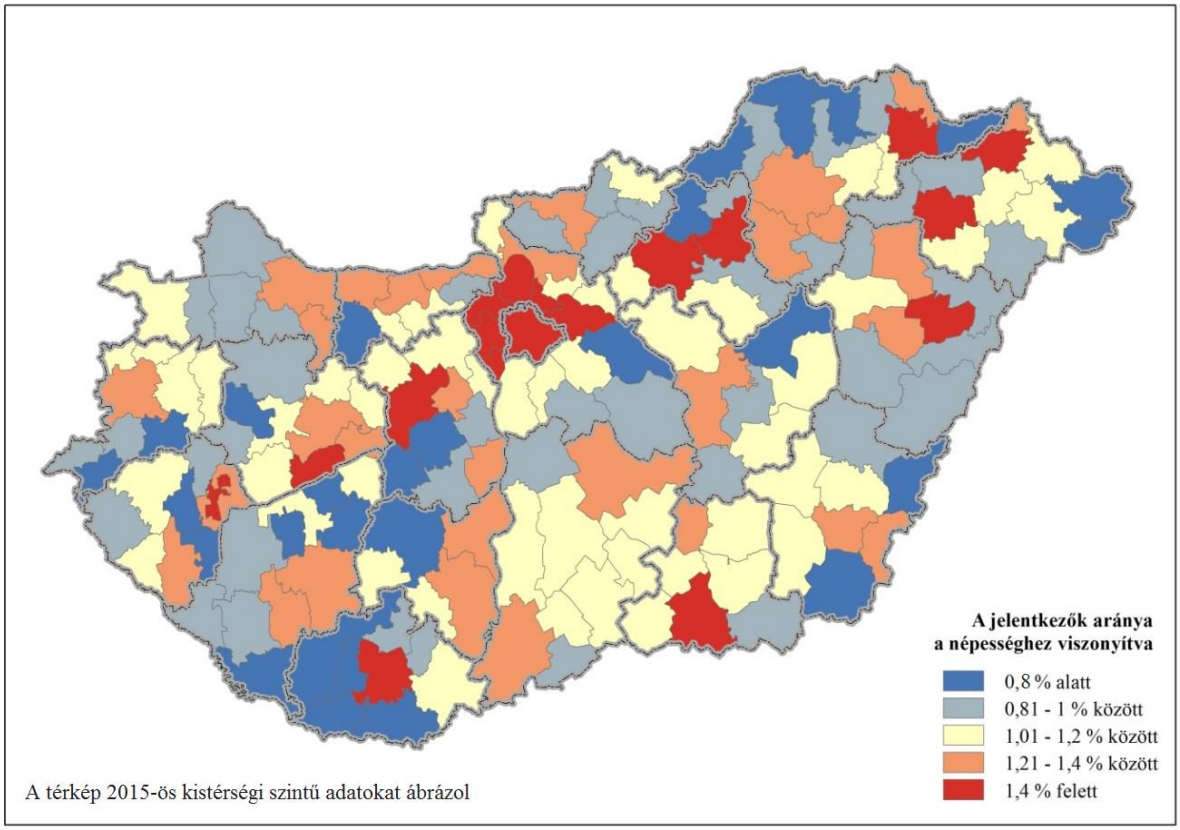
3.1.1. Demographic indicators – social mobility of disadvantaged groups

During the restructuring of higher education, attention must be paid to another problem also related to enrolment numbers. In recent years, higher education has also come to face the **reduction in numbers** due to the drastic decline in the number of births earlier: while according to HCSO (Hungarian Central Statistical Office) data in 1 January 2010 the statistical headcount of the 18-year old age group was 126,360 persons, by 1 January 2015 the headcount of this age group dropped to 110,440, which is a decline of almost 13% in a matter of 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. In parallel with this, Hungary has seen a continuous rise in the number of those with tertiary qualification in the 30-34 age group, and the national target of 34% determined in the Europe 2020 Strategy was exceeded in 2015 with the figure of 34.3%.

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. It is a fundamental expectation towards education at any level to support social mobility, and consequently, during the transformation of the higher education institutional system special attention must be paid to ensuring availability everywhere.

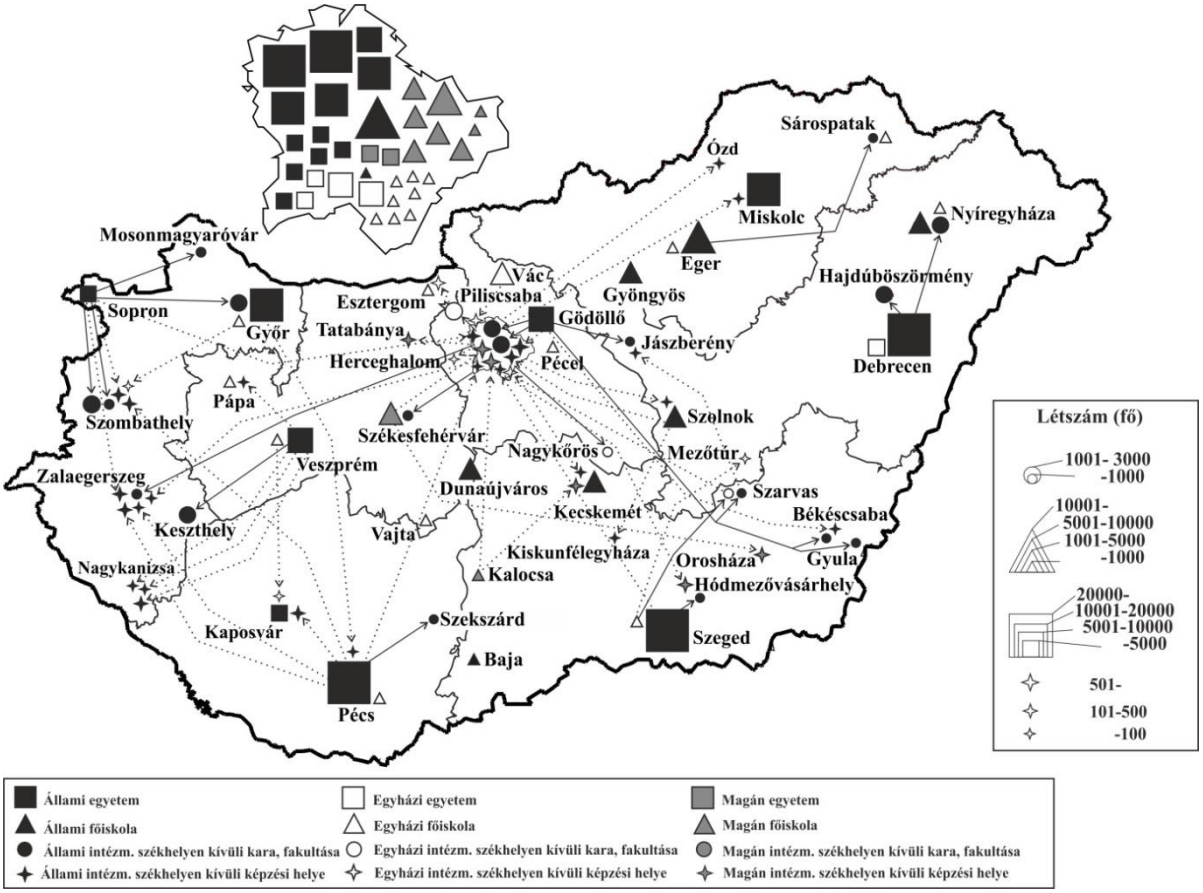
Examining the relationship between territorial disadvantages and participation in higher education in Hungary, it can be concluded that the place of residence and its characteristics, but mostly its location, have a significant impact on the willingness for enrolment application. While there are ample 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 configuration.[1]

[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 in Eger and Károly Róbert College in Gyöngyös merged as Eszterházy Károly University, Kecskemét College and Szolnok College merged as Pallasz Athéné University, the Mosonmagyaróvár and Győr faculties seceded from the Sopron-based University of West Hungary and were moved 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, Nagyvárad,

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.



Higher education has a dominant role in the less advanced regions of the country where the demand for social mobility and economic development appear in conjunction. 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 status of the less developed regions, by introducing the institution of the **community-based higher education centre**, the communities in the convergence regions can also access the competitive knowledge that allows them to find prosperity primarily in a local setting and offers competences in adequate quality that form the basis of successfully participating in the knowledge economy.

Szabadka and Zombor on the map would somewhat improve the situation, it would modify the framework of the analysis.

It is a fact that family background has a major impact on the academic progress of students. 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. 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. 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. Based on these reasons and causes, several initiatives have been launched - aligned with the public education system - such as the Biztos Kezdet Gyerekházak (Safe Start Kids' Houses network), Tanoda (charter school) programmes, Romani adolescent girls' programme, which help/support the academic performance of socially disadvantaged children - and in relation to this, improve their opportunities and chances to continue later into higher education.

The proportion of Roma holding a tertiary qualification - although showing a significant improvement - stills falls behind the proportion of the whole population. According to HCSO (Hungarian Central Statistical Office) census data for 2001 and 2011, the proportion of those holding a tertiary qualification in the whole population among those at least 25 years old is 12.6%, and 19.0%, while in the case of Roma it is 0.8% (2001) and 1.6% (2011). Regarding Roma participation in higher education, it must be noted that their number has doubled in the recent years, however, it is especially true that the pool of potential applicants that may be provided by those with a secondary school graduation examination certificate cannot be overseen. Based on census data, in 2001, 3.3% of the Roma population above the age of 18 had a secondary school graduation examination certificate, and this figure was only 7% in 2011 (while similar figures for the whole population were usually 38.2% and 49%). 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. As part of the inclusion policy, we must highlight the Útravaló Ösztönprogram (Útravaló Scholarship), including the Út a Diplomához (Journey to a Degree) subprogramme, and the Roma college system comprising a nationwide network.

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. Act CCIV of 2011 on National Higher Education stipulates that equal opportunities be created in higher education for persons with impairments.[2] As of 1999, a supplementary subsidy must be provided to higher education institutions for students with impairments. The amount of this greatly increased between 2015-2017. Higher education institutions must appoint a disability coordinator as of 1 September 2002 in order to provide the conditions ensuring equal opportunities necessary for students with impairments to pursue their studies. The current goal is to implement the measures supporting the admission of secondary school students with impairments to higher education by improving access to higher education programmes and increasing participation in education.

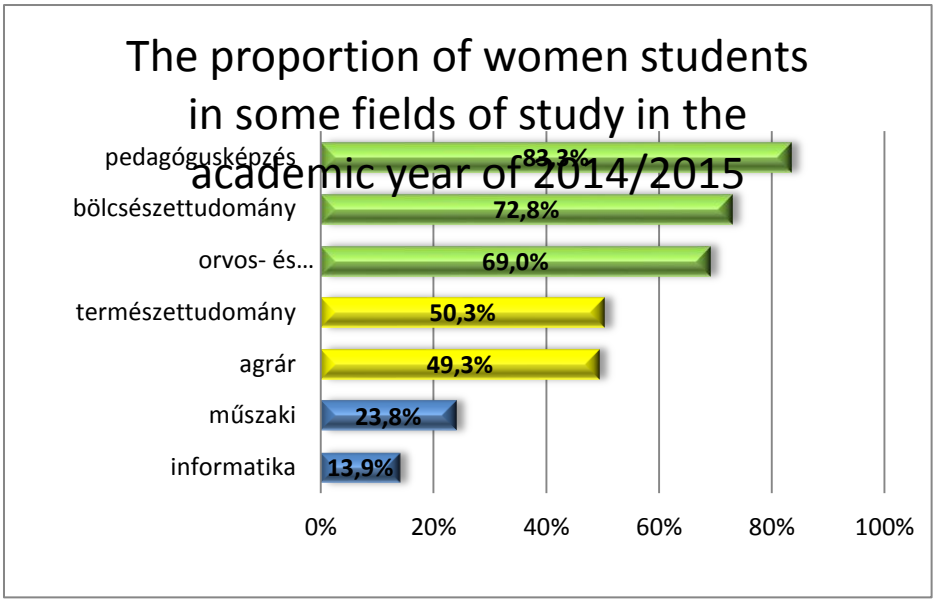
Regarding the infrastructural developments in higher education, it is a horizontal requirement to consider the needs of impaired persons in the design of facilities, use of space, communications connections - including physical and infocommunications accessibility. The disability coordinator is responsible for procuring the material instruments facilitating the studies of students with impairments at institutional level.

In Hungary, **equal access of women to higher education** is ensured, they have been the majority of students since the academic year of 1993/1994, therefore general inclusion data do not show any signs 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

[2] - For the purpose of Section 41(1), the Government shall ensure equal opportunities for the group of applicants with impairments during the higher education admission procedure and in their higher education studies.

- Having regard to Section 47(4), as of 2016 the higher education institution may extend the supported period of students with impairments by up to four semesters, and this benefit can be used to attain more degrees (diplomas).
- For the purpose of 49(8), students with impairments must be provided preparation and exams adapted to their impairment, and furthermore, they must be provided assistance in fulfilling their obligations arising from their student status. In justified cases, they shall be exempted from the obligation to study certain subjects, fields of subject or the obligation to report. When necessary, they must receive exemption from language exams or a part or the level thereof. During examinations, longer preparation time shall be allowed, in written testing the use of technical aids - especially typewriter, computer - shall be permitted, when necessary, written testing shall be replaced with oral testing or oral testing shall be replaced with written testing.
- Chapter 20 of Government Decree No. 87/2015 (IV. 9.) on the implementation of certain provisions of Act CCIV of 2011 on National Higher Education details the measures applied in order to facilitate the equal opportunities of students. Section 62 lists in separate clauses the scope and conditions of benefits that can be provided to students with physical impairment, hearing-impaired, visually impaired, speech-impaired, mental development disorders and autism. Based on this, applicants with impairments are entitled to the same benefits during the application procedure as the ones they were entitled to pursuant to the legislation on public education. In addition to this, in order to ensure equal opportunities, persons with impairments applying for higher education are entitled 40 extra points.

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 significant majority of women among those with tertiary qualification for decades, in the higher degrees of scientific hierarchy women fell behind men. 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.

Regarding the academic teaching staff and career advancement, the attainment of goals may be ensured by extending **part-time employment** or expanding the number of **child-friendly positions**, as well as the related infrastructural and organisational developments.

3.1.2. Attrition

Regarding the phenomenon of attrition, we can state that advancing students admitted to higher education until qualification is an ongoing task for the Hungarian education system, although the trend seen from the data in the **Higher Education Information System (FIR)** is clearly improving. 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. Seeing the Hungarian data in an international comparison, it can be stated that domestic figures in terms of attrition are of higher by an order of 10 percentage points compared to the average figure of 25-30% in the EU Member States, there is therefore meaningful potential to increase student success with interventions aimed at reducing attrition.

3.1.3. New research personnel

Regarding the indicators that measure the innovation capacity of countries, the number of PhD degrees in the 25-34 age group in the field of **doctoral studies** is 0.8 for one thousand residents annually, while the EU average is 1.69. Since 2008, the number of students achieving PhD degrees has been around 1200 annually, this number, however, is not sufficient to supply new researchers and teachers in sufficient numbers or to improve the international competitiveness of Hungary. 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.

3.1.4. 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. The mobility of Hungarian students travelling abroad has been improving since 2012. 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.

3.1.5. 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 responsibility of the government lies in creating an organised and managed higher education system that is in line with strategic goals.

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 can clearly be seen, though, that the growth of the Hungarian economy is inhibited - primarily in the fields of engineering and information technology - by the shortage of professionals in certain fields of study, while there is unreasonably high interest towards other programmes - especially in certain economic and humanities fields - that is not justified by labour market prospects. 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. 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. The competences that describe the general characteristics of the qualification levels (i.e. which are valid for every programme at a specified level) attainable in tertiary vocational, bachelor and master programmes include - inter alia - the competences of critical thinking, independent but cooperative problem-solving, civic knowledge, digital literacy and foreign language competences, ability, attitude, autonomy and responsibility. The characteristics of the common module of tertiary vocational programmes define further particular transversal competences and skills.

3.2. Launching a dual education system

In the higher education system, good international and domestic experiences and increased demand in the labour market justified, in addition to practice-oriented training, that **cooperative training**, a special form of practice-oriented training carried out with the involvement of economic entities in the system of training, be further incentivised by the government, and, to facilitate this, that the possibility of **dual study programmes** as defined by Act CCIV of 2011 on National Higher Education be introduced and regulated. 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.

3.3. 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 costs levelled out, companies increased their spending in this field until 2012 at an annual rate in excess of 10%, underpinning the fact that Hungary has been transitioning from being a manufacturing centre of the region producing conventional products towards 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. When designing and selecting the higher education R&D&I developments and tender structure, the National Smart Specialisation Strategy (S3) also needs to be taken into consideration, which determines sectoral priorities for the support of the domestic research, development and innovation activities.

In the field of higher education R&D&I, however, several areas in need of development can be identified. 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.

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.

4. Strategic goals

The economic and socio-political objectives of the government set high quality standards to the higher education institutional system, and, as a result, performance-driven approach gains major emphasis in higher education, too. The goal of the government is to have a system of higher education that is highly positioned in the international educational and research environment, is able to respond to social challenges, determines the economic success of our country, one that is driven primarily by competition. Raising the standards and competitiveness will only be accomplished if society imposes higher expectations towards the whole of the system of higher education.

As result of the measures to be performed in higher 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;
- students and graduates from STEM + IT programmes will increase;
- attrition will significantly decrease;
- 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.

In order to achieve certain objectives, sub-measures were indicated, and the parties responsible for their completion, the major contributors assisting in implementation, the implementation deadlines, its indicative cost requirements and the indicative location of the necessary resources were allocated to them. The distribution of funding requirements among funding locations is shown in the **cost matrix**.

4.1. Measures of the Objective 2

EDUCATION

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 will need to actively support their students to successfully complete their training - with special regard to Roma students or students with impairments. 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.

Intervention area	Responsible	Contributors	Deadline	Indicative funding location	Indicative funding requirement (HUF Bn)
2.EDUCATION					
2.1.1Objective: Supporting student achievement					
Measures					
A) Based on the competence level assessments of those admitted into the higher education institution, in the sphere of competence of the maintainer, announcing convergence courses for students in the lower third as part of their studies in order to reduce attrition and to improve the level of the specific knowledge required in the relevant course. Performing competence assessment at the beginning and the end of the training. Launching programmes to reduce attrition as well as student services and extracurricular courses to develop language and professional skills.	MHR State Sec. for Education, MNE	higher education institutions, Education Authority	31/12/2020, but no later than 2023	HDOP, CCHOP	2.993
B) Localising institutional systems supporting students' success (identification of success criteria, creating a learning-centred environment, increasing the motivation of students). Representing the	MHR OAT, MNE	higher education institutions	30/09/2021	HDOP, CCHOP	1.66

components facilitating the support of students' success in the allocation methodology of performance-based grants.					
C) Involving higher education institutions in shaping the secondary school foundation learning materials in natural sciences to an extent larger than before, in order to prevent attrition through adequate skills development.	MHR State Sec. for Education, MNE	higher education institutions	31/12/2020 continued as a budget programme from 2021	HDOP	1.28

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:

- those with residence in districts to be preferred, developed, developed through complex programmes as determined in Government Decree No. 290/2014 (XI. 26.) on the categorisation of preferred districts;
- 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 facilitates the reduction of the gap in territorial disadvantages, family background, and especially the Roma and those with impairment whose inclusion is the aim of separate strategies, too (Hungarian National Social Inclusion Strategy II. (2011-2020) and the National Disability Programme (2015-2025)).

2.1.2 Objective: Measures of the education system that ensures equal opportunities, social advancement, broad access	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**
Measures					
A) Maintainer taking measures to improve the data upload of higher education institutions in the Higher Education Information System in order to more intensively track the students	MHR State Sec. for Education, MNE	Education Authority	31/12/2020	HDOP, CCHOP	0.425

affected. Connecting FIR with registers that are of relevance in the field of public education.					
B) Providing national coverage with regard to the field of tertiary programmes by maintaining every current educational establishment and by creating the framework for community-based higher education centres; in some areas the regional, territorial portfolio of tertiary programmes can be extended by establishing special-focus training centres or branch campuses.	MHR State Sec. for Education	higher education institutions	31/12/2020	HDOP, CCHOP	2.17
C) Transforming the system of social grants with a view to contributing more effectively to making higher education accessible for disadvantaged youth in need and thus to social mobility. The expansion, extension and development of Roma colleges.	MHR State Sec. for Education, MHR State Sec. for Social Matters, MNE	higher education institutions operating a Roma college, student hostels pursuing college activities or operating as colleges and their maintainers	as of the academic year 2018/2019, continued as a budgetary programme from 31/08/2018 20201	HDOP, CCHOP, budget	9.34
D) Expansion and development of the scope of special student services: 1. launching career orientation and skills development programmes from grade 6, with special attention to preparing young female students for STEM + IT courses. 2. investments to facilitate the distance education possibilities of female students, and to implement child-friendly solutions in establishments (baby changing and nursing areas, kids' corner, day-care) and the realisation of niche investments in the area of student services of the campus. 3. introducing a preparatory "0 year" as a	MHR OAT	higher education institutions	31/12/2020, but no later than 31/12/2021	HDOP, CCHOP	5.07

form of training, operating development-type training programmes, 60-180-hour courses connecting practical training for students a) who have successfully graduated from secondary school but were not admitted to higher education or who did not commence their higher education studies, and b) who participate in grades 11-12 in secondary education. 4. in alignment with the concept of life-long learning, providing courses, training, club activities, series of information lectures, student circles, series of workshops, open universities, preparatory training courses not leading to formal qualifications which are based on individual motivation and social demand for those wishing to apply for higher education.					

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.

2.1.3 Objective: Increasing the interoperability and outcome alternatives of higher education programme outcomes	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**
Measures					
A) Developing and extending the range of dual study programmes, launching short cycle and further and retraining programmes in the system of higher education in the sphere of competence of institutional and sectoral regulation. At the level of sectoral regulation, establishing a bachelor programme outcome that	MHR State Sec. for Education, MNE	higher education institutions	30/09/2020, but not later than 30/09/2021	HDOP	4.51

builds on vocational training and work experience (programme outcome required for operating engineer, business economist functions), providing various outcome forms for further training and master programmes.					
B) Making the system and outcome of master programmes more flexible, in addition to 4-semester master programmes providing specialisation and preparing for doctoral programmes, creating 2-6 semester practice-driven master programmes which do not prepare for doctoral programmes, but, by providing higher quality knowledge, for work that adds higher value and is more specialised, and for development activities.	MHR State Sec. for Education	nr.	31/12/2020	Budget	nr. (no additional budgetary resource is required)

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.

2.1.4 Objective: Making scientific, postgraduate specialisation programmes more flexible so that higher education institutions will be the location of life-long learning	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**
Measures					
A) Encouraging joint development of learning material and methodology with companies. Strengthening a harmonised role with employers in postgraduate specialisation programmes.	MHR OAT, MNE	higher education institutions	30/09/2020, but not later than 30/09/2021	HDOP	1.47
B) Devising e-learning materials and adapting those in training, supporting the development of the related digital content and learning apparatus.	MHR OAT, MNE	higher education institutions	30/09/2020, but not later than 30/09/2021	HDOP	1.39

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. 1 Objective: At national and institutional level, user (corporate, employer) relations must be strengthened, for the renewal of the content of tertiary programmes, the	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**

programme requirements must be presented in the programmes, with special regard to technical language training					
Measures					
A) In every higher education institution, ensuring regular and intensive communications with the economic and professional organisations having an interest in the programmes of the relevant institution, through the measures of the maintainer. Regular examination of both the programme and outcome requirements, and the syllabuses during which the continuous participation of the user sector must be ensured by adjusting the content of the programmes to the changing needs.	MHR OAT, MNE		Continuously as of 2016,	Budget	nr. (no additional budgetary resource is required)
B) With the exception of short-cycle programmes - supporting and tracking the implementation of the legal provision that stipulates the amount of credits for all of the programmes, 10% of which announced in a foreign language. Launching foreign language programmes. In the international mobility programme with a national reach, partly to be financed from HDOP and CCHOP funds, supporting the participation in the periods of studies abroad that lead to credit recognition during the duration of the programme, with special regard to performing professional practice.	MHR OAT, MNE	higher education institutions, Tempus Public Foundation,	31/12/2020, but not later than 30/09/2021	HDOP	1.3

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.

2.2.2 Objective: Preparation for active citizenship	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**
Measures					
A) Integrating an open attitude, critical thinking, initiative, cooperation with others, social sensitivity and tolerance, general awareness and the processes of the world and the society that surrounds us into the system of pedagogical methods and testing (for example a more regular application of teamwork, interactive classroom management, the tools of scientific debate, as opposed to the dominance of frontal teaching). Increasing commitment to volunteering by introducing incentives for the participation of students in social causes.	MHR OAT	higher education institutions	31/12/2020, but not later than 30/09/2021	HDOP	0.45
B) Reinforcing and restoring trust in the institutions of university and student autonomy. Ensuring total transparency of finances, data processing practices of institutions, and the Student Self Governments integrated therein, and the services provided in the institutions, student events. Strengthening the legitimacy of the decision-making bodies of higher education institutions and of the Student Self-Governments. Public availability of candidates' manifestos must be made mandatory.	MHR OAT	higher education institutions	Ongoing since 2017.	Budget	nr. (no additional budgetary resource is required)

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.

2.2.3 Objective: Increasing the international mobility of students and instructors, researchers	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**
Measures					
A) Launching development programmes aimed at improving the internationalisation of higher education institutions, and at increasing the ability to attract foreign (both European and non-European) students. In order to further break down the obstacles in front of those participating in terms abroad, institutional reduction of the administrational barriers of credit recognition must be encouraged.	MHR OAT	higher education institutions	31/12/2020, but not later than 30/09/2021	HDOP	0.64
B) Encouraging the mobility of students, instructors, researchers, primarily by further developing the Campus Mundi and the Stipendium Hungaricum scholarships. Increasing the number of educational programmes in foreign languages, and introducing mobility windows in the programme syllabuses. Expanding the scope of international equivalence agreements in order to reduce the administrative burdens of returning home.	MHR OAT, MNE, MFAT	Tempus Public Foundation, higher education institutions	31/12/2020, but not later than 30/09/2021	HDOP, CCHOP	4

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 lesson 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,

2.2.4 Objective: In the field of education innovation, the teaching methodology used in higher education should be centred on practice and student work.	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**
Measures					
A) Encouraging to represent project work in programmes as credit. At regulatory level, transversal skills, including the modules aiming to develop entrepreneurial spirit, have been integrated into KKK.	MHR OAT	higher education institutions	31/12/2020, but not later than 30/09/2021	HDOP	0.85
B) The indicators that measure student progress will need to be integrated into the system assessing instructors' activity. Using community funds to train instructors and to launch certain teaching-methodology programmes. Increasing the number of master instructors involved in teaching. Providing 'train the trainers' programmes in order to facilitate the application of new teaching methods and teaching technology.	MHR OAT		ongoing since 2017 31/12/2020, but not later than 30/09/2021	HDOP	4.039
C) The use, development of quality e-learning material, digital teaching aids necessary for e-learning services, teaching processes suited to the specific profile, programme portfolio and programme services of the higher education institution and the creation of the platforms required for their online publishing and operation. Providing infocommunications accessibility as a horizontal element.	MHR OAT, M N E	higher education institutions	31/12/2020, but not later than 30/09/2021	HDOP	0.54
D) Launching an education infrastructure - including the tools of distance education - investment programme in the less developed regions from HDOP, in the Central Hungary Region from budgetary resource.	MHR OAT, M N E	higher education institutions	31/12/2020, but not later than 30/09/2021	HDOP, Budget	9.53

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

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. In order to step up against international "brain drain", central wage settlement commenced in 2015 and has been carried out gradually, allowing at the same time to bring new practical experts into the training. 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.

2.2.5 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	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**
Measures					
A) Reducing the number of personal lessons in instructors' activities and increasing the proportion of research and mentoring as well as e-learning consulting activities. Observing the results generated in the Instructors' Work Reviewed by Students.	MHR OAT	nr.	Ongoing since 2016	Budget	nr. (no additional budgetary resource is required)
B) Developing higher education career planning and motivational tools. Increasing the appeal of the teaching career by providing career paths, broadening the set of possibilities available to employers to reduce migration. In line with the objectives of the Investment in the Future Strategy, increasing the number of new researchers-instructors with direct support to target groups in relevant ESF	MHR OAT	higher education institutions	31/12/2020, but not later than 30/09/2021	HDOP, CCHOP, EDIOP	6.711

resources (HDOP, CCHOP).					
C) In order to have new professionals, the Government provides special grants in every institution for the assignment and "continued employment" of doctorands and pre-doctor for 1-2 years.	MHR OAT, MNE	higher education institutions	Ongoing since 2016	Budget: New National Excellence Programme	nr. (no additional budgetary resource is required)

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

Explanation: Although there has been a significant majority of women among those with tertiary qualification for decades, in the higher degrees of scientific hierarchy women fell behind men. **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.

2.2.6 Objective: Increasing the number of women instructors and researchers in underrepresented fields and positions.	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**
Measures					
A) Priority emphasis on gender equality in case of operations facilitating the supply of new researchers, in order to reduce the disadvantages of women researchers experienced from the postdoctoral phase.	MHR OAT, M N E	higher education institutions	31/12/2020, but not later than 30/09/2021	HDOP, Budget in relation to CHR	HDOP: 1.13, Budget: nr. (no additional budgetary resource is required)
B) Launching the infrastructural and organisational developments necessary for part-time employment. Launching the infrastructural and organisational developments necessary for creating child-friendly workplaces. (In order to increase the supply of new	MHR OAT M N E	higher education institutions	31/12/2020, but not later than 30/09/2021	HDOP, Budget in relation to CHR	2.1.2. D) and 2.2.6. for objective A), Budget: nr. (no additional budgetary resources

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).)					needed)

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.

2.2.7 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	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**
Measures					
A) Within the infrastructural boundaries provided by community-based higher education centres, the quality programme portfolio in the regions with limited higher education portfolios can be extended; to this end, sectoral policies must encourage institutions to have off-site programmes.	MHR OAT M N E	higher education institutions	31/12/2020	HDOP	0.42

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.

2.2.8 Objective: The system of quality assurance, quality control and accreditation must successfully contribute to achieving higher quality in programmes.	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**
Measures					
A) During the renewal of the accreditation system, aligned with the new structure of programme and outcome requirements, examining the compliance with the mandatory programme and outcome requirements during the accreditation by the Hungarian Accreditation Committee (HAC). Continuous and stricter control, tracking of programmes during studies and at outcome.	MHR OAT	nr.	Ongoing since 2016	Budget	nr. (no additional budgetary resource is required)

Performance indicators

	START VALUE	TARGET VALUE
The number of announced programmes decreases by 15% while maintaining the affected capacities	10,732 (2013)	9,122 (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)

4.2. Measures of Objective 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.

3.1 Objective: Higher education will take up an increased role in building up the innovation competences of technology-intensive companies, mainly SMEs	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**

Measures					
A) Further improving the conditions of cooperation between the industry and the universities, establishing the network of "University-Industry Cooperation Centres", providing an innovation incubation environment for SMEs by the regulators of the sector. 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.	MNE	enterprises, research establishments and higher education institutions	31/12/2020	EDIOP	48.81
B) When allocating community R&D&I resources, decision-makers prioritise developments realised with the involvement of higher education research institutes	MHR OAT, MNE,	higher education institutions, NRDI Office	31/09/2020, and 30/09/2021	HDOP	8.86

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.

3.2 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	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**
Measures					
A) Separating and clarifying the financing of academy-type and practice oriented research in terms of the actual funding. Unification of the institutional regulation relating to R&D&I financing and R&D&I revenues and integrating incentives to increase revenues. Increasing R&D&I revenues (involving higher education institutions in R&D&I megaprojects of the state, increasing the cooperation content of strategic partner agreements and extending them to actual higher education projects). Amending laws on research and development, technological innovation, and various taxes and contributions with elements supporting the functioning of the national research network. Creating a closer relationship	MHR OAT, MNE,	nr.	Ongoing since 2016	Budget	nr. (no additional budgetary resource is required)

between the research establishments of the Hungarian Academy of Sciences and publicly financed research establishments with higher education institutions.					
B) Harmonising access to domestic and EU funds in order to avoid that the successful exploitation of R&D&I capacities of the country are limited by regional regulations. Simplifying the administrative measures and procedures attached to R&D&I activities, making them more flexible at operative level.	MHR OAT, MNE,	higher education institutions	31/09/2020, and 30/09/2021	HDOP, Budget	nr. (no additional budgetary resource is required)

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.

3.3 Objective: Creating R&D&I networks between institutions and strengthening the focus on institutional R&D&I	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**
Measures					

A) Identifying the priority competence areas based on the competence map of higher education institutions at the level of the sectoral regulator. Elaborating a system of knowledge and asset division instead of the fragmented, in many cases parallel developments. Creating cooperation systems in every step of the innovation value chain (fundamental research, applied research, experimental research, market innovation, social innovation).	MHR OAT	nr.	Ongoing since 2016	HDOP, Budget	HDOP: 0.69, nr. (no surplus budgetary resource needed)
B) Reinforcing research excellence along predetermined disciplines through development, financing and maintainer's measures. Launching programmes to further social innovation.	MHR OAT, NRDI Office	higher education institutions	31/09/2020, and 30/09/2021	HDOP, EDIOP, NRDI Fund, Horizon2020	36.273
C) Launching programmes to support the research to cope with socio-economic-environmental problems and challenges in the country and in the Carpathian basin.	MHR OAT, MNE, NRDI Office	higher education institutions	31/09/2020, and 30/09/2021	HDOP, NRDI Fund	0.43

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.

3.4 Objective: World-class R&D&I universities; increasing the international integration of higher education research	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**
Measures					
A) Concentration of resources to support fundamental research projects that are internationally competitive. Increasing the fundraising ability of higher education institutions, increasing the number of research teams and intensifying successful tender activities.	MHR OAT, MNE, NRDI Office	higher education institutions	31/09/2020, and 30/09/2021	HDOP, NRDI Fund, CCHOP, Budget: New National Excellence Programme	HDOP: 5.82, NRDIO: 14.68, CCHOP: 1.424, Budget: nr. (no surplus budgetary resource required)

B) Providing targeted facilitating grants from HDOP necessary to join Horizon2020, and other ERA programmes (e.g. EIT KIC). Integrating the mandatory activities that strengthen international research technology relations into HDOP institutional tenders. 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. Internationalisation of higher education (EU, OECD, UNESCO) and via the specialised diplomacy branch. Supporting the ongoing bilateral or international projects, professional cooperation (ERASMUS, Fulbright, CEEPUS, TEMPUS, OMAA, MFIA, etc.)	MHR OAT, MNE, NRDI Office	higher education institutions	31/09/2020, and 30/09/2021	HDOP, NRDI Fund	HDOP: 2.237. NRDIO: for objective 3.4.A)

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.

3.5 Objective: Providing human resources to R&D&I in the long term	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**
Measures					
A) Establishing the system of discovery-focused research projects which are financed in the interest of the research establishment or in link to persons (doctorands, young researchers) but which are carried out there, based on measurable performance. 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.	MHR OAT, MNE, NRDI Office	nr.	Ongoing since 2016	NRDI Fund, budget	97
B) Monitoring the transformation of the system of doctoral programmes - carrying out more transformation if necessary - in the following fields: (a) increasing scientific performance, (b) introducing a two-phased training	MHR OAT	nr.	31/12/2020, but not later than 30/09/2021	HDOP	2.215

system (2+2 years, support to high performers in the second phase), (c) preferring the tutoring system as opposed to the formal, regular education. Creating a system of incentives in order to connect corporate experts to doctoral programmes, and to research in higher education or at research institutes, on a temporary basis, or for a longer term. Strengthening the research, tutorial character of doctoral programmes instead of face-to-face lessons. 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

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.

3.6 Objective: Renewing the R&D&I infrastructure	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**
Measures					
A) The targeted, planned, efficient use of community funds in the convergence regions, budgetary and ITSF/NRDIF grants in the Central Hungary Region for the scheduled modernisation of the 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.	MHR OAT, NRDI Office, MNE	higher education institutions	31/12/2020, but not later than 30/09/2021	HDOP, EDIOP, CCHOP, Budget, NRDI Fund	29.29
B) Providing and developing central service infrastructure (National Information Infrastructure Development Institute (NIIDI), Hungarian Electronic Information Service	MHR OAT, MNE	nr.	31/12/2020	EDIOP	for objective 3.6.A)

National Programme (EISZ)) from HDOP and EDIOP resources.					

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.

3.7 Objective: Strengthening the industry relations of higher education institutions, establishing University-Industry Cooperation Centres	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**
Measures					
A) Establishing University-Industry Cooperation Centres, in the convergence regions with the support of EDIOP, in Central Hungary with the support of the NRDI Fund	MNE	enterprises, higher education institutions, research establishments	31/12/2020	EDIOP	for objective 3.1.A)

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	9 (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 articles in a foreign language generated in higher education	10,177 (2012)	13,000 (2023)

4.3. Measures of Objective 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 strength is its broad geographical coverage in terms of seats and branch campuses. 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.

4.1 Objective: Strengthening the influence that higher education exerts on local economic development	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**
Measures					
A) Channelling economic players into the strategic decision-making processes of higher education institutions, primarily with organisational and regulatory instruments. Channelling the intellectual potential higher education possesses into designing and implementing the smart specialisation strategy, and the local economic strategies. 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.	MHR OAT	higher education institutions	31/12/2020, but not later than 30/09/2021	HDOP	0.3

B) Ensuring the participation of higher education institutions in the organising of TOP programmes. Improving the incubation services of higher education institutions with funding from the human resources development funds of HDOP, ensuring participation in the economic development and R&D programmes of EDIOP and TOP.	MHR OAT, MNE	higher education institutions, start-ups, incubators	31/12/2020, but not later than 30/09/2021	HDOP, EDIOP, TOP, Horizon2020	1.76

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:

- healthcare, 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.

Another objective of Horizon2020 is to reinforce **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. Developments realised as part of educational innovation are aimed at the targeted support of the participation of Roma students and students with impairments.

4.2 Objective: Increasing the activity of higher education institutions in managing social challenges and in the spreading of social innovation	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**
Measures					
A) Targeted support of research that seek solutions to environmental, economic and social challenges, future- and problem-oriented topics as well as gender considerations, as a focus or a horizontal consideration, in the form of separate programmes or orders.	MHR OAT, MNE	higher education institutions	31/09/2020, 30/09/2021, 31/12/2022	HDOP, CCHOP,	1.411
B) Reflecting upon environmental, economic and social challenges and the topic of sustainability are integrated into learning materials mandatorily, both by	MHR OAT, MNE	higher education institutions	31/09/2020, and 30/09/2021	HDOP	8.9

regulatory means as well as through development interventions.					
C) Higher education model projects are launched in the areas of the frugal and efficient - primary and secondary - use of natural resources (water, energy, raw materials), modelling the potential mid-term and long terms impacts of climate change, with special regard to their impact on the quality of life, expected performance of agricultural production and the food economy, in the framework of Environmental and Energy Efficiency Operational Programme for public institutions (e.g. passive buildings presented).	MND, MHR OAT	nr.	31/12/2020, but not later than 30/09/2021	EEEOP	4.89

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,

4.3 Objective: Expanding science	**Responsible**	**Contributors**	**Deadline**	**Indicative funding**	**Indicative funding**

popularisation, informative and opinion shaping services, and extending free access to higher education knowledge bases				**location**	**requirement (HUF Bn)**
Measures					
A) Active support to and extending science popularising programmes, both in an institutional framework and also in cooperation with cultural institutions and public collections. Launching knowledge base development and extension programmes in HDOP.	MHR OAT	higher education institutions	31/12/2020, but not later than 30/09/2021	HDOP	1.52
B) Mandatory integration of opinion shaping and introductory elements into higher education investments as a horizontal element. Providing infocommunications accessibility as a horizontal element.	MHR OAT	higher education institutions	31/12/2020, but not later than 30/09/2021	HDOP	0.71

4.4 Objective: Creating modern informational content and providing broad access to it

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. The objective supports the creation of modern informational content and broad access

provided to it - this latter includes providing access to student with impairments. Special attention must be paid in this area (too) to infocommunications accessibility, which also appears as a horizontal element in this objective, too.

4.4 Objective: Creating modern informational content and providing broad access to it	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**
Measures					
A) Expanding educational content produced in an electronic form or based on new methodology or methodological developments. Providing infocommunications accessibility as a horizontal element.	MHR OAT, MNE	higher education institutions	31/12/2020, but not later than 30/09/2021	HDOP	for objective 4.3.B)
B) Supporting the coordinated digitalisation of valuable, conventional textbooks, journals, educational materials. 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.	MHR OAT, MNE	higher education institutions	30/03/2019, and 30/09/2021	HDOP, CCHOP	1.643
C) Supporting the dissemination of research results with the use of a growing variety of scientific communication channels. Developing an environment to permanently safeguard the results included in the publications, as part	MHR OAT	higher education institutions, NRDI Office	31/12/2020, but not later than 30/09/2021	HDOP	0.98

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.					

4.5 Objective: Strengthening the service functions of higher education both towards the students and the local community

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.

4.5 Objective: Strengthening the service functions of higher education both towards the students and the local community	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**
Measures					
A) Continuing and expanding the ongoing higher education sports development programmes, and as a result of this, establishing a high-quality sport infrastructure, developing recreational and sport service systems that facilitate regular physical activity and exercise in every institution. As part of an inter-sectoral cooperation, facilitating the establishment of "health promoting universities", participating in successfully completing this programme. Encouraging catering services supporting a healthy lifestyle in the premises of higher education institutions.	MHR OAT	higher education institutions	31/12/2020	HDOP, Budget	38.63

B) Incorporating cultural dissemination activities into higher education HDOP developments as horizontal elements.	MHR OAT	higher education institutions	31/03/2020 and 30/09/2021	HDOP	0.68

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.

4.6 Objective: Qualitative and quantitative development of Hungarian education beyond our borders	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**
Measures					
A) The instructor expat system should be maintained in order to reinforce the missing professionals. 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	MHR OAT	civil organisations, churches, budgetary entities	31/12/2020	HDOP	0.78

students pursuing studies in Hungarian programmes should be strengthened and supported with 1-5 month-long terms abroad.					
B) Broadening the Hungarian higher education programme portfolio offered in the mother land. 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	MHR OAT	civil organisations, churches, budgetary entities	31/12/2020	HDOP, Budget	4.6

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.					

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)

4.4. Measures of Objective 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 is practical to eliminate local rivalry leading to parallel capacities in a region, as it is necessary to combine the regional resources in order to cope 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 respect of the **education activity**, prime cost of the programme - taking into consideration maintaining its quality level -, student headcount, and student attrition and performance (therefore, among others, the *amount of credits*) will need to be taken into consideration, as this provides the greatest 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.

5.1 Objective: In the financing of training, research and scientific performance, a stable, predictable, task- and	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**

performance-based system based on realistic specific cost must be established that can adapt to labour market requirements and the relevant budgetary resources					
Measures					
A) In the financing scheme, independent support must be created for research, scientific performance. Establishing the financing principle and methodology of the public duties to be performed. Outplacement of tasks and programmes that have priority due to special, national economic or social considerations (e.g. regional role) to community-based higher education centres or setting up new establishments, priority support to priority research disciplines. Creating the system of requirements for project-based financing elements	MHR OAT, MNE	nr.	Launched in the 2019/2020 academic year	HDOP, Budget	HDOP: 1.04 nr. (no additional budgetary resource required)
B) Creating the regulatory environment relating to institutional financial management, wealth management which can achieve the stabilisation of the operation and the financial management of the institutions, reduce their dependence on state and community resources, create the necessary conditions to introduce new business models.	MHR OAT, MNE	nr.	31/12/2020	HDOP, Budget	HDOP: 0.69, nr. (no surplus budgetary resource needed)

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.

5.2 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	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**
Measures					
A) Examining three areas in terms of the spatial structure of higher education. Determining the necessary interventions in the framework of smart specialisation to create the training and labour market portfolios of individual territories (a functional urban territory, county, region or country), in consideration of the catchment areas and the actual space usage and the	MHR OAT	nr.	Ongoing since 2015	Budget	nr. (no additional budgetary resource is required)

economic processes of the areas covered or not covered with higher education services, and for geographically overlapping or supplementing institutional profiles and potential realignment and cooperation.					

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.

5.3 Objective: Efficient provision of central sectoral services	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**
Measures					
A) Providing and developing basic infrastructure in line with the provisions of the relevant chapter.	MHR OAT, MNE	nr.	Annual Development Budget (ÉFK) for 2017 and 2018	nr.	nr. (no additional budgetary resource is required)
B) Providing annual data integration involving every relevant registry (HEIS, R-EIS, GCTS, HCSO (Hungarian Central Statistical Office) data provisions).	MHR OAT, MNE	higher education institutions	31/12/2020	HDOP, CCHOP	0.506
C) Launching a methodology programme with national competence with HDOP-CCHOP financing in order to centrally provide measurement assessment systems and graduate tracking system.	MHR OAT	higher education institutions	31/12/2020	HDOP, CCHOP	0.253

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 2016-2020 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 sale 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.

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	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**
Measures					
A) Support should be provided with programme capacities so that the activities of the universities that enable external fundraising are turned into routine activities, the donation raising and R&D&I activities are strengthened, and that the necessary human capacities are developed.	MHR OAT	nr.	Ongoing since 2015	nr.	nr. (no additional budgetary resource is required)

4.5. Measures of Objective 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.

When medical training as a whole is regarded as a complex system, intervention is required in *five interconnected areas*.

1. Higher education will **need to satisfy the Hungarian health care system's demand for professionals in every necessary area**. According to our surveys, higher education capacities increased in past years provide 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.

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, it can be seen that 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 of applications over admission quotas; 3-5 times the number is typical for both English and German language courses. As for the three medical training centres 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 involved 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.

2. The second intervention area of the institutional system of medical training is the state of institutions 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.

3. The third 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.

4. Fourthly, 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.

5. 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 pharmaceutics 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.

In **health sciences, particularly in the training of nurses**, the greatest challenges are the training of new personnel and the provision 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 through medical vocational training, b) high levels of attrition, c) there has been significant technical development – new learning content – in nurse training, 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 where the professional knowledge necessary for providing health care services has increased considerably, and it is imperative to acquire such knowledge 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 tendencies described above, 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 market for longer periods (such as those living on a care 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 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 need for modernisation is particularly pronounced in the case of the infrastructural background of preclinical education started in the third year and the clinical infrastructure, 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.

6.1.1. Objective: Increasing the volume of medical training and reinforcing, consolidating and raising the quality of the clinical education	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**

base to assist in this purpose					
Measures					
A) Doubling the clinical capacities at the four universities affected, significant modernisation of the infrastructure of university clinical programmes. Expanding teaching capacity by increasing the headcount of medical practitioners and the number of beds of universities and/or cooperating with teaching or affiliated hospitals. Improving the service infrastructure of students to increase the appeal for foreign students, and to expand the opportunities of health tourism.	MHR OAT, MNE	higher education institutions	31/12/2020	HDOP, Budget: Modern Cities Programme (Pécs) Budget (or EIB): Development of the Semmelweis University (CHR)	HDOP: 5.19
B) 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 clinics and teaching hospitals in the area of practical training. Introducing and expanding interprofessional education in the field of study (experiencing what it is like to work	MHR OAT, MNE	higher education institutions	31/12/2020	HDOP	for objective 6.1.1.A)

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.					
C) Applying information technology platforms in theoretical and practical training, research and healing, increasing the number of online teaching materials (e-learning).	MHR OAT, MNE	higher education institutions	31/12/2020	HDOP	for objective 6.1.1.A)

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 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.

6.1.2. Objective: Improving the personnel background of medical and health science programmes	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**
Measures					
A) Elaborating the system of subsidies for special medical and pharmaceutical research	MHR OAT	nr.	31/12/2018	nr.	nr. (no additional budgetary resource is

					required)
B) Continuous and high-level professional training of teaching clinicians in universities and public hospitals and establishing an assessment system based on objective criteria.	MHR OAT	nr.	31/12/2020	HDOP	nr. (no additional budgetary resource is required)

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 carrier 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.

6.1.3. Objective: Developing higher education in health sciences, achieving a marketable training methodology that meets domestic needs and foreign demand	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**
Measures					
A) Subordinating health care vocational training under the professional supervision of universities, and elaborating the principles of health care professional teacher and practical	MHR OAT, MNE	nr.	Launched in the 2019/2020 academic year	nr., Budget	nr. (no additional budgetary resource is required)

instructor training and the simulation instructor training. Launching of an expanded master model programme covering anaesthesiology, as well as emergency, intensive and perioperative care. 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.					
B) In higher education, to support medical social work, the establishment of dual study programmes must be encouraged in the places of programme with health care training background, with the involvement of the social care services (employers).	MHR OAT	higher education institutions	31/12/2020, but not later than 30/09/2021	HDOP	0.06
C) Developing the content and methodology of the educational programmes of health science faculties, supporting the accessibility and performability of doctoral programmes for instructors. Developing the bachelor and master health sciences programmes in foreign languages. Supplementing currently existing international, short-	MHR OAT, MNE	higher education institutions	31/12/2020, but not later than 31/12/2022	HDOP, CCHOP, own revenues	0.08

term further training programmes with additional Far Eastern, Western European and North American relations. Tracking the effects of the measures taken in relation to tertiary vocational programmes with health sciences specialisation, launching related training and content development programmes annually or biennially in order to update the specialised fields of topics. Elaborating the network of the human patient simulation system of health sciences and the methodology of the education.					

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.

6.1.4. Objective: Expanding and developing the adult education and further training activities in health care	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**
Measures					
A) Launching new programmes to conduct adult education. Organising further training aimed at groups of professions	MHR OAT, MNE	nr.	starting in the 2019/2020 academic year	HDOP, Budget	HDOP: 0.01, Budget: (no additional budgetary resource required)

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.					
B) Improving the infrastructural conditions of adult education	MHR OAT, MNE	nr.	31/12/2020	HDOP	for objective 2.2.4.D)

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. The health industry is a priority sector in National Smart Specialisation Strategy, therefore in eligible RDI developments, innovative health industry and health tourism solutions are applied.

6.1.5. Objective: Reinforcing the Hungarian health industry and expanding the associated pharmaceutical and diagnostics R&D capacities	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**
Measures					
A) Establishing a phase one test laboratory. Reinforcing the research capacities necessary for manufacturing medical diagnostic instruments in Hungary, integrating the testing of medical diagnostic research and	MHR OAT, MNE,	nr.	31/12/2020	Budget	nr. (no additional budgetary resource is required)

instruments into the training process in cooperation with relevant companies.					
B) The development of health informatics: especially in the area of analysing epidemiological and pathological "big data " generated in patient care.	MHR OAT, MNE	nr.	31/12/2020	HDOP	0.6
C) Developing procedures, instruments supporting modern care technology, with particular regard to home care services and the treatment of chronic illnesses. 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.	MHR OAT	nr.	31/12/2020	HDOP	1

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.

6.1.6. Objective: Modernising the conditions of pharmacist education and research	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**
Measures					

A) Expanding and modernising the territory 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.	MHR OAT, MNE	higher education institutions	31/12/2020	HDOP, budget (or EIB): Development of Semmelweis University (CHR), own resources, corporate resources	HDOP: 4.72
B) Regularly increasing the state scholarship headcount.	MHR OAT, MNE	nr.	introduced in the 2018/2019 academic year	Budget	nr. (no additional budgetary resource is required)
C) Launching pharmacovigilance and EU inspector postgraduate specialisation programmes in cooperation with the National Institute of Pharmacy and Nutrition (OGYÉI) and the European Medicines Agency (EMA). The replacement of retiring professionals and providing a professional background with regard to the European Medicines Agency's (EMA) expected move to the continent	MHR OAT	nr.	introduced in the 2018/2019 academic year	Budget	nr. (no additional budgetary resource is required)

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.

6.1.7. 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	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**
A) Providing full territorial coverage in the case of social training and care professions. Flawlessly aligning the vocational training system of social training programmes and care professions with higher education programmes, increasing their prestige, raising the awareness of those interested in the field. In the case of social and care professions, establishing a priority system of grants for retraining. In the social field, providing high-level leadership training in order to adapt to the ever-changing challenges.	MHR OAT, MNE	nr.	31/12/2020	HDOP, Budget	HDOP: for objective 2.2.4.B), Budget: (no additional budgetary resource required)
B) During the transformation of the educational content, integrating local regional problems in the learning material and skills development. In social education, reinforcing the acquisition of community organising, converging, mobilisation skills and the skills reinforcing social confidence, with special regard to local needs and the third mission activities of the training institution. Actively and formally	MHR OAT, MNE	higher education institutions	31/12/2020, but no later than 31/12/2021	HDOP, Budget	HDOP: 2.2.4. for objective B) and 4.2.B), Budget: (no additional budgetary resource required)

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.					
C) Regularly increasing the state scholarship headcount and increasing the subsidised self-financing.	MHR OAT, MNE	nr.	introduced in the 2018/2019 academic year	Budget	nr. (no additional budgetary resource is required)

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: In Hungary, currently there is an ongoing process to raise the standard, teaching aids and pedagogical methodology of natural sciences education in secondary schools, with special regard to meeting the requirements resulting from the development of digitalisation. 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.a Objective: Providing an input of adequately prepared students for STEM + IT training courses in order to increase students' success	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**
Measures					
A) Developing the quality of natural sciences education in secondary schools: by changing the syllabus, developing textbooks and teaching aids, expanding the possibilities for experiments in lessons, development of assets. Further priority support to teacher training in natural sciences. Further training of the instructors already working for the more widespread application of innovative pedagogical methods, and for updating professional knowledge.	MHR OAT	higher education institutions	31/12/2020, but not later than 31/12/2021	HDOP	for objective 2.2.4.B)
B) Preparatory courses held for students thinking of applying for natural sciences courses. (Introducing a preparatory "0" year as a form of training, development courses, conducting 60-180-lesson courses to connect practical training in the case of STEM + IT majors, as well.) 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.	MHR OAT, MNE	higher education institutions	31/12/2020, but not later than 31/12/2021	HDOP	for objective 2.2.4.B)

C) Continuing the Bridge to the world of higher education programme for socially deprived students in a form supported from community resources.	MHR OAT, MNE	nr.	Continuous	Budget	nr. (no additional budgetary resource is required)

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.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	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**
Measures					
A) Implementing science popularising and informative actions in order to increase application willingness for STEM + IT courses. Organising career orientation programmes to introduce and popularise natural science, technical and	MHR OAT, MNE	higher education institutions	31/12/2020, but not later than 31/12/2021, continued as a budgetary programme from 2021	HDOP	1.28

information technology professions and research careers among secondary school students.					
B) In connection with the previous point, encouraging the groups of students who have so far displayed low willingness to apply for STEM + IT fields of study. To this end, implementing skills development and communication, orientation programmes from age 10-12 upwards. o 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) than that of men. To involve talented women in these two fields in higher numbers, it is justified to support the involvement of women. o Students with territorial and/or social disadvantage apply for STEM + IT courses at typically lower proportions in comparison to fellow students without disadvantages. To remedy this, these groups should receive support to elevate their aspirations for STEM + IT fields.	MHR OAT, MNE	higher education institutions	31/12/2020, but not later than 30/09/2021, continued as a budgetary programme from 2021	HDOP	1.28

C) Intensive support to novel forms of secondary school talent management, e.g. (a) extending the "Student Researcher" movement to 3-4-week summer workshops where students familiarise themselves with the specifics of scientific branches during a term of in 15-20 working days spent with intensive work; or (b) creating public interest work opportunities in the institutes in STEM + IT branches (organising, cleaning, maintaining equipment rooms, collections, exhibitions, laboratories).	MHR OAT, MNE	nr.	Ongoing since 2016	Budget	nr. (no additional budgetary resource is required)

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.

6.2.1.1. Objective: Increasing the standard of bachelor and master programmes in natural sciences	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**
Measures					
A) Significantly decreasing the number of face-to-face lessons of natural sciences students, requiring more individual tasks instead ("project work"). Spreading team-based and pair work, applying modern pedagogical principles in education and testing.	MHR OAT	nr.	Ongoing since 2016	nr.	nr. (no additional budgetary resource required)
B) The additional costs deriving from the nature of natural science education (practical	MHR OAT, MNE	nr.	Launched in the 2019/2020 academic	nr.	nr. (no additional budgetary resource

training, laboratories) need to be taken into consideration in the financing system. Realistic prime costs should be calculated to this end. Encouragement to use the existing laboratory assets more intensively, emphasising the practical side of training.			year		required)
C) Laying down the foundations of the programme portfolio. Supporting courses with small headcount (e.g. meteorologist, astronomer). These programmes require a special financing structure.	MHR OAT	nr.	Ongoing since 2016	nr.	nr. (no additional budgetary resource required)

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.

6.2.1.2. Objective: Improving PhD programmes: internationalisation, reinforcing the scientific character, establishing a systematic system of pre- and postdoctoral grants	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**
Measures					
A) Advancement in international competition. Grants to non-domestic doctorands, students with great talent should	MHR OAT, MNE	higher education institutions, civil organisations, churches,	31/12/2020, but not later than 31/12/2022	HDOP, CCHOP	1.771

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.		budgetary entities			
B) Less lesson attendance, more credits awarded in the organisation of the programmes.	MHR OAT	nr.	2016 Ongoing	nr.	nr.
C) Improving the methodology of doctoral programmes, implementing a module-based curricular reform. Encouraging professional cooperation of doctoral schools.	MHR OAT, MNE	higher education institutions	31/12/2020	HDOP, CCHOP	1.088

6.2.1.3. Objective: Increasing research effectiveness

Explanation: The effectiveness of research is bound to personnel and material requirements, where, among others, we mean 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 which is currently hindered by degree recognition and 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.

6.2.1.3. Objective: Increasing research effectiveness	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**
Measures					
A) Making the postdoctoral system of grants universal, encouraging postdoctoral and instructor positions to be awarded based on tenders. Providing increased remuneration to the best of the	MHR OAT, MNE, NRDI Office	nr.	Ongoing since 2016	NRDI Fund, Budget : New National Excellence Programme	NRDIO: 4.9, nr. (no additional budgetary resource required)

instructor-researcher staff based on objective assessment.					

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.

6.2.1.4. Objective: Reinforcing industry relations to allow university scientific achievements to reach the application phase as early as possible	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**
Measures					
A) Where applicable, direct industry relations and the teaching of industrial-economic approach should be stimulated.	MHR OAT	nr.	Continuous	nr.	nr. (no additional budgetary resource required)
B) The training of researchers must include familiarisation with the industrial research environment, too, partly to allow to the workforce demands of industrial research establishments be satisfied, and to allow every graduate to learn about the culture of industrial research/development	MHR OAT	higher education institutions	31/12/2020, but not later than 30/09/2021	HDOP	0.3

that differs from fundamental research.					
C) Establishing and reinforcing technology-transfer offices, because the industry relies more and more on the academic sector in its research activity.	MHR OAT	higher education institutions	31/12/2020, but not later than 30/09/2021	HDOP	0.228

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 by justified from among the master programmes than there is today. Attrition rate is extremely high in the case of bachelor programmes.

6.2.2.1. Objective: Renewing the structure of bachelor and master programmes in the technical field of study	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**
Measures					
A) 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.	MHR OAT	nr.	Continuous	nr.	nr. (no additional budgetary resource required)
B) Fostering harmony among the bachelor and master programmes built upon one another through the supervision of the syllabuses.	MHR OAT	nr.	Continuous	nr.	nr. (no additional budgetary resource required)

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.

6.2.2.2. Objective: Creating and regulating a new partnership between higher education institutions and companies employing graduate students	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**
Measures					
A) Elaborating regulation that encourages a new partnership between companies and higher education institutions.	MHR OAT		31/12/2018	HDOP	0.08
B) Developing, 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	MHR OAT, MNE	higher education institutions	31/12/2020, but not later than 30/09/2021	Own resources, budget in certain key areas	nr. (no additional budgetary resource required)

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

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. 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.

6.2.2.3. Objective: Increasing the efficiency of teaching methods in the technical field	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**
Measures					
A) Reducing the number of weekly face-to-face lessons, increasing the ratio of independent work.	MHR OAT	nr.	Continuous	nr.	nr. (no additional budgetary resource required)
B) 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.	MHR OAT, MNE	Tempus Public Foundation	31/12/2020, but not later than 31/08/2021	HDOP, CCHOP	0.64
C) Establishing regulations that takes into consideration the specialty of interdisciplinary programmes.	MHR OAT, MNE	nr.	until the 2019/2020 academic year	nr.	nr. (no additional budgetary resource required)

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.

6.2.3.1. Objective: Meaningful revision of the programme and outcome requirements of IT bachelor programmes in view of industry trends, domestic corporate demands and international experiences	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**
Measures					
A) Within the IT bachelor programmes, decreasing the weight of the subjects that have an attrition effect. Examining the possibility to introduce an alleviated admission system to mitigate labour shortage, to train sufficient numbers of quality workforce. Inclusion of practical projects in the syllabuses from the first year. Deepening mathematical and statistical knowledge for web/hardware maintenance tasks. Establishing a wide range of subjects that are optional 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	MHR OAT Institutions	nr.	2016. KKK (programme and outcome requirement) completed. Continuous	nr.	nr. (no additional budgetary resource required)

cumbersome inclusion of instructors can in part be replaced by MOOC programmes. Simplifying the system of testing.					
B) In the period of specialisation, average performers should be offered dual study programmes, outstanding performers should be offered innovation laboratories and business incubators.	MHR OAT	higher education institutions	31/12/2020, but not later than 30/09/2021	HDOP	0.06

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.

6.2.3.2. 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	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**
Measures					
A) Due to the specialty of the field, IT training courses are especially sensitive to the subsidisation of investments, which, therefore, is justifiable to increase.	MHR OAT	higher education institutions	31/12/2020, but 31/03/2020 the latest	HDOP	2.15

B) Development resources should be provided to regularly upgrade the equipment of institutions conducting training in the field of IT (including software and IT services).	MHR OAT, MNE	higher education institutions	starting with the budget for 2018	HDOP, Budget in relation to CHR	HDOP: 1.42, Budget: (no additional budgetary resource required)
C) Corporate investment and sponsoring should be encouraged in support of the asset procurement of higher education institutions.	MHR OAT, MNE	nr.	31/12/2018	nr.	nr. (no additional budgetary resource required)

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.

6.2.3.3. Objective: Improving corporate relations, reinforcing cooperation with industry players in the field of both training and research	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**
Measures					
A) 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	MHR OAT	higher education institutions	31/12/2020, but not later than 30/09/2021	HDOP	0.08

existing dual study programmes.					
B) Encouraging research cooperation between the corporate and academic sectors, providing development funds that can be drawn jointly in order to generate interest.	MHR OAT, MNE	higher education institutions	31/12/2020, or 31/12/2021 the latest	HDOP, CCHOP	0.153
C) Establishing and reinforcing technology-transfer offices, because the industry relies more and more on the academic sector in its research activity.	MHR OAT	higher education institutions	31/12/2020, but not later than 30/09/2021	nr.	nr. (no additional budgetary resource required)

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.

6.3.1. 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	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**
Measures					
A) Regular revision of the development programme of the master programme portfolio adjusted to local labour market demands in terms of content, launching new specialisations.	MHR OAT, Institutions	nr.	2016. KKK (programme and outcome requirement) completed. Continuous	nr.	nr. (no additional budgetary resource required)
B) Establishing the possibility for highly-experienced professionals from the market who have no academic career background	MHR OAT, Institutions	nr.	2016. KKK (programme and outcome requirement) completed. Continuous	nr.	nr. (no additional budgetary resource required)

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

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.

6.3.2. Objective: Utilising the opportunities offered by internationalisation, reinforcing competitive, foreign language economic training programmes primarily in master studies	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**
Measures					
A) Encouraging skills development, content development in foreign languages.	MHR OAT, MNE	higher education institutions	31/12/2020, but 30/09/2021 the latest, starting with the 2018 budget	HDOP	for objective 2.2.1.B)
B) Launching online educational programmes in foreign languages in highlighted institutions.	MHR OAT, MNE	higher education institutions	31/12/2020, but 30/09/2021 the latest, starting with the 2018 budget	HDOP	for objective 2.2.1.B)

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).

6.3.3. Objective: Reinforcing an intensified role in economic postgraduate specialisation programmes and adult education in coordination with employers	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**
Measures					
A) Accurately defining the field-specific role of economics higher education institutions in further training and adult education, and establishing the associated conditions it requires.	MHR OAT, Institutions	nr.	2016. KKK (programme and outcome requirement) completed. Continuous	nr.	nr. (no additional budgetary resource required)
B) Encouraging structured, target-oriented forms of cooperation with employers.	MHR OAT, Institutions	nr.	2016. KKK (programme and outcome requirement) completed. Continuous	nr.	nr. (no additional budgetary resource required)

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, automatisation 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.

6.4.1. 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%	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**
Measures					
A) 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.	MHR OAT, Institutions	nr.	Continuous	Institutional allocation	nr.
B) Supporting communication campaigns aiming at popularising agricultural higher education programmes, facilitating cooperation between the Hungarian Chamber of Agriculture and higher education institutions.	MHR OAT	higher education institutions	31/12/2020, but no later than 31/12/2021	HDOP	0.32

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.

6.4.2 Objective: Introducing new dual study programme forms - proportionate to increasing foreign demand - expanding foreign language programmes	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**
Measures					

A) Tracking the introduction of the agricultural engineer course, reinforcing agricultural bachelor programmes, and the specialisations within, and also the practice oriented nature of tertiary vocational programmes.	MHR OAT	nr.	2016. KKK (programme and outcome requirement) completed. Continuous	nr.	nr. (no additional budgetary resource required)
B) If there is increased interest among foreign students: expanding the foreign language agriculture programme portfolio.	MHR OAT	higher education institutions	31/12/2020, but no later than 31/12/2021	HDOP	0.32
C) Broader introduction and expansion of dual study programmes in the field of agricultural higher education.	MHR OAT	higher education institutions	31/12/2020, but no later than 31/12/2021	HDOP	0.2

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.

6.4.3 Objective: Reinforcing agricultural education centres,	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**

clearly designating the profile of existing places of programme, rational, structural and sectoral merger of individual places of programme					
A) Reinforcing the agricultural centres professionally, and to concentrate the programme portfolio.	MHR OAT	nr.	31/12/2020	nr.	nr. (no additional budgetary resource required)
B) Determining regional specifications, and the profile realignment of the affected institutions on the basis of this.	MHR OAT	nr.	31/12/2020	nr.	nr. (no additional budgetary resource required)

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 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 teaching disadvantaged students as possible for accepting potential teachers.

[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

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)	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**
Measures					
A) 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: o after the phase-in of single-cycle long teacher training, initiating a parallel accreditation in cooperation with the Hungarian Accreditation Committee; o in addition to the relevance of a scientific degree, reinforcing the involvement of instructors with professional experience in the training in practical studies; o in the training element of teacher preparation, reinforcing the task division of organisational units with pedagogical	MHR OAT	nr.	31/12/2020	nr.	nr. (no additional budgetary resource required)

function, practice institutions providing professional practice, partner institutions. 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.					
B) The conditions should be created for the practice year to be financed by the students.	MHR OAT, MNE	nr.	31/12/2020	Budget	1.364
C) Determining the tasks of higher education institutions in teachers' further training:_ o compiling a centrally-determined, listed, mandatory further training register, which the teacher training establishments operating in the region - in cooperation with the locally competent teacher training centres of the Education Authority - offer, o creating an	MHR OAT	nr.	Continuous	Budget	12

optional, upgradeable (elective) teacher training portfolio in a network cooperation of teacher training establishments and public education institutions, potentially project-based; o reviewing the system of postgraduate specialisation programmes and the teacher certification exams with the purpose of aiding preparation for career phases, public education duties; o 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.					
D) 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	MHR OAT	higher education institutions	31/12/2020, but not later than 31/12/2021	HDOP	0.64

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

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.

6.5.2. 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	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**
Measures					

A) 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	MHR OAT	nr.	31/12/2020, but no later than 31/12/2021	nr.	nr. (no additional budgetary resource required)

teachers' further training. Recognising the acquired professional practice of teachers graduating from single-cycle long teacher training and acquiring a teaching qualification during the first employment after graduation.					
B) A new system of further training for teachers should be created with established financing conditions, determining the role and responsibilities of the places of programme. Churches and teacher training establishments should be involved in the following public education tasks: o regular revision and adaptation of teacher training, teachers' further training based on the experiences of teacher qualifications, institution development activities and teachers' further training; o training the attending mentors of the partner institutions participating in related public education practice of students; o in connection with the professional practice of the training, professional support in the task performance of lead teachers of practice	MHR OAT, MNE	nr.	31/12/2020, but no later than 31/12/2021	Budget	for objective 6.5.1.C)

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; o professional support to research teacher and master teacher roles (supporting, lead consultant and innovator master teachers), supporting subject-related consulting; o providing scientific, methodological support at system level to master teacher consultants; o 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; o 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; o 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 church and civil organisations; o involving the persons working in public education and contributing to teacher training (mentors, practice school lead teachers, attending mentors, apprentice supporting mentors) and church 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					

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.

6.5.3. Objective: Creating teacher training development and adaptation tasks, organisational responsibilities, methodology at institutional level	**Responsible**	**Contributors**	**Deadline**	**Indicative funding location**	**Indicative funding requirement (HUF Bn)**
A) 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.	MHR OAT	nr.	Ongoing	nr.	nr. (no additional budgetary resource required)
B) 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.	MHR OAT	nr.	31/12/2020, but no later than 31/12/2021	HDOP	1.2
C) it is necessary to further develop the institution of the Klebelsberg Training Scholarship, and to connect and prepare	MHR OAT, MNE	nr.	Continuous	Budget	nr. (no additional budgetary resource required)

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.					

5. Fulfilling ex-ante conditionality

Thematic objective No. 10 of the EU2020 Strategy is "Investing in education, training and vocational training for skills and lifelong learning". According to the Partnership Agreement, a key objective of the developments of the Hungarian education and training system is to prevent social exclusion with the instruments of education and talent promotion in a public education and higher education system that educates independent and responsible citizens.

It is an important ambition in higher education to have as many higher education workshops as possible that matches European standards and that developments should contribute to increasing the numbers of higher education graduates as well as widening the base for new researchers. Developments related to the 10th thematic objective will be designated by the Public Education Development Strategy, the Strategy to Prevent Early School Leaving, Lifelong Learning Strategy, the Scientific Policy Strategy, in part the National Information and Communication Strategy, and "Shifting of Gears in Higher Education Mid-Term Policy Strategy 2016", and this action plan was prepared to ensure its successful implementation.

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) were determined in line with the thematic objectives. In the case of the higher education objectives and the access to the community funds, it was a preliminary requirement to have a national or regional level strategic policy framework in place relating to higher education, which includes the following:

1. measures to **increase inclusion and graduation rates in higher education among low income, underrepresented, disadvantaged social groups**;
2. measures increasing graduation rates that **reduce attrition and/or improve the ratio of graduates**;
3. measures supporting the creation of **innovative content and programme structure**;
4. measures aiming at increasing employability and entrepreneurial spirit that encourage **the development of "transversal skills"** in the relevant tertiary programmes, including entrepreneurial skills, too;
5. measures aiming at increasing employability and entrepreneurial spirit that **reduce gender inequality** in the field of academic and professional choices.

The implementation of the preliminary requirements of higher education objectives are ensured by policy regulation (strategy creation) and actual measures. The responsible, the contributor, the completion deadline and the resource requirement of individual measures, and the location where the necessary resources will be available, have been determined in this action plan and the attached cost matrix.

5.1. Increasing the inclusion and graduation rate in higher education among low income, underrepresented, disadvantaged social groups

The strategy determines measures aimed at increasing inclusion and graduation rates in higher education among low income, underrepresented, disadvantaged social groups through the following objectives and related measures:

- 2.1.1. Objective: Supporting student achievement:

Measure A) improves the competence level of those admitted to higher education institutions. Remedial courses will be launched to students who are in the lower third based on the surveys as part of their studies in order to reduce attrition and to improve the level of specialised knowledge necessary for a given course. Competence assessment should be performed at the beginning and at the end of the training to track development. It is a priority task to launch attrition reduction programmes and student services, language and professional skills development extracurricular courses.

Measure B) reinforces the effects of measure A) as presenting the elements that facilitate the support of student achievement is mandatory in the division method of merit-based scholarships.

- 2.1.2 Objective: An education system that creates opportunities, provides social advancement, broad access:

For the purpose of the objective, several measures have been designated; improving the data uploads of higher education institutions to the Higher Education Information System (HEIS) to intensively track the affected students and connecting HEIS with databases that have relevance in the field of public education. Measure B) enhances territorial access, in the meaning of which by maintaining all current training sites and by establishing the framework represented by community-based higher education centres the aim is to reach national coverage in the field of tertiary programmes; in some areas, the establishment of special purpose training centres and branch campuses can expand the regional, territorial supply of tertiary programmes.

Measure C) is an important part of creating opportunities, which sets the task of reconstructing 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. A further goal is the expansion, extension and development of the Roma college network.

The scope of special student services will be expanded:

1. launching career guidance and talent development programmes as early as grade 6, with particular attention to preparing female students for STEM + IT courses.
2. investments have been realised to promote distance education opportunities for female students, and to implement family-friendly solutions at branch campuses (baby

changing and nursing areas, playrooms, day-cares), and also investments to fill gaps are implemented in the field of student services in campuses.

3. preparatory courses ("grade 0") as a form of training and developmental training, 60-180-hour courses connecting practical training will be introduced,
    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.
4. in line with the concept of life-long learning, the aim is to provide 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.

5.2. Reducing attrition and/or improving graduation rates

The measures determined to reduce attrition and improve graduation rates will in part take place as part of the measures connected to objective 2.1.1.: "Supporting student achievement" by launching attrition reducing programmes and student services, language and professional skills development extracurricular courses. Measure C) sets a task to include higher education institutions at a rate higher than before in the development of natural sciences foundation courses for secondary schools, to prevent attrition.

Preventing attrition should also be supported with measures in the key fields of study. For this purpose, in the framework of objective 6.2.2.1: "Renewing the structure of bachelor and master programmes in the technical field of study" we mitigate the "top-heavy" character of bachelor programmes, i.e. the educational content will be transformed by eliminating early exclusivity of the professional foundation subjects, distributing them more evenly in the programme plan to reduce attrition.

In the field of IT training, the weight of the subjects that lead to attrition will be reduced in the IT bachelor programmes. Presenting practical projects in the syllabuses from the first year is a key task. The system of testing should be modernised according to the above.

5.3. Creating innovative content and programme structure

The educational content will be renewed following the measures planned in the framework of objective 2.1.3: "Increasing the interoperability and output alternatives of higher education outcomes" by developing dual study programmes, expanding their content and launching short-cycle programmes and tertiary further training and requalification programmes within the higher education system. In addition to making the system and outcome of master

programmes more flexible and in addition to 4-semester master programmes providing a specialisation that prepare students for doctoral programmes, 2-6-semester practically oriented master programmes will also be established to prepare students not for doctoral programmes but, by providing higher quality education, for performing specialised work with higher added value and for research activities.

Creating innovative educational content and structure is needed in specialised areas, too. Local, regional problems need to be integrated in the learning material and in skills development. In social training programmes, it is necessary to reinforce the acquisition of community organising skills, convergence skills, mobilising skills and the skills that enhance social confidence, with special regard to local demands and the third mission activity of the training institution. It is desirable to actively and formally involve the supply system and the church and civil organisations operating in the area. In order to update special fields of topics, training and content development programmes are launched annually or biennially.

In the technical field, the educational content will be transformed by eliminating the early exclusivity of professional foundation subjects and distributing them more evenly in the programme plan, in order to reduce attrition.

5.4. Developing "transversal skills"

Including corporate knowledge in the learning material and the cooperation established with companies facilitate students' employability and competitiveness through several objectives of the strategy.

The measures related to objective 2.1.4 ("Making scientific, postgraduate specialisation programmes more flexible so that higher education institutions will be the venue of life-long learning") encourage the joint development of learning material and methodology together with companies. Reinforcing a harmonised role with employers in postgraduate specialisation programmes is a strategic task.

As part of objective 2.2.1 ("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"), in every state-run higher education institution, regular and intensive relations will be maintained with the economic and professional organisations having an interest in the courses of the relevant institution, through the actions of the maintainer. Both programme and outcome requirements and the curricula will be systematically reviewed, in the course of which the continuous participation of the employment sector must be ensured in order to adjust the educational content to evolving needs.

The measures of objective 2.2.4 ("The teaching methodology used in higher education, in the field of education innovation, should be centred on practice and student work") ensure that

project work is represented in the programme as credits, and, at the level of regulations, the modules affecting the development of transversal skills, including entrepreneurial spirit, are and will be integrated in the programme and outcome requirements.

The development of transversal skills also emerges in the field of research. Objective 3.1 ("Higher education will take up an increased role in building up the innovation competences of technology-intensive companies, mainly SMEs") places great emphasis on further improving the conditions of cooperation between industry and university, the establishment of a system of "University-Industry Cooperation Centres", on maintaining an innovation incubation environment for SMEs by the industry management. The criteria for the financial management of higher education institutions should be modified to ensure cooperation with companies.

In the field of doctoral studies, the aim is to create an incentive system so that connect corporate professionals will participate in doctoral programmes, and in research in higher education and research institutes, either temporarily or for a longer term. Measures are being implemented to reinforce the research, tutorial character of doctoral programmes instead of its face-to-face lessons. To facilitate the gathering of professional experiences, it is supported to attain bachelor, master and doctoral degrees in different institutions in the long term. This is designated in the framework of objective 3.5 ("Providing human resources to R&D&I in the long term").

In the field of IT training, in connection with objective 6.2.3.1 ("Meaningful revision of the programme and outcome requirements of IT bachelor programmes in view of industry trends, domestic corporate demands and international experiences"), investments and sponsorship by companies should be encouraged to support the asset procurement of higher education institutions. Research cooperation between the corporate and academic sectors should also be supported, jointly callable development funds should be ensured in order to create an interest.

In terms of economic sciences, a more intensive role coordinated with employers should be reinforced in economic postgraduate specialisation programmes and in adult education. For this reason, encouraging structured, target-oriented forms of cooperation with the employers is included in the measures of objective 6.3.3.

5.5. Decreasing gender inequality

Gender inequality can be reduced, among others, by increasing the number of female instructors and researchers in the underrepresented fields and in leadership positions. Objective 2.2.6. includes the measure that, in the operations intended to ensure the replacement of retiring research personnel, pays special attention to gender equality in order to reduce the career disadvantages experienced by female researchers after the postdoctoral phase.

It is essential to initiate the infrastructural and organisational developments necessary for the promotion of part-time work and family-friendly workplaces. In order to facilitate the increase in the number of new female instructors and researchers, investments are needed that promote part-time employment and distance education opportunities for female students and implement family-friendly solutions at branch campuses (baby changing and nursing areas, playrooms, day-cares) are needed.

In the field of natural sciences, technical and IT training, in connection with objective 6.2, student groups that have so far showed low willingness for participation will be encouraged to apply for STEM + IT fields of study. For this purpose, skills development and communication, orientational courses will be implemented from the age of 10-12. 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) than that of men. In these two fields, it is justified to support the inclusion of women in order to include talented women at higher rates. Students with territorial and/or social disadvantages apply for STEM + IT courses at typically lower rates than their peers without disadvantages. To remedy this, these groups should receive support to elevate their aspirations for STEM + IT fields.

6. Monitoring

Monitoring tracks the implementation process of the goals determined in the action plan of the Shifting of Gears in Higher Education Medi-Term policy strategy, in the course of which decision-supporting information can be gained regularly of relevant events and activities in a structured form.

Two types of monitoring occurs:

1. **Continuous monitoring**: integrated in the functioning of the institutions, organisations involved in the implementation of the action plan, which includes the regular supervising activity of the management and the operations that employees perform while carrying out their duties. It is performed continuously, in parallel with the activities, reacting to the changing conditions.
2. **Separate assessment**: it is based on the data from risk assessment and continuous monitoring. It aims to implement the audit conclusions and recommendation without delay.

The institutions, organisations participating in the implementation of the action plan are involved in the process of assessment through "self-assessment" monitoring reports.

In the course of monitoring, those control mechanisms are established that facilitate its timely performance in accordance with the financial plan. The quality assurance of processes is carried out by regularly revising and testing the control mechanisms.

Requirements for the monitoring system

The established monitoring system should apply to the entirety of the action plan, it should be based on risk, i.e. it should focus on processes that most jeopardise the realisation of the goals in case of scare resources, and it should be able to continuously renew in adaptation to the changing environment.

The goal of monitoring: regular, accurate and reliable information/data should be available to governmental and sectoral decision-makers. Regular feedback should provide up-to-date information about the emerging problems, deficiencies and the efficiency of the functioning of monitoring should be measurable.

Investigation areas of monitoring:

- **Monitoring of performance (achievement of output indicators)** monitoring and evaluating measurable output figures associated with the achievement of strategic goals expressed as indicators.
- **Monitoring the result (the realisation of output indicators)** by continuously observing the socio-economic results achieved through the realisation of strategic

goals that are measurable and appear in the short term after the implementation (collecting, analysing and assessing data).

- **Monitoring effectiveness** (data of comprehensive strategic objectives that become measurable after realisation on the long term, generally investigated in conjunction with the impact of several interventions): the scope of data necessary to monitor effectiveness should be determined at the beginning of the implementation of the action plan, and data collection and their integration in the process should start at the beginning of the process.

Feedback on monitoring activity - communicating the results:
The monitoring process, in accordance with legal requirements and the provisions of internal policies, end in a documented form, with a report. The report should contain the identified deficiencies and the final conclusions in relation to the effectiveness and efficiency of the internal control system. The frequency of monitoring and assessment is various. Tracking the implementation of the necessary measures after the conclusions are drawn and recommendations are made is also part of monitoring.

Selecting information during the monitoring activity:

To perform the evaluations, direct and/or indirect data are needed. **Direct data** may originate from those participating in implementing the action plan, from data collection (observation) or testing. **Indirect data** originate from the data of controlled processes, for example, from statistics, publicly available databases. To successfully implement monitoring, both types of data need to be collected regularly, in an organised and structured manner.

Monitoring the data available from the **Higher Education Information System (HEIS)** is a type of indirect data collection. HEIS is an electronic database that contains the data related to maintainers, institutions, employment, students, instructors and other employees necessary for planning at the level of the national economy. The institutional core of HEIS (HEIS-IC) stores the data of higher education institutions, the personnel registry (HEIS-PR) provides a database of student, dormitory, guest student, doctorand legal relationships, and in the case of employees a database of persons having an employment, public employee, agency or service relationship. The registry of institutions and the personnel registry have a close logical connection (for example, in the case of a student legal relationship students can only be reported to programmes registered in HEIS-IC). The central registry of HEIS collects the institutional and personnel data of higher education in a single information technology system, which, therefore, are centrally accessible, and the continually updated information can be accessed anytime.

The central registration of the academic career of the students participating in higher education also serves as a basis for the **Graduate Career Tracking System (GCTS)**, which allows the labour market output of higher education institutions to become comparable. The GCTS database can significantly contribute to the quality development of higher education, to improving the competitiveness of the affected institutions. The **Repository-based Executive Information System** (R-EIS) helps recognise substantial processes, trends, problematic areas,

irrational financial management, financial-organisational problems, complex relationships of the quality of education, strategic questions, and also critical intervention points. It provides feedback for realistic performance evaluation, it enables decision preparation based on realistic grounds, and brief, succinct, target-oriented informing.

The **HDOP Monitoring Committee** participates in monitoring the measures of the action plan allocated to HDOP, which, according to its procedure, fulfils the tasks set forth in Articles 49 and 110 of Regulation (EU) No 1303/2013 of the European Parliament and of the Council, especially the following: ensures that the data necessary to revise the effectiveness of OP implementation are continuously provided; performs the audit of management and control systems; performs the audit of reported expenses; perform ad-hoc audits.

The monitoring data serve as a basis to determine the objectives (scheduling and fund allocation), tasks and responsible persons of the next programming period.

7. Annexes

Annex 1

Shifting of Gears in Higher Education Mid-Term Policy Strategy 2016, Action Plan 2016-2020. Excel cost matrix (in a separate document)