A CHANGE OF PACE

IN HIGHER EDUCATION

Contents

Higher Education is Changing Gears

In the last 25 years Hungary has paid its long standing debt to society and families regarding higher education. Higher education became more accessible, groups that had been denied access to education could get the desired degrees, freedom of teaching was introduced, the institutional system and structure of training of the unified Hungarian higher education was created, the unity of education and research was re-established and the demand for the quality development of higher education appeared. Regarding access to higher education, the system of institutions in its spatial structure covers the whole country both in economic and social terms.

This transition process – alongside of the above positive points – toke place in such a way and including such elements (uncritical implementation of the bologna-system, supporting mass education without substantial control, drawing away from the labour-market demands, erroneous interpretation of the autonomy in higher education, unconsidered institutional mergers and formation of structure of programmes), that has led to a system of higher education operating with low efficiency in almost all of its elements. Over-complicated and uneconomical structure of degree programmes, occasionally worthless degrees, declining performance of lecturers, researchers and students, governance systems with a wide range of powers but with limited obligations, both in the management of the institutions (senate and rector elected on a self-governance base), and in student relations.

Hungarian higher education has to switch to the speed of the global world by creating a system that delivers better quality, that is performance oriented and serves the needs of the economy, through using the capabilities of the system in a focussed manner, concentrating on value preservation and creation and using the resources effectively.

Education and training meeting the needs of the labour market means that institutions fulfil their roles if knowkedge transferred to students are relevant in the labour market and useful for the society and the national economy as well, and if professionals with adequate qualifications and in sufficient number are available in all regions of the country. To that effect we restructure the educational structure of Hungary. Programmes not promoting employments and support to such programmes through state grant will be eliminated, and at the same time new forms of education and training will be created, and interoperability between higher education and vocational education will be facilitated. To make transition from education to work smoother, forms of education requiring project-based student work will be favoured, skills needed in the labour market will be made part of the curricula, dual higher education will be spread, higher vocational education wil be restructured, and industrial cooperation centres will be created. The network of institutions will be restructured according to the functional spatial structure of the country, and community-type institutional operation will be provided for in the less favoured regions.

Increasing operating efficiency affects educational and research activity, and efficiency in the operation of the institutions as well. The number of graduates from Hungarian higher education institutions is quite low compared to the number of students accepted; drop-out rates are high. Reducing drop-out rates is one of the key elements of restructuring. Increasing entrance requirements, strenghtening the support scheme based on the assessment of students' competencies, changing the methodology of education, developing the qualification system of teachers, shaping the education and training offer of institutions to be more targeted, and reintroducing master-disciple relationship all contribute to this objective. Research, development and innovation activities of institutions, and the increasing of these activities will be supported through a system driving personal excellence, making higher education institutions a determining element of the Hungarian economy's innovation activity.

In the governance of the institutions, responsibility for academic and management issues will be separated. The Consistory established by the maintainer exercises its right to agree in connection with the decisions of the Senate (elected in a way of self-governance) setting long-term, strategic goals for the institution. Optimal operation of the institutions is assured through the chancellors.

1. Introduction

Transformation of higher education is a time consuming process. If our aim is to build a higher education system that is competitive and sustainable for the long term by European standards, the institutions themselves and society has to be allowed enough time to digest the changes.

Based on the current images for the future, the aim of the government is clear: to operate a higher education system that is high ranking regarding education and research, plays a key role in the success of our country's economy, and one that is based on competition. If we do not challenge the students, if the professors are not enthusiastic, if the researchers are lethargic due to the decades of lagging behind the "West", the performance deficit will be permanent. In other words: the level and competitiveness of the higher education system will improve if and only if society expects more. We have been too comfortable recently: we need competition, higher standards and challenges, in short, performance oriented higher education.

Our objectives are ambitious, but clear: a workfare society in which the engine of the economy is the production of businesses owned by national capital, and the organising force is the network of innovation built on higher education institutions. Our task is to apply the new concepts of public thinking regarding economy to the higher education. We must be aware of the fact that the future of higher education must involve a demographic approach, and we also have to make society aware of this fact. This means that the knowledge acquired at the start of our career will not be sufficient on the long term without further learning. Lifelong learning and lifelong performance is a must.

Financial matters of higher education have to be redefined, and the responsibilities of the state and of the institutions must be clear. We must answer a basic question again: who is the owner of higher education and who is the buyer, who orders the services? The reason for this is that those education policies that did not have a real vision, were lost in the details of daily operation or built on reforms that only made formal modification, putting both the students and the institutions on a wrong track. Students and institutions do not have to fight real challenges and the system is not adequately motivating. As a result of this drop-out rates are high. The institutions do not have to face real competition and are not forced to perform, their budgets are wasteful, their administration bureaucratic, and several aspects of their management systems are outdated. Furthermore, the interests of the managements, the teachers and the students may not always overlap. Finally, stakeholders of the labour market tried to solve temporarily their HR problems with not economical in-house trainings instead of investing to the higher education, contributing to the inflation of certain degrees or degree types.

As a result the social perception of Hungarian universities and colleges changed negatively, the value of Hungarian degrees devolved for university graduates and businesses, and this affected adversely the education and development options and the competitive labour market position of the next generations. For Hungarian higher education to find the right path again, organisations, institutions or persons representing the real demands of the economy and society have to be provided with rights and responsibility: they have to be admitted to the group of owners, the governing bodies of institutions, and in return they contribute to the operation of higher education.

To prevent Hungarian higher education to lag permanently behind the higher education of other countries in international comparison, institutions have to establish the ability and conditions to operate on non-state sources. Hungary has access to unparalleled development funds in the current, 2014–2020 EU budgetary cycle, but this is the last possibility for the country to create a higher education system that is competitive in the knowledge based world economy. Operation after 2020 cannot be based entirely on grants from the Structural Funds. Therefore it is necessary to use state incentives to help institutions to find external supplementary sources through their own activities beyond the state sources that will slightly increase in spite of the decrease of the number of students.

In order to raise the level and competitiveness of education the affected parties have to accept the concept that state higher education institutions can and must operate as a part of the market. Naturally, the entire system of education cannot be funded from the market, but institutions must have multiple income sources, because the current level of dependence on direct state funds may lead to instability.

If Hungary wishes to compete in the region and later in Western Europe on the long term, we need a higher education that offers high quality knowledge to a large percentage of the population, and this knowledge gives an appropriate basis to be competitive in the knowledge economy. However, we must be

aware of the fact that the basic level of knowledge, skills and abilities required by the economy and society do not necessarily overlap with what is offered by bachelor level programmes. In certain cases these offer too much, in other cases not enough. This means that the structure of the programmes must be revised and adjusted to the actual demand based on the experience of the last decade to continue the work that will make Hungarian higher education the best in Central Europe.

It is practically inevitable to employ the proven sectorial approach of economic policy in higher education, and – bearing the objective of forming a work-based society in mind – we must meet the labour market and innovation requirements of each sector individually (medicine, teacher training, engineering, economics, agriculture), also bearing in mind the objective of creating a work-based society. This is a top priority as the majority of state sources must be focused on those areas that have already proven on international level, and are a major contributor to the performance of higher education.

The OECD study "Education at a Glance 2014" draws the attention of the government and the key players of higher education to the fact that a "change of pace" is needed, as soon as possible. We cannot wait, we have to implement the changes that are necessary in the sector (and that are considered inevitable by every expert). The question is whether we implement these on our own, or the environment forces us to do so.

However, we must draw attention to the fact that higher education is one of the successful and competitive branches of Hungary's economy. It is a major contributor to social mobility, the prestige of people working in higher education is higher than average, and a higher education degree gives a high status on the labour market. However, we must not be contempt. The ambitious objectives of the government regarding the economy and social policy set high quality requirements, so the concept of "performance" must not be a taboo any more. If quality is questioned, if performance is not in proportion with the benefits, an intervention is needed.

1.1. Hungarian Higher Education in 2030

2030. It is not a coincidence that the target date reaches further than the term of the current government and the EU planning cycle. Higher education is a robust, slowly changing system. Substantial changes need a long time to implement. In other words, if the government wishes to achieve essential changes, it must allow the necessary time. The 2030 target date allows us to be considerably more ambitious about defining the necessary interventions, and based on these formulate the steps that have to be taken in the current term of the government to reach the long term objectives.

What are the characteristics of higher education we plan to create by 2030?

In 2030 cooperation and a healthy competition of programmes will characterise the connections of the institutions. Students, teachers and institutions will answer the challenges and international competition with continuously improving performance, and those who cannot perform will change their expectations accordingly. It is not compulsory for everyone to become a scientific researcher, and what is more important: we must prevent students to fail in their studies and drop-out because their level of knowledge had not been assessed correctly.

Higher expectations regarding students will be justified by 2030, as the *level of education provided by the institutions will be considerably better. Teachers will be more prepared both professionally and regarding methodology, the teaching experience will be considerably more intense, and personal mentoring will play a more important role.* The master and disciple model will be generally employed again, the disciples will know each other personally and will help each other, and the students will successfully finish their studies as a result of proper leadership and realistic sample curriculums.

In 2030 differentiation based on the abilities of the student will be an established practice. Interested, motivated, hardworking students will have the opportunity to progress faster and further in their studies supporting each other. They will be able to receive experience abroad, try themselves in the labour market, and they will be able to join live business projects or basic research projects even during their studies. Of course, all of this is not new: the trends are already present in the higher education, but will be widespread by 2030.

Students *work harder*, they invest more energy and money, but receive a higher quality education, more valuable *knowledge that they can use better* in their career. Naturally, the necessary prerequisite of

quality higher education is properly functioning secondary education: the knowledge and skills received in secondary schools, the intermediate level state language exam (or equivalent) - that is a requirement to enter higher education from 2020 - all presuppose the success of the fundamentally modified system of institutions and the new professional concepts. We believe that the renewed Hungarian secondary education will provide an input of such quality for the higher education that the teachers can confidently rely on.

The system of higher education is characterised by a clear work allocation in 2030: the central mission of universities is research, while the „universities of applied sciences" (with the traditional term: colleges) focus on the application of knowledge, that covers bachelor or master level studies, practice oriented research or industrial development. The two types of institutions work in close cooperation with each other and the economic environment to support prosperity and businesses.

By 2030 the structure of the programmes will be substantially more differentiated, yet flexible than today. Input requirements will be higher, but those who meet these will all be admitted to the bachelor level courses, and the most eminent students will have access to quality, practice oriented master level courses to develop their knowledge further. These students will be the innovators and entrepreneurs of the future with up to date technical knowledge, business and analytic skills. Besides these, short cycle higher education programmes are popular with the students. After graduation they either enter the labour market directly, or they further improve their work opportunities by taking part in practice oriented bachelor level programmes, that are also open for those talented students with good results who come from vocational training.

Those students who are interested in science and have more ambitious professional goals, and those who wish to employ their research and development skills developed during their university years through project work, can enter theory oriented bachelor level programmes; the majority of them will take part in master level programmes to gain deeper knowledge. Transition from the bachelor level programmes to master level programmes is unrestricted: graduates of both practical and theoretic bachelor level programmes are free to carry on with their studies in practical or theoretic master level programmes. This enables students to review and correct the decision made at the age of 18-19 years, without any higher education or work experience, based on the progress in studies and personal interests – if necessary.

As a form of adaptation to these, *the institutions have a highly specified, clear education profile.* Some institutions concentrate on vocational training and bachelor level programmes, others focus on one or two fields and offer dual training that involves a tough challenge and a large amount of extra work, and promise lucrative possibilities on the labour market. Then there are those institutions that offer academic type of programmes and career for the most eminent students; these typically also concentrate on the strengths and have a powerful institution image. A powerful profile also improves the international reputation of institutions: it is clear for both Hungarian and foreign students which institution to choose for which course, and each business knows who to cooperate with on a specific field, and which institution's graduates are the best.

Each institution has *talent management programmes*: the traditional *scientific students' workshop programmes* unite those students who plan a career in science and offer them possibilities to progress; *colleges for advanced studies* are unique to Hungary: these colleges organize in-house professional programmes, build communities, and play an active role in training and research. Roma colleges for advanced studies are unique formations of the Hungarian higher education system, the operation of which needs to continue to be supported. Personal, tutorial forms of talent management are spreading; each talented student starting their career can rely on the professional help and support of certain university teachers.

Each institution is among the best in the world in the one or two disciplines that are their specialty areas, and collectively the higher education institutions of Hungary cover all fields of study and level of knowledge. By 2030 the unnecessary rivalry among the institutions of a certain city or region will end, to the extent that instead of the parallel and uneconomic programmes running today, the synchronization of education programmes will be evident.

By 2030 the specialization of education will be implemented not in itself, but parallel to the focused research and development activities; the result of this will be a high level of resources concentration, and national institutions of certain fields will be able to attract the best international talent. Through the basic research carried out in Hungary, our scientists will once again be among best in the world, helping to address the social challenges of the future. Moreover, domestic applied research and innovation activities contribute significantly to competitiveness of the main economic sectors of the EU and Hungary.

This process involving specialization, focus and cooperation will be implemented with the active support of the major actors of the labour market and society. Besides defining requirements companies, business and state employers play an active role in financing education and research, and this leads to the creation of a new type of institution, *community colleges*.

Community colleges serve a regional purpose, without these institutions the affected region will inevitably lag behind. Its basic mission is to deliver knowledge services to the local communities in places and in circumstances where education services cannot be maintained on purely market terms. The contribution of all affected parties is needed to maintain the courses in a sustainable way.

Institutional culture can be characterised by one word: „quality". Daily operation, strategic decisions, the evaluation of teachers, researchers and programmes are all quality oriented, guaranteed on national level by strict, objective accreditation criteria and a total transparency.

1.2. Current State of Hungarian Higher Education

The vision and the objectives are clear, but to understand how to reach the described situation, we must see clearly the current state of Hungarian higher education. The reason for this is that the system of higher education is characterised by a high level of inertia. Independent of the interventions performed, it will continue on the previous track for a while, and the changes will take effect later. To reach the desired results and effects, we have to investigate the current social and economic conditions and international position of Hungarian higher education.

The mission of modern higher education institutions is to utilize education, research and knowledge for the benefit of the society and the economy. By fulfilling its complex mission, higher education serves the community in various ways, but the most essential of the important functions is to *facilitate social mobility.* It is a basic requirement for all levels of education to facilitate social mobility. Therefore, it is imperative that during the transformation of the system, special emphasis is put on the *availability of higher education everywhere, but specially in the disadvantaged regions.*

Besides social effects higher education plays a decisive role in the economy. The methodology of the annual Competitiveness Report of the World Economic Forum distinguishes three stages of the development of national economies based on GDP per capita: resource driven, efficiency driven and innovation driven. According to the Report Hungary is in a transition from the efficiency driven phase to the innovation driven phase, which means that the most important task of the next decade is to perform this transition – the decisive factor of this is the availability of highly qualified workforce. The development stages above can be characterised by the constantly growing proportion of the workforce employed by companies at the higher levels of the value chain, or in other words those companies that produce a higher added value. However, this requires qualified employees. This also means that the *availability of a higher education system of the appropriate size and quality is a key aspect of the economic development of Hungary.*

On macro level the performance of higher education can be characterised by the ratio of higher education graduates in the population, the drop-out rate, the average length of studies and the return of investment to education. There are two basic ways to improve the performance besides the students working harder: students with better skills enter the system, and the teacher to student ratio is improved, and better teachers are employed.

A good estimation can be given of knowledge level of the students entering the system based on the science points of the PISA evaluation. The data of the OECD countries justify the assumption that higher PISA points indicate higher participation in the higher education, lower drop-out rates, shorter time to graduation and better return of social investment. Reading comprehension PISA points indicate the same. The fewer students, more and better teachers ratio enables a more intense learning experience, and leads to improved drop-out rates, shorter time to graduation and higher social return.

Higher education may be financed based on three principal solutions:

- flat rate financing of institutions,
- proportionate financing based on the number of students and other input criteria (for example the size of infrastructure) and
- output based financing (for example the number of graduates).

OECD statistics show that the financing solutions based on the number of students can provide sources proportionate to the costs if tuition fees are calculated correctly, and can result in a larger participation in higher education. Nevertheless, in many cases drop-out rates are increasing and the profit for society is lower. Flat rates financing generally results in smaller input, drop-out rates are maintained, but the budget is balanced and planning is uncomplicated. International examples show that student loans are a more objective oriented method of supporting students compared to scholarships, as the loans make higher education available for everyone and considerably shorten the time to graduation. However, the serious debt of career starters is a considerable risk as for example in the USA it may lead to a new economic crisis. Changes in this respect can only be implemented in Hungary with respect to the actual social situation. Finally, it is safe to assume that if students have to contribute to the financing of their studies, the number of higher education graduates will grow, and the middle class will strengthen, as this undoubtedly requires more responsible behaviour, i.e. lower drop-out rates and shorter time to graduation.

The table below shows the correlation of input and output indicators based on the information above. „+ +" indicates strong positive, „– –" strong negative correlation. (For example: if students enter higher education with better science competence, the number of successful graduations will grow and drop-out rates will be lower.) Colour codes of the fields indicate if the correlation is favourable or unfavourable. (Green indicated favourable, red unfavourable changes; yellow indicates a warning.)

	Ratio of tertiary education graduates in the population	Drop-out rate	Average time to graduation	High social return vs. individual benefit
Higher PISA score (science)	+ +	– –	–	+
Many students for each teacher	– –	+ +	+	– –
Financing follows the student	+ +	+ +	–	–
Scholarship instead of student loan	–	–	+ +	+
Students contribute to tuition costs	+ +	– –	– –	–

As a part of the transformation of the structure of higher education there is a further problem to be taken into consideration connected to input numbers. In recent years higher education was hit by the demographic fall that resulted from a radical drop in birth rates earlier: according to the numbers of the Central Statistical Office, the 18 years old age group counted 126,000 in 2010, but the respective number will only be 105,000 in 2015. This is a nearly 20% drop in just a few years. This trend means that demand for Hungarian higher education will be considerably lower for a longer period, at least in this age group. However, the lower number of students has its benefits: there will be free capacities that can be utilized in the quality centred transformation of higher education. Parallel to this, the ratio of higher education graduates in Hungary – including those who take part in the value generating (manufacturing) processes directly, and have a qualification beyond ISCED 5b, in line with the EU methodology, for example plant engineers, operating managers, qualified nurses, diagnostic assistants, insurance agents – in the 30-34 years old age group is constantly growing, and already exceeded the 30.3% objective set in the EU 2020 Strategy with 31.8% in 2013. Based on this fact the analysis of the trends of the previous years, new target values can be defined. In line with the planned interventions the value will be 34% by 2020, and will reach 35% by 2023.

We must draw attention to the fact that from the indicators used to measure the innovation capacity of countries, the number of PhD holders is unfortunately very low in Hungary: in the 25–34 age group 0.8 per 1000 persons are issued with a PhD per year, while the EU average is 1.69. This value in Hungary is low not only in comparison with that of such developed countries as Germany (2.65), Sweden (2.9) or Switzerland (3.68), but in regional comparison also – Romania (1.4), the Czech Republic (1.3), Slovakia (3.1) – and these countries are our direct competitors regarding international development centres. Drilling deeper, the

number of applicants for PhD programmes is 1.6 in Hungary (per 1000 persons per year), compared to the EU average of 2.9. Taking these data into consideration, besides the *capacity extension of PhD programmes* (that has already been implemented partially), we need to improve the *number of successful graduations*. It is important to note though that it is *essential to increase the participation of business partners* and the number of research topics requested by businesses in doctoral programmes.

To be able to provide the human resources required for an economy that is competitive on an international level, Hungary has to face one more important problem. Training and retraining of the workforce is performed through the different forms of lifelong learning, and the indicators are rather unfavourable for Hungary in this respect. This can be best illustrated with the data on participation in non-formal education. In Hungary 10% of the 25 to 34 age group and 2% of the 55 to 64 age group participate in non-formal education, which is barely a quarter of the OECD average (37% and 23%, respectively). It is not higher education that is mainly responsible for solving the problems of *lifelong learning*, however, it must provide an answer to this challenge during restructuring.

It is undeniable that higher education plays a significant role in *the less developed regions* of the country, where *the need for social mobility and economic development appears simultaneously* and urgently; however, the institutional system in its current form can only meet this double challenge to certain limitations. Consequently, a segment must be established in the institutional system which is centred around *prosperity to be achieved locally* in a way that the given institution provides practice-oriented education that meets regional labour market demand and a proper career for young people. Above all these, another objective must be set for these institutions to undertake a great role in non-formal education as well, to operate as real *intellectual centres* and to become major players in *local economic development*. From the point of view of Hungary, the most easily adaptable system and best practice is the system of Community Colleges in the USA.

With the accomplishment of its third mission, higher education has become an important economic factor in the last ten to fifteen years, however, there is more to it in Hungary. The use of the R+D+I potential available at the institutions is of vital importance for the economic development of the country. It is a great problem for the Hungarian innovation system that it is made up of two, structurally contradictory parts. On the one hand, we rank outstandingly high in the ranking that measures the economic effects of innovation (by far the highest among the countries of the region) primarily due to the standard of innovation culture and technology incorporated by the large international companies. On the other hand, in the indicators measuring the innovation of the SME sector we lag behind. It is therefore obvious that the efforts of the government aimed at the development of domestically and internationally competitive Hungarian companies (hereinafter SMEs) can only deliver good results on the long term if the innovation intensity of the undertakings is increased, but this can only be achieved efficiently if the potential of higher education is utilised. *Thus, one important area of intervention of the higher education concept is to create a support system that instigates higher education institutions by the well-considered use of innovation support to provide R+D+I support for the corporate sector and within this, the SME sector in particular, and, reciprocally, the higher education institutions must be given a significant role in the use of the financial support targeted at the SME sector.*

1.3. What changes are needed?

Following the analysis of the current situation and the outline of the future goals of the Hungarian higher education, it will be possible to determine the exact tasks with regard to the vision. While changes are needed, we also emphasize that *the whole higher education system will receive the appropriate support* to accomplish its mission at a high standard. In academic culture artistic and scientific literacy are inextricably linked to each other, which must be reflected in the higher education system; the proportions cannot be pushed to the extremes.

Since the beginning of modernity, *the task of humanities and social sciences* is to react to the everyday cultural, social and historical processes that require analysis and response. Since these processes occur on a larger scale and at a higher pace than ever, their understanding and debate requires an unprecedentedly wider scientific and educational capacity. The society of the 21st century is characterised by transnational networks and constant changes. In this world the knowledge of foreign cultures becomes a market factor,

just as efficient change management cannot be imagined without the understanding of social processes. When creating a national higher education strategy it must be kept in mind that European values can only be appreciated if we know our own values, just as tolerance towards other nations' identity cannot exist without a healthy national identity. We mainly build on our historical studies and the values of our history, literature, and arts when creating and maintaining a healthy national identity.

Managing the *global problems* that directly concern national economies and the scope for action of the national governments requires that political decision makers, market participants, and professionals – representing different disciplines – who are able to analyse the long-term trends of technology and society find the solutions together; and that they be able to communicate with one another ("understand each other's languages"). This is also true for the questions of environmental issues, sustainable economic growth, societal cohesion, and political stability; all of which signify today's serious challenges (the European Union itself also devotes 41% of the total R+D source, until 2020, to the solution of the "big societal challenges"). These challenges need to be answered by interdisciplinary, problem oriented responses, which also call for well qualified professionals specialised in social sciences.

An essential pre condition of the *technological development's* societal reception and effective practical application that serves the well-being of families: increasing the adaptive, innovative and cooperative capacity of individuals as well as organisations. This is not possible without understanding the social processes, the social behaviour and attitudes – that the social sciences programmes prepare students for. These societal challenges require that specialists in social sciences command appropriate basic scientific and IT knowledge, and that professionals with technological, scientific and IT qualifications command appropriate knowledge in social sciences.

Education prepares students for the challenges of the future, and for the fundamental global and domestic challenges only if it prepares them for – in every sense – the *interdisciplinary* and problem oriented, *problem solving* thinking as well as *team work*. This of course does not entail that education policy cannot enforce *preferences* that are favourable for the country's economic interests, but – besides economic expectations – social needs towards a well-operating society, a strong middle class, a benign state and an artistic and cultural sector must also be represented.

The institutions accomplish their mission if the knowledge passed onto the students is *relevant in the labour market,* if research results are *beneficial for the society and national economy,* and if the institutions act as *regional catalysts*. However, higher education is a robust system with long lead times: approximately one decade has to pass until the students currently enrolled in higher education demonstrate a significant factor in the labour market. Similarly, at least ten to fifteen years is needed until research results become products and basic research contributes to raising the living standards in a way that is noticed by society.

Thus, the real question lies not in what the *current* labour market expectations are, but what they *will* be like in ten years. It is not the current social challenges that need to be analysed, but the challenges that will arise in a decade.

The world around us is constantly changing, the challenges become bigger, and the current higher education concept must be drafted with a view to *the socio-economic megatrends* that can be expected in the next ten to fifteen years.The future that lies ahead of us differs very much from what we know about our world today in at least five aspects:

- the progress of technology occurring at an incredible speed pushes the biological boundaries of humankind;
- the aging populations which at the same time remain active for a longer time challenge our old notion about age groups;
- globalisation expands and socio-economic boundaries disappear;
- members of the society voice their needs more and more actively and they participate individually in the shaping of the future via social media networks;
- the understanding of the finite nature of resources incites humankind to seek sustainable forms of development.

Technological revolution: our technological possibilities show an exponential expansion, practically the whole developed world is interconnected via smart and mobile devices (5 billion smartphones will connect almost the whole humankind by 2025), we can access our data and applications from anywhere anytime – and not only at fixed locations – via the so-called cloud services. Productivity increases, human

resources are replaced by robots in some fields, social participation strengthens in the business sector, and huge companies and freelancers compete for customers in the same market. A great part of the knowledge of humankind is available for the public in a digital form; in education emphasis shifts from transferring actual basic lexical knowledge to learning methods and technologies of acquiring knowledge ; and the boundary between personal and virtual presence and personal and computer-assisted decisions becomes blurred.

Globalisation: space and time blend together, the work week is made up of 7 days and workdays are made up of 24 hours, because somebody always works somewhere. New economic powers (BRICS) are being formed, the familiar world order is transformed (since 2013 the Share Of Developing Countries In World Economy has exceeded 50%). The economy of the developing world is not only made of production centres, innovation itself is increasingly implemented there. A lack of higher education capacities is characteristic of the third world too, because the proportion of young people in the total population is the highest there, but these countries are not able to meet their education needs without help within a reasonable time (by 2020 half of the world's middleclass population will be Asian compared to one-fourth in 2010). The world is becoming more and more urban, since the majority of humanity will live in cities, and a significant part in megacities. A peculiarity of the global crisis is that a local problem may create huge waves, the instability of just one country may cause the crisis of whole regions or even the whole world economy. This is naturally true for the opposite, i.e. economic boom as well.

Demographic trends: By 2030 the key age groups of the labour market will only know from hearsay that there has been a time when Internet has not existed. In Europe less and less children are born, but people live longer and also work longer, partly because they are used to and need an active lifestyle, and partly because they cannot make ends meet with their pension only (in 2000, 9 workers had to support one pensioner, while by 2050 only 4 workers will be responsible for one pensioner). Migration is growing on a worldwide scale.

Social needs: personal fulfilment and meaningful recreational activities are becoming all the more important for individuals; almost all services and the whole marketing and media industry becomes customised. Traditional male and female roles are revalued and become more balanced (half of the computer users are women).

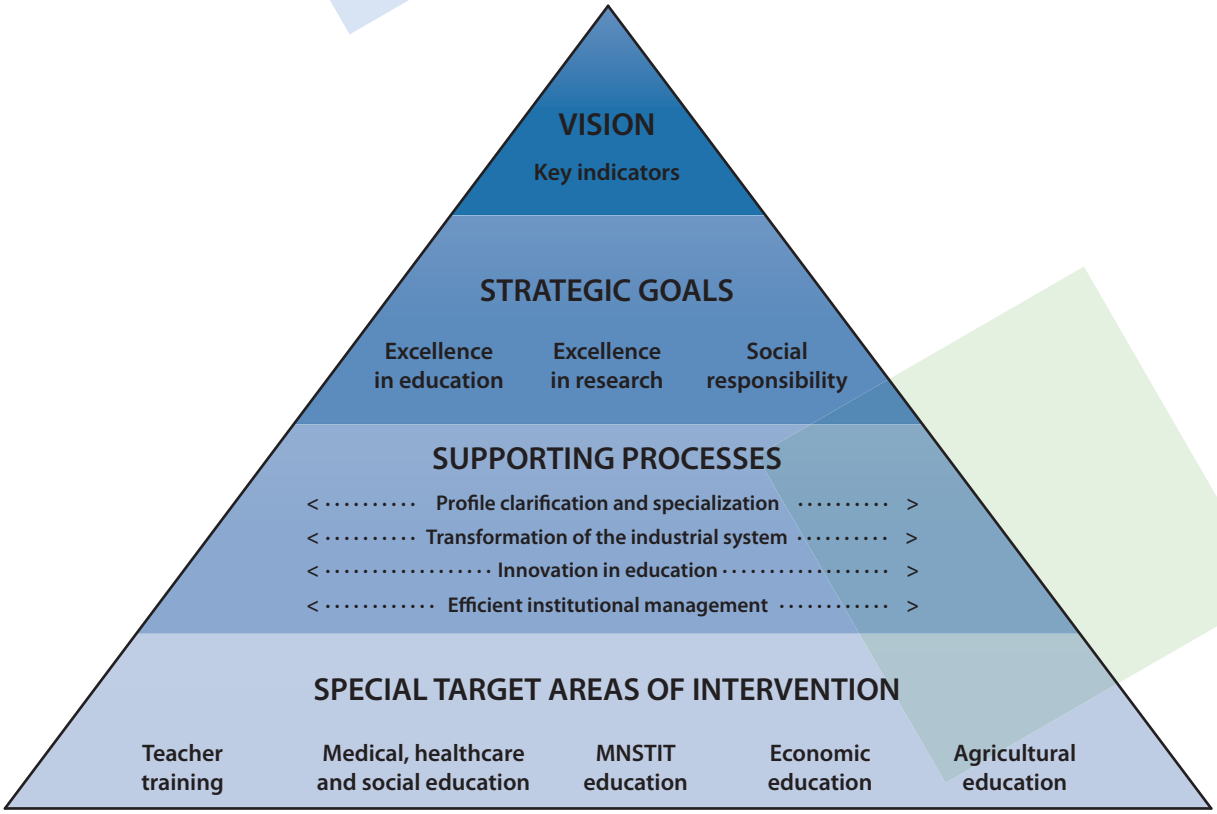
Scarcer (energy) sources: energy and raw material prices constantly rise, global climate change affects everyday life, and therefore, the trend of the need for environmental conscious, economical, self-financing and sustainable systems becomes widespread.

The above mentioned five megatrends affect all social and economic actors, and higher education cannot stay unaffected and isolated from them. If we are aware of the challenges we need to face, we can take the necessary steps to help higher education better accomplish its mission.

MEGATRENDS →	CHALLENGES →	NECESSARY STEPS
Technological revolution	Strengthening higher education and institutional focus	Initiating competition between the programmes, higher performance, quality and motivating moments of achievement, joining technical innovation
Globalisation	Cooperation within and among the institutions and with external partners	Transformation of the institutional system based on the spatial structure of the Hungarian people in Hungary and the Carpathian Basin, taking further efforts towards internationalisation
Demographic trends	Rethinking the value generating processes of institutions, reducing the number of students	Programme supply and education innovation based on demographic projections, support of quality strategies instead of quantity increasing strategies
Social needs	Better reflection of external needs in the internal structure of institutions	Profile clarification and specialisation, delimited institutional types and fields of competence
Scarcer (energy) sources	More efficient use of sources, generation of additional sources	Transformation of the institutional management system, introduction of new business and operational models

Following the definition of all these challenges and trends, the *focal points of the concept* aimed at creating a competitive and high quality higher education can be clearly set:

- *In the future* all higher education actors, students, teachers and institutions will be motivated by *competition*, will perform high and will be successful.
- Hungarian higher education offers services of European quality in the field of *education, research, as well as third mission* for both the society and the economy.
- The modernised institutional system adapted to the regional structure of the country and the Carpathian Basin – in which all actors know their role perfectly – allows for and *supports* the accomplishment of the mission. The education system adapts to demographic trends; the institutions operate effectively and efficiently.
- Besides all these, in certain subfields the strategy should be supplemented and fine-tuned annually in accordance with the *priority sectors* of the country.



We should not forget that every strategy is worth exactly the same as the level of success in its implementation and the execution of actions defined in line with the priorities. Thus, the rest of this document is built on the following logic: definition of *practical objectives* – supported by short, quantified justification – when passing along the defined strategic goals and delimited target areas of intervention, and the assignment of *specific actions* to these in all cases. Intervention into the system in a synergic manner is done by using the five available channels:

- Legislation (acts, regulations etc.);
- Direct institutional management (chancellery system, senate, information technology management tools);
- Financing (core funding, tenders, direct funding of excellence, tax relief);
- Movable and immovable property (investment, assets procurement, intellectual property management);
- Communication, media and publicity.

It follows from the logic described above that the areas of intervention are used to implement the strategy, thus, the currently highlighted priority areas defined along the current socio-economic realities may change over time, but the high level strategic objectives remain unchanged.

2. Competition, Performance, Quality and Success

Since the end of the communist era access to higher education has been democratised, as a result of which the proportion of people with a higher education degree in the population doubled in 25 years , and tripled among the young (aged 30 to 34). The conflicting criteria of education expansion and excellence in education created a dynamic and competing ecosystem of institutions and programmes.

In the currently forming economic and social system of the 21st century, knowledge and creativity start to replace the agricultural land, mineral resources or even cheap mass labour force that were the decisive factors previously. Qualification has become a major competitive factor.

Globalisation and the general availability of Internet access reinterpreted physical distances, the best students select their place of their further education independent from countries or cities, usually based on the quality of the institutions and the study programmes provided by them. In parallel to that, competition for the best students, the most excellent professors and research support has become international.

Higher education in Hungary seems to lag behind in this competition according to several statistical indicators; it cannot leave the shadow of the past behind. The basic subjects of higher education policy debates are still the amount of state subsidies and their allocation mechanisms, and the necessity for institutional system and management reforms. In the meantime many of our most talented students and teachers try their luck abroad, and our institutions start with an almost insurmountable handicap in the competition for European Union research and development funds. The challenge is great even though it can be proved with numbers that Hungarian higher education compared to the region's countries attracts the highest number of foreign students and in proportion to that very few Hungarians choose a foreign university for their higher education studies.

The transformation of higher education must answer the following question: how is it possible to establish an institutional system that offers competitive and quality programmes in all study cycles and forms, while providing all Hungarian citizens their right set out in the Fundamental Law to access higher education according to their abilities. The unproductive debate about education policy must be ended, and practical solutions must be found to the problems instead.

The following table shows a summary of the policy issues and the related practical tasks.

EDUCATION POLICY ISSUES	SPECIFIC PROBLEMS, PRACTICAL TASKS
Access	Hungarian state grant (thus undertaking the duty of establishing and maintaining an employment relationship in Hungary, related to this form of financing), student loan, system of student grants, selection procedure and education methods allowing for efficient studying while working.
General quality of education	The value and social prestige of degrees have fallen in the last decade and the quantity and quality of knowledge behind getting a degree has also decreased. Truly valuable knowledge requires more personal investment (studying) from the individual.
Shortcomings of the education structure (assessment of the Bologna Process, the system is not differentiated enough, there is a lack of elite education)	The level of knowledge of incoming students varies greatly, drop-out rate is high, the programme structure is fragmented, it is necessary to develop and transform higher vocational education and education leading to Bachelor's degree, there is no real competition between students.
Selection	Without selection the use of support is not efficient, quality drops; it is not lexical knowledge that is truly important, but learning competencies and attitude (motivation).
Equality	The inappropriate (or legacy) differentiation between the disciplines has a negative effect on quality and on meeting labour market needs.
Lack of cooperation	Cooperation between the institutions is not typical, competition between programmes is low: both factors have a negative effect on quality. The regular and long-term cooperation of the economy and the academic sector needs to be improved.

EDUCATION POLICY ISSUES	SPECIFIC PROBLEMS, PRACTICAL TASKS
Input vs output funding	Output funding leads to the depreciation of degrees, while input funding leads to uneconomical programmes and a high drop-out rate. The solution is to create real competition between the programmes offered by institutions and to make the issuing of quality degrees a matter of prestige. Instead of the historically created norms a system based on real costs of education should be created. The links between funding and the tasks cannot be traced. Differentiated funding, realistic self-financed costs are needed. Private funding is not enough; state subsidies are of a limited scale compared to demand.
Market operation vs state regulation	External costs should be integrated into the fees, a predictable funding system clearly reflecting government goals is needed for long-term planning.
Accreditation, transparency, international dimension	The criteria used by the labour market and the HAC (Hungarian Higher Education Accreditation Committee) are very different; the students cannot understand them, therefore market criteria prevail in a distorted manner at the time of enrolment. Real competition is not on national level any more.
Research funding	Cross-financing between education and research; in many cases the past performance and the position in science policy dominate when allocating funds. National vying with each other (instead of cooperation) destroys international chances.
Programme structure	Professional (practice-oriented) and academic (theoretical) education blend together; historically achieved positions blur the current labour market values.

From the above mentioned heap of problems it becomes clear that economic success and social welfare in Hungary may only be reached via quality education and research, and the enhancement of performance is the only possible method to achieve this. However, permanent higher performance results only from competition, thus, this strategic document focuses on the restoration, clarification, regulation and enhancement of competition.

2.1. Performance-based Teaching and Learning Environment

A lot of criticism has been made in recent years in the field of higher education from the customer-employer side: the observations concerned the *programme structure*, the *quality* and *content* of the programmes, as well as the *number* of graduates. Another difficulty is that the opinions requesting changes are quite diverse, and they quite often call Hungarian higher education to account for contradictory trends. The government's responsibility is to initiate steps within the sphere of responsibility of the state based on the arising suggestions for modifications and as a result help establish a better planned and organised higher education system – compared to the practice of the previous years – which is in line with the strategic objectives.

In the last 25 years, adapting to the needs of the catching-up economy and the modernising society, the number of admissible students as well as training locations of the programmes and educational paths training students for the tasks of the service sector has increased significantly. The relatively low total cost of these programmes has also contributed to the fact that a wide range of higher education institutions has announced such programmes. The thus fragmented system of programme offers raises, in some places, the problem of the eventuality of quality and professionalism. This may be related to the fact that, in several institutions, the number of highly qualified teachers and researchers has decreased.

As a preliminary point, we can declare that *besides keeping the study cycles* (higher vocationaleducation, bachelor education, master education, doctoral education, postgraduate specialization training) it is necessary to *transform the programme structure* as a result of which the number of programmes constantly on the increase from 2005 up to now will decrease at national and institutional level on the basis of output experience. This of course does not mean that the existing Hungarian education structure recognised all over Europe should be disposed of, because a significant part of the programmes did meet the expectations set at theirestablishment. However, today the programmes can be valued on the basis of relevant information, because now we can form a comprehensive picture of the graduates of programmes established at the introduction of the Bologna system with the help of the reports of the Graduate Career Tracking System, the data of the Higher Education Information System on further education and drop-out, as well as the

needs of the society shown in the applications for admission. On the basis of these measures, the labour market focus of the programmes can be significantly improved, lifelong guidance activity can become clearer and more successful, and the resources can be successfully concentrated at institutional level.

According to general professional agreement, measures aimed at the *quality of programmes* are also necessary, which assume the stricter control of quality management and accreditation criteria, the development of the quality and preparedness of teachers and the further restriction of entry criteria, thus the setting of advanced level school-leaving examination and foreign language knowledge as entry condition to higher education can also be found among medium-term plans. The general *competence level* of students have to be examined at the beginning and at the end of the programme to see clearly how the given programme has contributed to the development of students' skills and knowledge. The data recorded at the beginning of the programme can help to designate those students who are in a greater need for mentoring and coaching, and on the basis of the aggregate data it will be clearly seen how much the given institution has been able to develop the examined skills and knowledge of the students during the programme. The data allows for the intervention by maintainers, as well as by the education organisers and teachers of the institution. It can be forecast that better prepared students, more motivated teachers and a more strictly controlled quality management system will guarantee the improvement in education quality.

Continuous cooperation is needed between the higher education institutions and the socio-economic actors to *modernise* or – where appropriate – transform the *education and outcome requirements education and outcome requirements*and their content in the wider sense. Due to this the labour market relevance of programmes and the knowledge of graduates and the utility of this knowledge can be improved considerably.

The new system of admission procedure, which is built on programme capacities, may ensure that the expectation on the number of graduates primarily voiced from the side of the economic actors can be met. Since Hungarian economy, which is in a period of growth, needs a large number of well-trained experts, it is not reasonable to limit the number of students admitted to higher education, and on the whole the *raising of the number of people with tertiary level education* is necessary in a structure that is aligned with the needs of the economy. *Reduction of the drop-out rate* and taking further intervention during the creation of capacities of the range of programmes offered in certain fields of study is of utmost importance. It is obvious that the lack of experts in certain fields of study (mainly in engineering and information technology) hinders economic growth in Hungary, while there is high but unjustified interest in other programmes compared to labour market prospects, or the programme supply is not aligned with actual demand (in certain fields of economics and humanities).

The traditionally most popular fields of study in Hungarian higher education are connected to humanities and social sciences. Student interest is outstanding not only in numbers but also regarding its quality indexes: half of the undergraduate students with the best educational achievements have been admitted to these programmes. The economic significance of knowledge in humanities is increasing in the knowledge sector as well as in the innovation sphere. However, this is not sufficiently reflected in the programmes, since students do not acquire the skills and the knowledge of possible applications that the real economy demands, the interdisciplinary connections are not sufficient, and also, classification of programmes is sometimes overworn. In addition, in many cases, the strict institutional structure now superseded prevents educational offers and the research portfolio from becoming more open. When rethinking institutional level capacities for each programme, the currently unused infrastructure and human resources potential should be revealed and activated (one example of this is the low proportion of female students in technical and information technology programmes), and institutional profiles should be repositioned.

As a result of the measures to be implemented in the field of education

- the institutions will react faster and more efficiently to the labour market expectations due to the structural changes,
- the local higher education institutional network will give everyone the opportunity to participate in higher education,
- drop-out rate will be significantly reduced, the student competences linked to labour market expectations will be improved,

- the share of the population having tertiary level qualification will increase on the whole,
- thanks to the supportive processes the number of participants in international mobility programmes will rise,
- Hungarian higher education will become more attractive,
- due to the healthy programme structure the international programme provider capacity of institutions will increase and at the same time the amount of own income from programmes will also rise,
- the students will receive a degree that is more competitive and provides more extensive knowledge.

2.1.1. Strategic Objectives Set in the Field of Education and Training

Objective: the relations with employers (corporations) should be strengthened on national and institutional level, demands for qualifications should be channelled into the programmes to renew the content of higher education programmes, especially regarding foreign language courses for professional purposes.

Reason: higher education prepares specialists for the labour market, and students apply for further education to gain useful knowledge and competences, therefore, the external customer side should also have an effect on the content, quality, and depth of education besides the specialists teaching in the given programme. Furthermore, the provision of professional knowledge in foreign languages is also of utmost importance. With respect to the usually foreign-owned labour market environment operating in foreign working languages, the launching of foreign language programmes should be urged, which is a precondition for the knowledge export performance of Hungarian higher education and the increase of the number of foreign students.

Actions:

- The list of higher vocational education programmes, Bachelor programmes, single-cycle long programmes and Master programmes and sprofessional qualifications should be enclosed in a new government regulation, during the preparation of which the professional organisations concerned should be involved in all fields of study.
- Regular and intensive relations should be maintained in all public higher education institutions with the economic and professional organisations interested in the programmes of the given institution. This should be supported by measures from the maintainer.
- Apart from short-cycle programmes, the number of credits to be offered in a foreign language should be prescribed for all programmes (the minimum target value being 10% of credits) which requires legislative amendment
- The launching of foreign language programmes should be supported and encouraged, the implementation of which is the responsibility of the institutions. In the training and content development programmes of the HDOP (Human-Resources Development Operational Programme) the development of credits taught in a foreign language is a compulsory element.
- In the international mobility programme with national scope, partially financed from HDOP and CCHOP (Competitive Central-Hungary Operational Programme) funds, strong focus is given to studying in a foreign higher education institution with the credits recognised, and especially to pursuing professional training.

Objective: we encourage the establishment of educational and research cooperation between institutions, the launching of joint programmes, the strengthening of the mentoring role of decisive institutions, and the creation of networks facilitating faster development of students.

Reason: it is necessary to provide national supply coverage in various fields of higher education, however, not all institutions have or can have the resources in the appropriate quality and quantity, so their rational distribution is needed.

Actions:

- We allow the higher education institutions having the same maintainer to organise joint programmes while using each other's infrastructure. This requires egislative amendment.

- In the course of the coordinated institutional announcement of higher vocational education programmes, Bachelor programmes and Master programmes, the rational direction of further studies should be made clear, which is the responsibility of the sectorial policy.
- Quality programme supply can be expanded in regions with a currently limited higher education programme supply within the infrastructural framework provided by Community Colleges; to this end, sectorial policy should encourage institutions to outsource their programmes.

Objective: the education and outcome requirements will be renewed in content and in structure in compliance with the renewed programme structure.

Reason: the recommendation of the European Union of 2008 on the establishment of the European Qualifications Framework for lifelong learning (EQF) requested that the Member States establish their own national qualifications frameworks and to link their frameworks to the EQF under a standardised referencing process. Pursuant to the recommendation, all new qualification certificates and degrees issued by the Member States should contain a clear reference to the appropriate Hungarian and European framework level. The learning outcomes of the qualifications that entitle to fill a position or to practice an occupation or professional activity and the requirements of the knowledge to be obtained by the educational attainment and the professional qualification in Bachelor programmes and Master programmes, and professional qualification in higher vocational education programmes should be determined in the education and outcome requirements (the characteristics of knowledge, skills, attitude, autonomy and responsibility in a manner to be comparable with the cycle descriptors of the Hungarian Qualifications Framework). The expansion of the education and outcome requirements with such content also allows for the review and modernisation of content for all programmes codified for almost 10 years. Due to this the regulation of programmes and outputs will become more well-considered and their content more competitive.

Actions:
- The education and outcome requirements of Bachelor programmes, single-cycle long programmes and Master programmes should be published in a new ministerial decree with the cycle descriptors of the 2008 recommendation. In parallel, the content of the education and outcome requirements can be modernised, during which the professional organisations concerned should be involved in all fields of study.
- Learning outcomes should be made measurable not only by the final examination, but by a special competence test to be taken at the beginning and at the end of the programme, which clearly shows how the student has developed during their higher education studies thanks to the programme of the given institution. This requires legislative amendment.
- Launching a methodological programme of national scope with HDOP and CCHOP support to measure learning outcomes, optional connection to a EU or OECD system (AHELO).

Objective: Increasing interoperability among higher education training outputs and output alternatives.

Reason: different types of training are needed which better adapt to labour market participation.

Actions:
- A Bachelor programme output (e.g. production engineer or technician) based on vocational education and training and work experience should be created at the level of sectorial regulation, and various forms of output (including to Master programme) should be ensured for further education.
- Creating a possibility to join a lower study cycle from a higher study cycle, thus ensuring the optimal level of output.
- Launching dual programmes, profile clarification of vocational education and training in the higher education system, launching short-cycle, higher vocational education programmes and retraining programmes under the responsibility of institutional and sectorial regulations.

Objective: introduce and continue solutions and programmes enhancing access to higher education.

Reason: one of the social mobility channels of modern societies that work best is the successful participation of well-prepared applicants and students in higher education.

Actions:

- Measures are taken by the maintainer to improve the institutional data upload of the higher education information system so that the students concerned can be monitored more intensively.
- The funds available for the Mentoring programme will be increased so as to reduce the drop-out rate among socially disadvantaged students already admitted to higher education.
- With the maintenance of all current places of studies and by determining the frameworks provided by Community Colleges, national coverage will be realised in the field of higher education; the regional supply of higher education programmes can be extended by establishing special dual training centres in certain fields.
- For the students admitted to a higher education institution who belong to the lower one-third under the sphere of responsibility of the maintainer based on the competence test taken in the given programme compensatory courses will be organised within their studies in order to reduce the drop-out rate and to improve the level of special knowledge necessary for the given programme.

Objective: A performance-oriented promotion system for teachers and researchers shall be introduced, teachers' as well as researchers' performance shall be measured, and the conditions for competitive compensation shall be established in order to enhance personal excellence.

Reason: It is the effectiveness, success, and competitiveness of higher education that depends on the appreciation, motivation and professional excellence of its teachers and researchers, who facilitate education directly. To act against international "brain drain" and to promote research excellence, it is necessary to carry out the revision of wages that was postponed for years, which also allows for the involvement of new experts with private sector experience into education. The new wage and remuneration system has to provide teachers carrying out educational activities and employees with other classification with – even in the case of young employees – an income for a full-time job competitive with that of those not working in higher education. A fundamental and acute problem in the Hungarian research jobs system is the lack of the fixed-term pre- and postdoctoral job category, and as a result students working on their dissertation or having recent PhD degrees find very few jobs; therefore, migration is most typical of this group.

Actions:

- The new higher education implementing regulation of the act on public employees should be laid down, which should contain the transformed system of remuneration.
- The number of experts with private sector experience involved in education should be raised, for which the amendment of legal regulations may be needed apart from institutional steps.
- In order to measure the teachers' performance, the compulsory system of teacher work assessment should be introduced, in which the data of the Hungarian Scientific Bibliography. Database and the results of the Student evaluation of teacher performance should also be taken into consideration in the assessment by the employer. The best performing teachers on each programme should be entitled to additional benefits. To this end, legal authorisation and regulationare needed.
- A transparent quality assurance system of the education and research activities of university teachers after their appointment should be laid down, which requires legal authorisation and regulation.
- To secure a new generation of teachers, the government provides special support for all institutions to employ doctoral candidates and pre-doctors for 1 to 2 years, as well as for their "continuation of employment"; this support requires legal regulation and a reformed funding method.
    - In addition, the direct target group support aimed at increasing the new generation of teachers and researchers should be allocated in the relevant ESF funds (HDOP and CCHOP) in line with the National RDI Strategy for 2013-2020 "Investment in the Future".

Objective: The students' entry and outcome quality requirements shall be increased.

Reason: higher education can only be operated with students who are adequately prepared and motivated. While all applicants who are adequately prepared and have the necessary knowledge should be provided with the opportunity to participate in higher education, the expected level of preparedness must be raised and advanced level school-leaving examination and the adequate level of foreign language knowledge should be set on the medium term in order to improve the quality of programmes.

Actions:

- Access to the Hungarian state grants should be regulated with a programme-specific admission score system to help ensure adequate preparedness at the entry and appropriate level of motivation. Those provided with state grant undertake the duty of establishing and maintaining an employment relationship in Hungary, related to this form of financing. This measure should be implemented within the framework of sectorial decision-making.
- We examine and, after having assured the appropriate authorization by law, regulate, where appropriate, by means of a regulation the programmes and study cycles for which advanced level school-leaving examination or an equivalent minimum admission requirement is necessary from 2020.
- From 2020 it is justified to introduce as input admission requirement in all programmes other than short-cycle programmes the knowledge of at least one foreign language at intermediate level, which requires legal regulation.
- Learning outcomes should be made measurable not only by the final examination, but by a special competence test to be taken at the beginning and at the end of the programme, which clearly shows how the student has developed during their higher education studies thanks to the programme of the given institution; this, as it has been mentioned before, requires legal authorisation and regulation.
- The reallocation of students who perform more poorly should be performed at a greater pace into the full tuition category by a more strict quality criteria imposed during the programme; in parallel, the reallocation of well-performing self-financed students to the state-financed category should be increased at the same pace, which again requires the amendment of law.

Objective: Redefining quality assurance and the role of Hungarian Higher Education Accreditation Committee on the basis of the principle of performance.

Reason: further quality development of higher education is conditional upon the restriction of quality assurance and accreditation expectations and requirements, which of course should still comply with the current principles of ESG and the ones renewed in 2015; these principles continue to be authoritative and guiding for the Hungarian higher education.

Actions:

- The transformation of the accreditation system, enhancement of the role of the Hungarian Higher Education Accreditation Committee in measuring the skills, competences and learning outcomes necessary for the classification of outcome results and study cycles, besides entry regulations.
- A new government regulation is needed to separate the establishment of a programme from launching a programme, alleviation of the requirements to launch a programme (simpler procedure, but it entails continuous and stricter control during the programme and at the end).
- The transformation of qualified teacher requirements in a way to ensure that in all forms of education, especially in dual education, the experts with private sector experience employed in a higher education institution or a place of professional training who undertake an active role in education are taken into consideration during accreditation. This action requires the amendment of law.
- The maintainer should regularly control on its own initiative the internal quality assurance system of institutions and its operational practice, i.e. all institutions should prepare a report every year to the maintainer on how the institution applied its regulations in practice, and what where the results of the measurement of the quality of teachers, study programmes and the institution as a whole.

Objective: The system of PhD training and the system of incentives will be reformed.

Reason: the number of students enrolled in doctoral programmes has risen notably in the last few years, but further measures are needed to strengthen the high number and the quality of the new generation of scientists.

Doctoral programmes fall under the competence of the Member States, but the Berlin Communiqué of 2003 declared the field of doctoral studies an "action area", and also highlighted the importance of synergy between the European Higher Education Area and the European Research Area.

After issuing the Berlin Communiqué, the fundamental principles concerning doctoral studies were clarified in the "ten basic principles" of Salzburg. The two most important principles from the point of view of the intervention of the higher education strategy are:

- The core component of doctoral training is the *advancement of knowledge through original research*. At the same time it is recognised that doctoral training must increasingly meet the needs of the labour market outside the academia.
- *Doctoral candidates as early stage researchers*: should be recognized as professionals – with commensurate rights - who make a key contribution to the creation of new knowledge.

The biggest challenge in the transformation and development of doctoral studies is to strengthen the research and practice-oriented approach.

Actions:

- Elaboration of a scholarship system with differentiated grants to increase the number of doctoral students or MSc/MA students preparing for doctoral studies and laying down the related legal regulations.
- Replacing the contact hour-centred content of doctoral programmes of many institutions by strengthening the research and tutorial nature of studies, which requires legal regulations and institutional steps.
- Prescription of higher research performance for PhD students supported with state scholarship for PhD studies and limited education workload at the same time, thus increasing the ratio of students obtaining a degree. This requires legislative amendment.
- To gain professional experience, it is supported on the long term to pursue Bachelor programmes, Master programmes and doctoral programmes in different institutions.

Objective: there should be no talent lost, all talented students shall have the possibility to achieve their potentials.

Reasoning: institutionalised talent fostering has been one of the strengths of Hungarian higher education, research and development for centuries, that was present in every era of the Hungarian education system, from the beginning of modern history. We are convinced that different forms of talent fostering can make it clear for every talented student that they can rely on the professional support of their professors, from the start of their career.

Actions:

- All higher education institution shall operate a talent fostering programme designed for the given institution, that can be in the form of Academic Student Workshop, where everyone gets a chance to develop and achieve its potentials.
- The National Scientific Students' Associations Conference shall be organised in the future as well.
- Higher education institutions shall be encouraged to actively operate special colleges (and/or Roma colleges for advanced studies, as the case may be) within their talent fostering programme, that besides professional programmes and their role in community development will also be involved in higher education and research as well.

Performance indicators

	BASE VALUE (2013)	TARGET VALUE (2020)
The number of programmes offered while retaining the capacities concerned is reduced on a national level by 15%	10,732	9,122
The drop-out rate decreases by 10 percentage points on average in Bachelor and single-cycle long programmes	35%	25%
Number of foreign students	23,000	40,000
Number of students in dual Bachelor programmes in the relevant fields of study among first-year students	0%	8%
Ratio of persons with tertiary level education or equivalent in the age group 30–34 years	29.9% (2012)	35% (2023)
The proportion of students participating in foreign partial training sessions of at least 3 months or of a value of minimum 15 credits, in the frames of foreign travel or professional training	10.41%. (2012)	20% (2023)

2.2. World-class Research

The amount spent in the Hungarian economy for research and development and innovation has been on the increase since the economic crisis, but this is mainly due to the increased expenditure of businesses. While academic and university R+D+I costs practically stayed the same, companies increased their related expenses by more than 10% annually, which justifies that Hungary has been shifting from the regional production centre of traditional products towards production with high added value that requires research and development.

Hungary remains an attractive destination country for foreign investors, on the one hand due to its technological development achieved recently, and on the other hand the "safety" of technology placed here, furthermore because of the still existing lower labour costs. Continuing this process and achieving the objective "Hungary as innovation centre of Central and Eastern Europe" is a high priority. The economic environment increasingly requires the establishment of innovative products at every level of the supply chain, including the original producer as well as SMEs at lower levels of the supply chain. A clear trend is that every actor aims to do its best in its own competency areas, handing over the full responsibility of irrelevant elements, especially the development of the given product, down the supply chain. In this sense, the Hungarian economy is particularly sensitive to the broad existence of R&D&I competence.

The role of research and development as well as innovation cannot be limited to activities used by economy in the short and medium term; frontier researches and, generally, activities promoting the social innovation are also high priorities, and the community is responsible for their presentation and funding.

Both EU and domestic community specify R&D&I and its funding as a strategic area and allocate the resources needed. It is a fundamental interest of the country to use these resources *effectively, focusing on the economic and social development*. To this end, the Government has approved the document "Investment in Future: National Research and Development and Innovation Strategy 2020" and specified the action programme, which is able to terminate the weaknesses of knowledge bases and knowledge production, furthermore, to handle the problems of the co-operation mechanisms of knowledge flow, knowledge and technology transfer as well as business and community sectors performing knowledge management, too.

The Hungarian higher education system has to meet this strategy from two aspects: ensuring the external requirements outside the institution (e.g. the background for researchers) and activity inside the institution (the actual R&D&I).

From scientific, professional and organisational point of view, the higher educational institutions are the most important actors of domestic R&D&I. The number of people performing research and development – whose participation in education in the majority of cases is similar – has slightly decreased in recent years, the higher educational institutions, however, have a significant potential in performing tasks related to R&D&I:

- Considering the number of people employed in the R&D&I of higher educational institutions, employees with a scientific degree provide the highest ratio (66%, while this value is only 10% for corporate research centres).
- Almost two thirds of the publication references and references measuring their effectiveness are created by the researchers of higher educational institutions, more specifically, 10-15 institutions play the most important role at international level, the majority of which operate in six research universities.
- Institutions are increasingly present in the field of industrial property notifications: 15% of the domestic patents are produced here.
- In contrast to academic and corporate research centres, the regional distribution of researchers in higher education is essentially balanced: 57% of researchers are employed outside Budapest.
- Partly due to their R&D&I, partly their educational activity, higher educational institutions are in intensive contact with economic and social actors, are able to understand their demands, consequently, can establish effective external partner relations.
- They play a key role in the area of corporate R&D&I since the presence of R&D&I intensive suppliers in Hungary – apart from the institutional network of the Hungarian Academy of Sciences – is not typical, this task can be performed by higher educational institutions following the relevant structural modifications.
- Immediate integration of research results into education is only ensured for higher educational research institutes.

However, a number of problematic areas can be identified in the area of higher education R&D&I, which can endanger the effective, sustainable operation of the system:

- Funding of activities related to higher education R&D&I has eventually not changed, the value of input as a proportion of GDP has been about 0.24% with some fluctuations for a decade.
- Higher education does not supply the next generation of researchers as expected, mostly due to deficiencies in PhD programmes (only 22% of the students have obtained an academic degree in the framework of school-based training since the introduction of the current PhD system).
- There are too many independent doctoral schools, at the same time, their activity does not focus on areas being important for R&D&I (only a low number of doctoral programmes and PhD candidates in areas related to engineering, and natural sciences).
- Considering the revenues of the institutions, the ratio of direct (e.g. not supported from community sources, mainly corporate-related) R&D&I resources is relatively low.
- Structures aimed at ensuring direct corporate conditions for cooperation of the institutions have not been formed in a sustainable and efficient way.
- The R&D&I activity of the institutions results in an inefficient use of resources in many cases, the level of professional cooperation among the PhD programmes as well as institutions is low.
- The R&D&I support system of EU results in special situation since outstanding institutions operating in the central region are in an unfavourable situation due to lack of community funds.

2.2.1. Strategic Objective of the Higher Education Institutional System Related to R&D&I

R&D&I activity of higher educational institutions at the level of institutional system is currently not planned and not coordinated. R&D&I participation and effective operation of the whole higher educational system could be ensured in a more effective way with a consistent, systemic strategic coordination broken down to institutions and its adequate implementation. It is our objective therefore to *plan R&D&I activity, structure and funding of the higher educational institution system according to technology policy and excellence expectations of the country and to implement it accordingly.*
As a result,

- the number of researchers increases both in higher educational institutions and in corporate and publicly-funded research centres;
- the number of researchers from EU Member States increases in domestic institutions; the number of lecturers and researchers performing common researches with EU research institutes and higher educational institutions also increases;

- the scientific productivity of lecturers, researchers and doctoral candidates, thereby the number of publications and the ratio of degree obtaining increases;
- the international standing of higher education institutions improves, certain disciplines get into the forefront of international excellence;
- higher education institutions actively participate in development of corporate R&D&I capability, with special regard to Hungarian-owned, technology-intensive SMEs;
- the volume of direct R&D orders increases;
- direct community funding of institutions significantly increases (Horizon2020), and participation in EU research programmes and networks reaches the EU average.

Objective: To establish R&D&I networks between institutions, strengthen R&D&I focus.

Reason: professional cooperation among higher education institutions is not typical, which results in the fragmentation of resources and, finally, causes non-competitive operation in the majority of institutions. In order to ensure effective operation, competence areas of institutions should be identified and developed consciously and other areas should be covered in cooperation with other institutions. Additionally, establishment of an institutional cooperation network based on excellence is also an objective.

Actions:

- It is necessary to establish a system related to sharing of knowledge and facilities instead of fragmented, often parallel developments. This requires sectorial coordination.
- Establishment of cooperation systems in every step of the innovation value chain (basic research, applied research, experimental development, market innovation, social innovation). Funding of basic research is considered to be a community task while the others require a mixed funding, and inclusion of industrial resources becomes more and more important with the progress of the process.
- Identifying the priority competence areas at sector management level based on the competence map of higher educational institutions.
- Strengthening research excellence through development, financial and maintainer measures in light of specified disciplines.

Objective: Higher education takes part in the establishment of the innovation competencies of technologically intensive companies - primarily SME's - in line with the specializations and directions dedicated by the National Intelligent Specialization Strategies.

Reason: Hungary holds a leading position in the region with regard to innovative large companies but is among the last in the case of domestically-owned SMEs with R&D&I capability (26% of the Hungarian SMEs are innovative, while the European average is 49%). The current EU support cycle gives priority to the development of the innovation capacity of SMEs, however, a substantial part of the Hungarian SMEs will not be able to use the EDIOP (Economic Development and Innocation Operational Programme) resources available effectively without external support. Higher education institutions can play a significant role in this process due to their existing knowledge, availability within the country as well as their tools and relations, provided that relevant structures exist.

Actions:

- Establishing the conditions of cooperation between the industry and universities, establishing the system of "Higher education and Industry Cooperation Centres", ensuring innovation incubation environment mainly for SMEs by sector management.
- Proper establishment of the internal processes and structure of the higher educational institutions, in competence of the maintainer, in cooperation with institutions.
- Amending the economic conditions of higher education institutions in order to ensure cooperation with companies, which requires legislation activities at the level of laws and regulations.
- Prioritisation of developments and projects by decision makers, which are implemented with the involvement of higher educational research institutes during the allocation of community R&D&I funds.

Objective: the research and funding system should support the internationally competitive quality and resource concentration, as well as increasingly build on resources outside government finances, obtained by institutions, which will be promoted also by amendment of the Act on public finances (business activity).

Reason: In the future, research and development may be funded only in an organised and planned way, focusing on quality and efficiency expected. Substantially community funds are available until 2020 in order to achieve these objectives, effective use of them can make the R&D&I system of higher education operate sustainably in the long term as well. However, the unfocused fragmentation of research resources without any concept as well as re-funding and diversion into the training area should not be allowed.

Actions:

- Separation and clarification of funding of academic-type and practice-oriented researches with regard to the particular resources.
- Separation of the funding of research and training at institutional level, the first one should be funded by performance, the second one by task.
- Standardisation of institutional regulations related to the funding of R&D&I and R&D&I revenues with integration of incentives intended for the increase of revenues.
- The state enables higher educational institutions through its own tools (e.g. review of the relevant provisions of the Act on the State Budget, supporting the National Office of Intellectual Property) to increase R&D&I revenues (involvement of higher educational institutions in state R&D&I major projects, increasing R&D&I cooperation content of the strategic partnership agreements and their extension on particular higher educational projects).
- Raising attractiveness of corporate decisions making use of or developing R&D&I capacity of the national research network through allowances requiring amendment of various legislations.
- Harmonisation of the accessibility of domestic and EU funds in order that effective exploitation of the country's R&D&I capacity should not be limited by regional rules.
- Simplifying administrative actions and procedures accompanying the R&D&I activity as well as making them flexible at operative level.
- Completion of acts on research and development, technological innovation as well as on public procurement with elements supporting the operation of national research network.
- Creating stronger links between higher education institutions and research centres of the Hungarian Academy of Sciences and public research centres.

Objective: increasing the international integration of researches in higher education.

Reason: The EU 2020 objective of the European Union is to increase R&D&I capacities and harmonise them at EU level. In the 2014-2020 programming period, Horizon 2020 supports serve to strengthen the European Research Area (ERA) and integrate European potentials.

Statistics of the previous period (FP7) indicate that domestic higher education institutions were under-represented in the EU research programmes compared to their research and scientific potentials. For this reason, participation in ERA, Horizon2020 and related (e.g. EIT, FET) international research initiatives should be enhanced.

Actions:

- Concentration of resources in order to support the internationally competitive basic research projects.
- Ensuring targeted boosting support for joining the Horizon2020 and other ERA programmes (e.g. EIT KIC) from HDOP.
- Support for joining the European competence centres, research university societies and international programmes.
- Facilitating the international exchange of experience, development and arrangement of popular science programmes and trainings by strengthening international research technological relations.

Objective: Ensuring the human resources for R&D&I in the long term.

Reason: Ensuring the human resources segment of R&D&I is connected with two tasks: increasing the number of researchers and strengthening the level of relevant academic qualifications. Both belong to the priority tasks of higher education, partly due to the own R&D&I capacity, partly because of ensuring corporate and research institute capacities. The output of the doctorate training system currently in use cannot meet the European average and even the level of relevant countries (Germany, Austria, the Netherlands) in either volume or structure.

Actions:

- Transformation of the PhD training system through (a) increasing the academic performance, (b) establishing a two-step training system (2+2 years, supporting high-performers in the second step), (c) prioritising the tutorial system against school-based training. This requires legislative amendment.
- Establishing the system of frontier research projects based on the interest of the research centre as well as the measurable, person-specifically (doctoral candidates, young researchers) funded performance. In this framework, supporting the most excellent, young talents performing basic research activity mainly in MTMI area with an extra funding of about 10%, compared to the current state funding of higher education.
- Establishment of an incentive system in order to involve corporate professionals in PhD training as well as higher education and research institute research temporarily or in the long term, which requires measures at institutional level.

Objective: Renewing the R&D&I infrastructure.

Reason: In research and development, world-class results can be achieved only by continuous renewal and modernisation of the infrastructure aimed at R&D&I. The underlying principle is that basic infrastructure services which are provided centrally, uniformly at national level, should be provided by the state. At the same time, concentration and sharing, that is, use of large equipment, research infrastructure by several institutions and research groups should be a priority in institutional infrastructure investments.

Actions:

- In the convergence regions, targeted, planned and efficient use of community funds, in the Central Hungary Region, that of budget and RTIF support, for the scheduled modernisation of the infrastructure aimed at R&D&I. To this end, in HDOP ensuring educational, while in EDIOP research-targeted infrastructure developments, in the Central Hungary Region, introduction of a scheduled programme for the development of higher educational infrastructure based on specific decisions by the Government.
- Ensuring and developing central service infrastructures (NIIF, EISZ) from the funds of HDOP and EDIOP.

Performance indicators

	BASE VALUE	TARGET VALUE
Number of researchers [person]	37,000 (2012)	56,000 (2020)
Number of R&D employees per 1,000 employees	8 (2011)	12 (2020)
Higher educational R&D&I cost as percentage of GDP	0.24 (2012)	0.5 (2020)
Direct R&D&I revenue of the institutional system [as percentage of the total budget]	1.5% (2012)	10% (2020)
The proportion of students obtaining a PhD degree [total number of students admitted in the relevant year]	22% (2013)	30% (2020)
Number of patents in higher education [as a % of patents registered in Hungary]	13% (2013)	25% (2020)

	BASE VALUE	TARGET VALUE
The number of domestic centres of excellence appearing in the professional measurements of the Centre for Higher Education (CHE)	2 (2014)	10 (2020)
Number of institutions included in the League of European Research Universities (LERU)	0 (2014)	1 (2025)
Number of higher education international research projects funded from framework programmes (FP7 / Horizon2020)	397 (2007–13)	635 (2023)
The number of foreign language publications written in higher education	10,177 (2012)	13,000 (2023)

2.3. Higher Education is the Catalyst for Urban and Regional Development

Apart from their education and research functions, higher educational institutions play an important role in the social development of countries, and their indirect economic role shall not be contested, either. The so-called "third mission" summarises the activities of higher educational institutions and their impacts on the environment. This effect is explicitly strong even outside of the obvious area of training and research services, at the same time, it is typically realised through indirect and soft tools, consequently, it is difficult to quantify.

The national institutional network is potentially able to fulfil its role as third mission. The strength of it lies in the broad territorial coverage regarding headquarters and sites, which requires strong intervention only in some counties (Nógrád and Békés county). The local connections related to training, research, economy and settlement development are available even for institutions with a narrower profile. Community spaces, service infrastructures (sport, culture, library, public collections) are available to local intellectuals, institutions operate as living knowledge bases, however, they very often serve as regional centres of cultural and sports activities as well. Moreover, considerable international and EU funds are available for developments serving to strengthen typically the third mission of higher education.

Soft tools and factors becoming more and more considerable in economic stimulus and regional and urban development - innovation capacity, intention for establishing new knowledge, networking, social capital, trust, willingness to cooperation, enhancing social, economic, scientific and cultural relations and networks - as well as the creative medium of higher educational institutions are coherent with each other. There are well functioning contacts, services and programmes, that is, best practices are available.

2.3.1. Strategic Objectives Related to the Third Mission of Higher Education

Objective: To increase the impact of higher education on local economic development

Reason: Many industrial production centres established in the past 4 years, and the increasing cooperation between industry and higher education have significantly improved Hungary's economic integrity. The development of this cooperation remains a strong priority. It is essential with regard to the economic stimulus that the research and development performance of the large domestic scientific centres, i.e. higher education institutions, contributes to the development of the business sector, especially to that of domestic-owned SMEs.

The so-called spill-over effect of research and development activities performed in higher education institutions is not significant in the rural towns, a major part of innovative SMEs operate in Budapest and its agglomeration. At the same time, a considerable multiplier effect can be observed in the convergence regions with regard to the increase in employment (e.g. Pécs), generation of resource investment projects (e.g. Eger) and establishment of an incubation environment (Szeged, Debrecen).

In order to convert the results of scientific researches into the actual innovation, it is necessary to improve the knowledge and technology transfer activities of higher educational institutions and develop incubation services and services supporting the establishment of spin-off businesses. Channelling of existing training and research capacities as well as the knowledge base existing in higher education institutions to the establishment and implementation of regional strategies for economic and settlement development

is the spill-over effect of the economic stimulus. While the client's side also directly contributes to the planning of the structure and activity of higher education for the training and research objectives (training and research portfolio should be adjusted to the structure of regional economy), as for the side of the third mission, a more active involvement of higher education institutions in the local, economic and social processes is needed.

Actions:

- Channelling economic actors to the strategic decision-making processes of higher education institutions, mainly through organisational and regulatory tools.
- Channelling intellectual capacity available for higher education to the establishment and implementation of smart specialisation strategy, respectively, to local economic strategies.
- Ensuring participation of higher education institutions in the planning and implementation of RDOP programmes.
- Developing incubation services of higher education institutions through the funds of HDOP aimed at developing human resources and ensuring joining the economic development and R&D programmes of EDIOP and RDOPs.
- Supporting higher educational technology transfer processes through the funds of HDOP for the development of human resources.
- Enhancing the economy stimulation and regional development role through the active inclusion in implementation of the Smart City concepts.

Objective: To increase the activity of higher educational institutions in addressing social challenges and in the dissemination of social innovation.

Reason: Social challenges specified in strategic documents of the EU's framework programmes for research and technology development for the period between 2014 and 2020 cover also both future and current challenges related to Hungary. (i) health, demographic change and welfare; (ii) food security, sustainable agriculture and forestry as well as bio-economy; (iii) safe, clean and efficient energy; (iv) smart, environment-friendly and integrated transport; (v) climate change, environment protection, resource efficiency and raw materials; (vi) inclusive, innovative and reflective societies; (vii) protecting freedom and safety of Europe and its citizens.

The other objective of Horizon2020 is to strengthen *social innovation*. For higher education, the term social innovation refers to several innovative approaches, which, in the broader sense, are intended to support the adaptation of society to the current challenges. For instance, innovative measures aimed at managing employment problems or initiatives handling the social effects of the rapid technological development belong to important elements of social innovation. It is common in the forms of social innovation that they are based on a well-established field of knowledge in every case. Higher education institutions can be considered as domestic sample organisations in finding new forms of education, employment and cooperation as well as in their exemplary application.

Unfortunately, the international dimensions are lacking from the measurability of academic performance in the disciplines of humanities and social sciences. In the absence of the measures taking the specific features of the disciplines into account, it is more difficult to find objective handholds in allocation. The level of *fundraising* capacity (tenders, economic-social partners) of the disciplines' financing is low both locally and internationally. Since, concerning academic research and education, this channel is playing an increasing role in the domestic as well as international academic life, it is essential to find a way to reach these sources.

Expected effects relate to several levels: trainings and researches are adjusted to social, economic and environmental challenges, parallel with transformation of research functions. As a result, the challenges above are reflected in training and research activities. The treatment of social challenges is integrated into the management, operation and the institutional processes: they are not only present in research or training but, among others, in the fact that the environmental impact as well as water and energy consumption of higher education institutions effectively decreases; innovative, flexible forms of employment, training and education are introduced in institutions; various smart solutions are incorporated into the use and operation of higher education community spaces.

Actions:

- Targeted support of researches intended to tackle environmental, economic and social challenges in the form of a separate programme or orders.
- Future and problem-oriented topics as well as gender aspects are integrated as a focus or horizontal criteria in the research topics.
- Reflecting on environmental, economic and social challenges and the topic sustainability are integrated as mandatory elements in the curricula through regulatory and development interventions.
- Higher educational sample projects are introduced in the area of economical and efficient - primary and secondary - use of natural resources (water, energy, raw materials) as well as in the area of modelling potential medium and long-term impacts of climate change, with special regard to its impact on the quality of life and the expected performance of the agricultural production and food economy in public institutional constructions of the Environmental and Energy Efficiency Operational Programme (e.g. passive presentation buildings).

Objective: the number of science-popularization, awareness raising and attitude-forming services is expanding and accessibility to higher educational knowledge bases also increases.

Reason: the public collection related network (libraries, archives, collections) and databases of higher education institutions offer the knowledge base with the broadest territorial coverage and the most extensive content in Hungary. As a result of these particularities, measures and proposals introduced in universities and colleges and aimed at solving the current problems significantly shape the attitudes of younger generations; students leaving the higher educational institutions are not only appreciated employees but also the educated, broad-minded and environment conscious members of the middle class, who are able to tackle problems in an intelligent way.

Actions:

- Active support and extension of science-propagating programmes such as Kutatók Éjszakája (Researchers' Night), a Tudomány Ünnepe (Hungarian Science Festival), a Mindentudás Egyeteme (University of Omniscience), a Lányok Napja (Girls' Day).
- Mandatory integration of attitude-forming, presentation elements as horizontal elements in higher education investments.
- Introducing programmes for improving and extending knowledge bases in HDOP.

Objective: To produce up-to-date information contents and to guarantee wide access to them.

Reason: Apart from the traditional school-book supplies, the higher education libraries effectively contribute to the production and service of digital study materials. The majority of higher education libraries function as "study (information) centres", considerably exceeding the traditional role. The most significant change and justification that university libraries have remained and continue to remain the sites of learning can be observed among the new learning forms. More and more new methods are established, which are aimed at teaching or enhancing the high-level information literacy of students and lecturers, the new pieces of knowledge of scientific communication. Also the library technology should be able to handle the growing dominance of mobile devices among users (application developments required to mobile services, establishing educational cloud structures). Connecting library networks with other cultural / information networks could result in raising the quality of higher education.

Actions:

- enhancing the electronically established educational contents in a coordination at national level;
- integrating the support of coordinated digitisation of the traditional textbooks, periodicals, educational materials of value, in institutional developments;
- establishing a targeted and easy-to-use service environment for locally developed or obtained educational materials for students in the framework of institutional developments;
- supporting the dissemination of research results with the use of the more and more channels of communication;

- developing an environment for preserving results in publications in the long term in the framework of institutional developments;
- developments in order to manage, publish and preserve data and data sets generated during the research;
- integrating activities for the support of generating and providing science-metrical data in institutional developments.

Objective: strengthening the service functions of higher education both for students and the local society.

Reason: higher education institutions have a significant community, cultural and sports infrastructure, which particularly meets the students' and lecturers' needs but they are used by the entire population in several smaller university or college towns. Due to their extension and development, there will be broad-minded as well as more health-conscious and healthier students and prospective intellectuals, who conduct a healthier lifestyle. This is of great significance, since students graduating from universities and colleges – when working as leaders, exemplary employees in the future – will have a huge impact on the health and lifestyle not only of themselves but of their environment as well. During the improvement of the training process and its circumstances, it was an important aspect for the service system surrounding the students to have appropriate socialisation effects that promote regular physical exercise, appropriate lifestyle and a health-conscious behaviour. It is essential that these services should not operate as an enclosure in institutions, they should be open not only for students and lecturers but also the surrounding society. Consequently, the development and coordination of sport and health-improving services promoting regular physical exercise and activity is an important objective. Furthermore, sport and institutions with free infrastructural capacities related to health education will be able to contribute to meeting such local needs, and the cultural, recreational and health-improving services can serve as one of the base of local cultural, tourism-related, creative, recreational and health-improving urban developments.

Extension of sport, physical and health education programmes as well as sport and recreational services that promote regular physical exercise and activity is a priority objective, since university sport events and opportunities for sport mobilise not only the institution but also the wider local community. This way, the prestige and attractiveness of the institution and the town improves, and their positive attitude to sport as well as regular physical exercise and activity essential to prevent a number of diseases also ameliorates, making health culture develop and become wide-spread more easily.

In order to improve the higher education service systems accordingly, connecting to "The healthy cities" higher education sub-programme of the World Health Organisation signify an important opportunity of cross-sectoral cooperation. Compliance with the criteria system of the Health Promoting University also means the coordination of universities' and colleges' service systems as well as several fundamental processes, which promotes health-conscience, regular physical exercise and activity, sport and appropriate health-conscious lifestyle, and which meets the objective concerning the improvement of higher education's, and particularly the training process' and its circumstances', quality.

Actions:

- Continuing and extending the commenced higher educational programmes for sport development, consequently, establishing a high-level sport infrastructure as well as recreational and sport service systems promoting regular physical exercise and activity in every institution.
- Inclusion of cultural dissemination activities in higher educational HDOP developments as a horizontal element.
- Promoting the formation of "health-improving universities" within the framework of a cross-sectorial cooperation, and taking part in the successful completion of the programme.

Performance indicators

	BASE VALUE	TARGET VALUE
Number of higher educational, chamber and local government collaborations / discussion forums	2	12
Number of spin-off companies	*Survey ongoing*	+20%
Creative urban strategy, in the implementation of which a higher education institution is involved	2	5
Exemplary higher educational energy systems renovation with presentation function / passive public institution	2	10
Number of participants in higher education services related to sport and physical exercise as well as health-improvement services and health education	*Survey ongoing*	+20%

3. Changes Required for Development

Many changes should be implemented in order that the Hungarian higher education system could be stabilised, strengthened and ready for challenges expected in the future. The changes relate to the higher education policy and the other sectors of the Government as well as institutions themselves.

Profile clarification and specialisation: strengthening educational and cultural focus areas, clarity and separation of the mission of various institution types, assessing quality compliance with the mission, rationalising the structure of training and adjusting funding to this.

Transformation of the institutional system: cooperation and allocation of tasks instead of irrational and uneconomical local competition, unifying regional resources to cope with international competition. Establishing and positioning an efficient and effective institutional system adapted to the spatial structure of the country in the Carpathian Basin and Europe.

Unity of the Hungarian higher education in the Carpathian Basin: the Hungarian higher education ensures access to tertiary training for Hungarians throughout the Carpathian Basin, therefore operates institutions and maintains training opportunities even for Hungarian communities living outside the country.

Internationalisation of the Hungarian higher education: One of the biggest challenges of the 21st century is the internationalisation of science and research, in which Hungarian higher education must also keep pace with the ruling trends in order to reach a world-class level, and to become able to include and offer quality training for foreigners who wish to get acquainted with the results of Hungarian science.

Educational innovation: creative reinterpretation of the traditional higher educational self-image in the light of challenges and opportunities of the 21st century: more intensive learning experiences, methodological renewal, spreading of non-traditional training forms.

Efficient institution management and new business models: redesigning value generating and supporting business processes, direct presentation of maintainer's and users' interests, clarifying the institutional responsibilities and, at the same time, increasing the freedom of entrepreneurship. High-level autonomy belongs to the strengths of the Hungarian higher education, the individual institutions, however, are not able to contribute to the collective performance of the entire institutional system and, finally, that of the Hungarian society as desired, without personal commitment and responsibility.

These changes will be discussed in the following chapters one by one, specifying both education policy objectives and particular actions planned in the current government cycle.

3.1. Profile clarification and Specialisation

Higher education institutions obviously may not be compared directly to production companies, however, several parameters used for qualifying the supply chains have important lessons with regard to redesigning the sectoral processes.

PERFORMANCE INDICATORS OF THE SUPPLY CHAIN	HIGHER EDUCATIONAL INTERPRETATION
Transport time: how much time does the system need to react on emerging new user needs?	How much time do the new graduates who meet the emerging new social / economic demands need to be present in the labour market?
Exact completion of the orders: does the user receive what he originally wanted?	Channelling employers' needs continually to the content of the training. R&D performed according to direct industrial orders.
Capacity utilisation: high-level and stable operation.	Utilising institutional capacities, business utilisation (additional revenue source) or reduction of superfluous capacities, outsourcing.
Inventory: avoiding storage of superfluous raw materials as well as semi-finished and finished products.	Reduction of the average finishing time and drop-outs.
Incurrency: stock for which there was no demand for a long time.	Number of students who completed their studies but cannot find a job in their profession.
Profitability	Calculating the self-financed costs, increasing the ratio of non-community resources, relief of the budget.

Handling the social-economic orders starts with recognition of needs as soon as possible (proactive recognition). Performing labour market prognoses, graduate career tracking and channelling the social (seldom: family) needs can be mentioned as relevant elements. Ordering can be performed several ways in institutions: indirectly, when students participate in Hungarian state scholarships or also directly due to various alternative financing models (student loan, corporate scholarships, community and self-governmental scholarships). Institutions can react in a flexible manner on the orders, the various forms and levels of training (regular, cooperative, dual) result in different transit time. In the case of individual orders, immediacy of the connection to the market is also different.

Objective: Restructuring training programmes in order that students acquire knowledge, which can be used at the labour market and meets their skills and opportunities. Ensuring the higher educational transition from the vocational training system, establishing a new training structure and Bachelor programme (e.g. business engineer, business economist).

Reason: everybody – according to their right guaranteed by the Fundamental Law – can obtain a marketable degree meeting their skills. Higher education becomes a training system, which is accessible to everybody, cost efficient and meets the requirements of the labour market.

Secondary education in Hungary relates to *grammar schools*, *vocational schools* and *technical schools*. A *grammar school* is an educational institution offering general knowledge and preparing for the secondary-school leaving examination and commencing higher education studies, a *vocational secondary school* prepares for vocational secondary school certificate and the continuation of studies in institutions of vocational higher education besides the basic education in vocational groups, in the vocational training years vocational qualification related to the sector of the vocational secondary school-leaving examination may be obtained. A *technical school* offers general and initial vocational training.

A *grammar school* is an educational institution operating with four, six or eight years respectively, where education founding general knowledge and preparing for the secondary-school leaving examination and commencing higher education studies is carried out. Grammar schools generally operate with four years. A grammar school operating with six or eight years by performing the special tasks of talent promotion shall meet the requirements for advanced education. If a preparatory language year is included, it may be operated with five, seven or nine years.

Apart from preparing for the secondary-school leaving examination and commencing higher education studies, a *vocational secondary school* provides a basic education in vocational groups. In a vocational secondary school, the general and vocational training education as well as practical training is targeted at a given vocational group. A vocational secondary school shall have four secondary teaching years establishing general knowledge, where vocational theoretical and practical education shall be performed which shall comprise the common elements of the vocational qualification subject to secondary school-leaving certificate within the sector, in addition to the subjects in cultural domains according to the single general curriculum. At the same time, it prepares for the secondary-school leaving examination. After completing the twelfth year, the pupils may take the vocational secondary school-leaving examination. Qualification that can be acquired by the secondary school leaving examination including the mandatory examination subjects of general knowledge of the school leaving examination specified in the Act on National Public Education as well as mandatory vocational examination subject according to the sector of the vocational secondary school, which entitles the holder to seek employment according to requirements of the Decree on the National Qualification Register (OKJ). Completing this, studies can be continued in the 13th year (so-called vocational training year), where students can obtain a vocational qualification subject to secondary school-leaving certificate among vocational qualifications related to the sector of the vocational secondary school-leaving examination. In the framework of the preparation for vocational training subject to secondary school-leaving certificate, in vocational secondary schools the number of vocational training years is two for pupils who have no vocational secondary school leaving examination according to the sector of the vocational training but have secondary school leaving examination. In this case, the vocational secondary school organises the preparation for the complex vocational examination in the 13th or 14th (first or second vocational training) year. If so, after meeting the requirements of the 13th (first vocational training) year, the student can acquire a vocational secondary school certificate by passing the vocational secondary school-leaving examination from the sectoral vocational examination subject.

A *technical school* offers general and initial vocational training, which does not directly prepares for the secondary-school leaving examination. The period of the dual vocational training is 3 years since 2013, in which the ratio of the vocational practical training is higher than earlier, it can be performed at the workplace as early as from year one, in the framework of an apprentice contract. A student having a technical school qualification, on demand, should be admitted to the tenth year of the vocational secondary school if he fulfilled the requirements. If the student takes a secondary school leaving examination from the four mandatory examination subjects of general knowledge of the school leaving examination, on request of the student, the state-recognised vocational qualification obtained in the technical school shall be recognised as a secondary level vocational secondary school leaving exam. A student having no technical school qualification - by taking account of his general knowledge studies and the completed professional requirement modules - can continue his studies in a two-year secondary school training, which prepares for the secondary-school leaving examination from at least four mandatory examination subjects of general knowledge. The fulfilment of the requirements of the training is equivalent with completion of the last year of the secondary school (secondary grammar school, vocational secondary school). Pupils having professional qualifications specified in the Decree on OKJ who have professional experience of five years and a master's exam after completing the technical school, may as well commence their vocational secondary school studies targeted at acquiring a vocational qualification based on secondary-school leaving examination without passing this exam.

Obtaining the secondary school-leaving certificate is currently the fundamental condition of commencing higher education training. Consecutive higher education course cycles offering a higher education degree: in the majority of cases 6- or in certain areas 7-semester long *Bachelor programme* (BA/BSc), generally 4-semester long *Master programme* (MA/MSc) based upon the same as well as the 6-semester long *PhD programme* (PhD, DLA), which could be exclusively commenced with master's degree. In specific cases defined in relevant legislation, a master's degree can be obtained in a 10-semester long single long cycle as well.

Higher educational institutions - in addition to the above - can also initiate a 4-semester long *higher vocational education* not providing a tertiary qualification at the moment and a 2- or 4-semester long *postgraduate specialization training* not increasing the level of tertiary qualification. On the top of that, adult trainings can be organised in the framework of lifelong learning.

Actions:

- in addition to increasing the technical level of the current higher vocational education programmes, efforts should be taken that also these practice-oriented trainings provide a higher education degree, ensuring, if appropriate, the opportunity that candidate students from technical schools and vocational secondary schools - if their results in secondary education meet the requirements - could be admitted to these trainings, furthermore, with transfer those students who are not able to finish the Bachelor programme, the single-cycle long programme, in the traditional sense.
- As a general rule, apart from the 4-semester long Master programmes clearly awarding PhD programme, establishing 2- or 4-semester long practice-oriented Master programmes which do not prepare for PhD programmes but for higher-quality working through providing higher-quality knowledge.

Objective: Differentiating the profiles of institutions, proper operation of the primary functions of the various types of institutions (university, university of applied sciences).

Reason: a university is not better or worse than a college but its role is different in education. A college is not less important or weaker than a university. However, the name "college" has been out of date recently, and it means competitive disadvantage in the international educational market. Therefore, it is recommended to use the unified name "University of Applied Sciences" (in German: Fachhochschule).

Therefore, functionally, Hungarian higher education will offer two fundamental types of institutions in the future:

- University, where the focus is on *establishing new academic knowledge*, and the operation can be deducted from this mission; several universities of science have key importance among universities (due

to professional and scientific importance, size), which are the dominant elements of the institutional system of the Hungarian higher education;

- University of applied sciences, which is a professional training institution mainly focusing on meeting the economic-social needs and the *utilisation of knowledge*. This is the case even if some institutions are officially colleges according to their name;

The essence of the profile clarification regarding the university (including universities of sciences) and the university of applied sciences (the former college) category is that developments are aimed at strengthening research elements in the profile of the institution type focusing on the *establishment of new knowledge*, efficient participation in the European Research Area (ERA), while training, if appropriate, vocational training functions with regional effect focusing on the *utilisation of knowledge* should be rationalised for these institutions, and installed to the university of applied sciences (college) of the given region.

Based on experience, the qualification system of the Act on National Higher Education (Nftv.) being valid between 2012 and 2016 (priority higher education institution, research university, research faculty, college of applied sciences) will be replaced by a new targeted excellence system, the so-called "*national excellence centres*". The essence of this is that an internationally prioritised research-training area and the related organisational units (and not the entire institution) will get qualification and directed aid. Due their scientific importance and size universities of sciences necessarily can develop more excellence centres, at the same time, the other universities and, if appropriate, universities of applied sciences can have the chance for initiating such an excellence centre.

Objective: Establishing community colleges in order to improve the disadvantaged regions. The community colleges will *build up the framework of knowledge services tending to* the local community and regional enterprises, and play an important role in training intellectuals and keeping highly cultivated people.

A *community college* is a quite new form of institution operation in the domestic practice. The objective of establishing community colleges is that, in a geographic sense, "zones with no higher education" where higher education trainings are absolutely not offered should be eliminated; slightly reducing chances of people living there to participate in a high-level training. Considering that higher education has not managed to play an important role on a commercial basis and sustainably in these sites, a solution differing from the traditional institutional structure should be found.

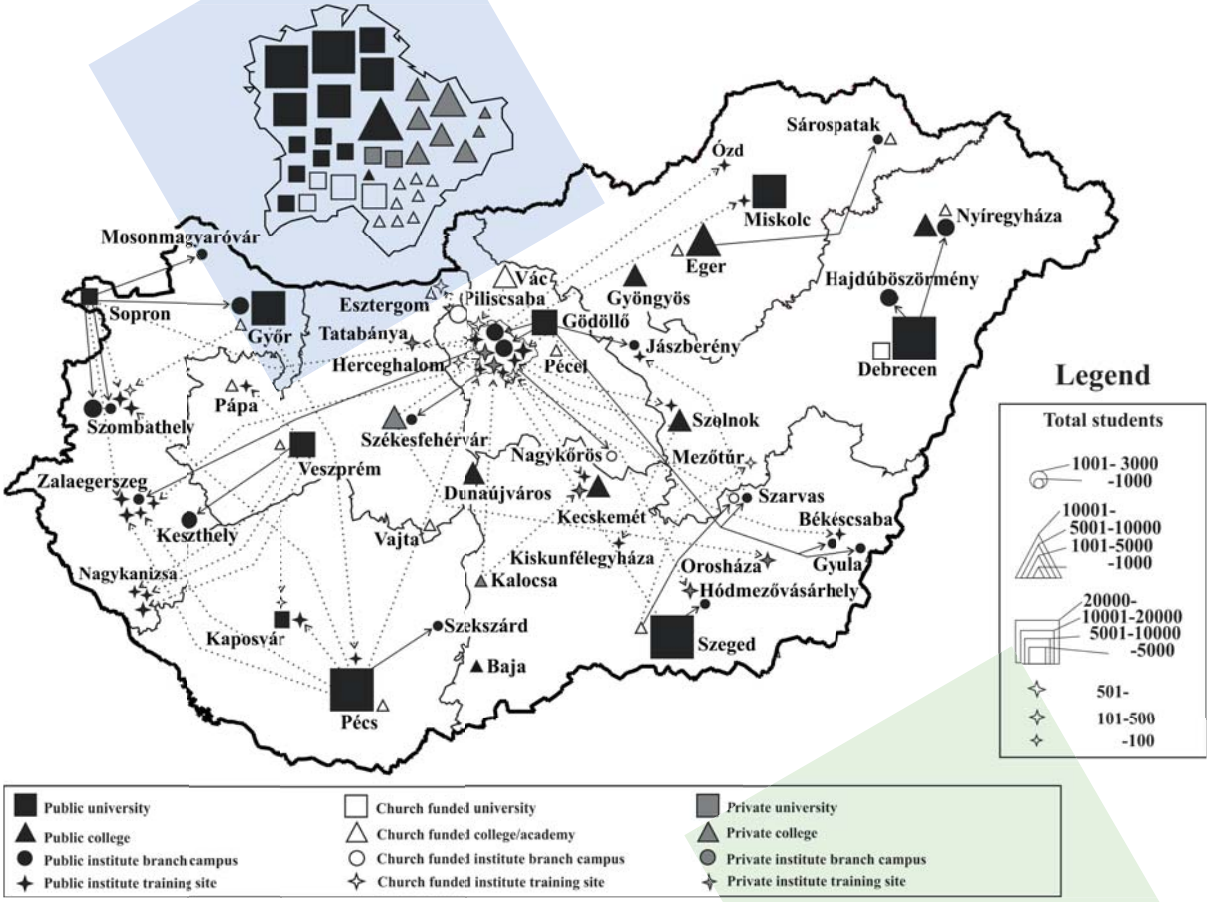
The essence of the new concept is that the community college should provide the necessary *infrastructure* for operating higher education trainings. Following an operating licence procedure, the organisation registered by the Educational Authority can serve as a scene without site registry in deed of foundation for the trainings of other higher educational institutions, provided that it acquires the training right on the request of the institution during the procedure of the Educational Authority - consulting with the Hungarian Higher Education Accreditation Committee - in the community college site.

The *maintainer* of the community college is basically a(n) organisation - committed to establishing local higher education - founded by (a) local government(s), possibly by (a) church(es) or (a) business organisation(s). Community colleges can have their own employees for operating training infrastructure. However, community colleges do not have their own lecturers and possibly researchers since exactly the lack of adequate professionals means the problem in these areas; initiation and accreditation of higher education trainings in an acceptable quality cannot be solved otherwise. In this infrastructure operated with higher educational objective, a lot of institutions can possibly advertise trainings after obtaining the relevant right for starting a programme. Moreover, students have a legal relationship with the institution providing the training, also the certificate is issued by this institution.

Community colleges may be established within a university of applied sciences but not in a settlement where a university is operated, and its operation requires the minister's consent. It is not an objective to operate a large number of these institutions: the Government supports the establishment of community colleges only in settlements which are relevant from the aspect of *full access to higher education*. It means that it is not a risk that the age of "intercity professors" and trainings announced in an uncoordinated way returns. However, establishing a community college this way ensures in all cases that the adequate training offer is available with a minimal effort in settlements where the offer in higher education trainings is low or does not exist at all although due to the size and importance of the given settlement it is fully justifiable.

3.2. Transformation of the Institutional System

Currently, headquarters, sites and outsourced trainings of the domestic higher educational institutions indicate the spatial structure as follows (figures were generated based on the maps of the National Development and Regional Development Concept):



Objective: To rationalize the higher education's institutional network; and create a hierarchical institutional system adjusted to the spatial structure of Hungary, directed towards quality improvement, and creating a competitive situation.

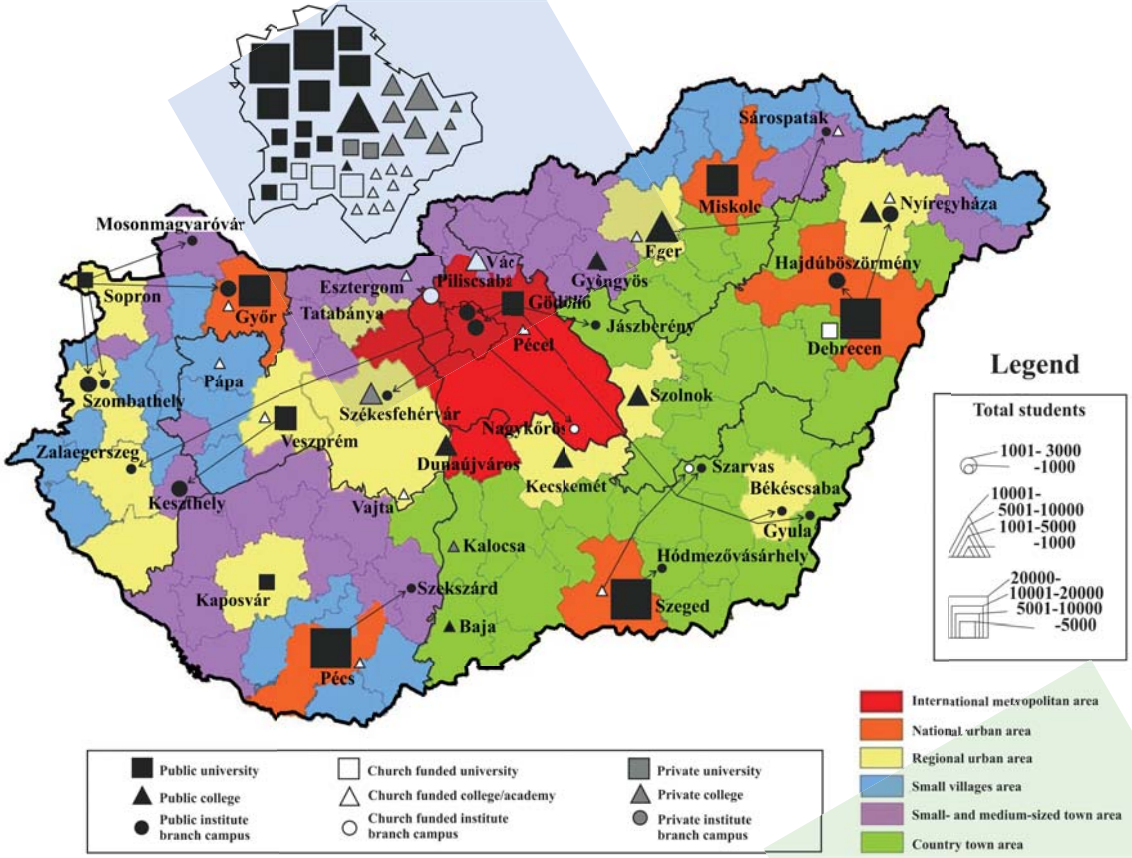
Reason: principles of transformation of the institutional system:

- The fact that almost everything is concentrated in Budapest is due to Hungary's spatial structure, which should be handled as a *feature* instead of *problem*.
- Even if the development policy built on the cooperation of equal parties is agreeable and fair, the settlement structure is *hierarchic*.
- *Functional urban regions (FUR)* should be considered as the basic units of the spatial structure without settlements.
- The presence of higher education should be ensured according to the *regional function*.

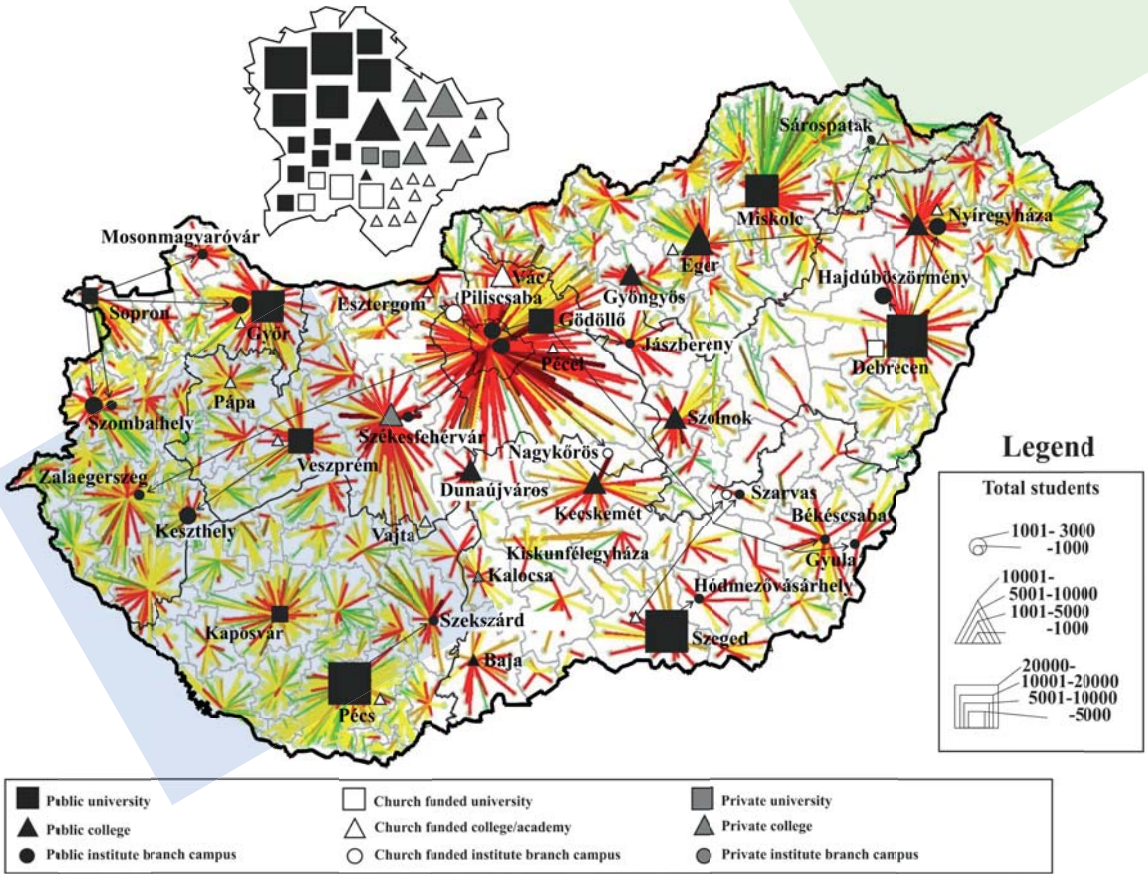
Three areas should be examined with regard to the spatial structure of higher education and the interventions should be assigned accordingly:

- what potential an institution needs to participate in the establishment of a training and labour market portfolio of a region (functional urban region, county, region or country) within the framework of *smart specialisation*,
- areas covered and not covered by higher educational services, taking into account the *attraction zones* as well as the actual processes related to the use of space and economy,
- regionally overlapping or complementary institutional profiles as well as potential profile clarification profile clarification *and cooperation*.

Correlation between higher educational institutions (and sites) and functional economic regions:



Higher educational institutions (and sites) and use of space:



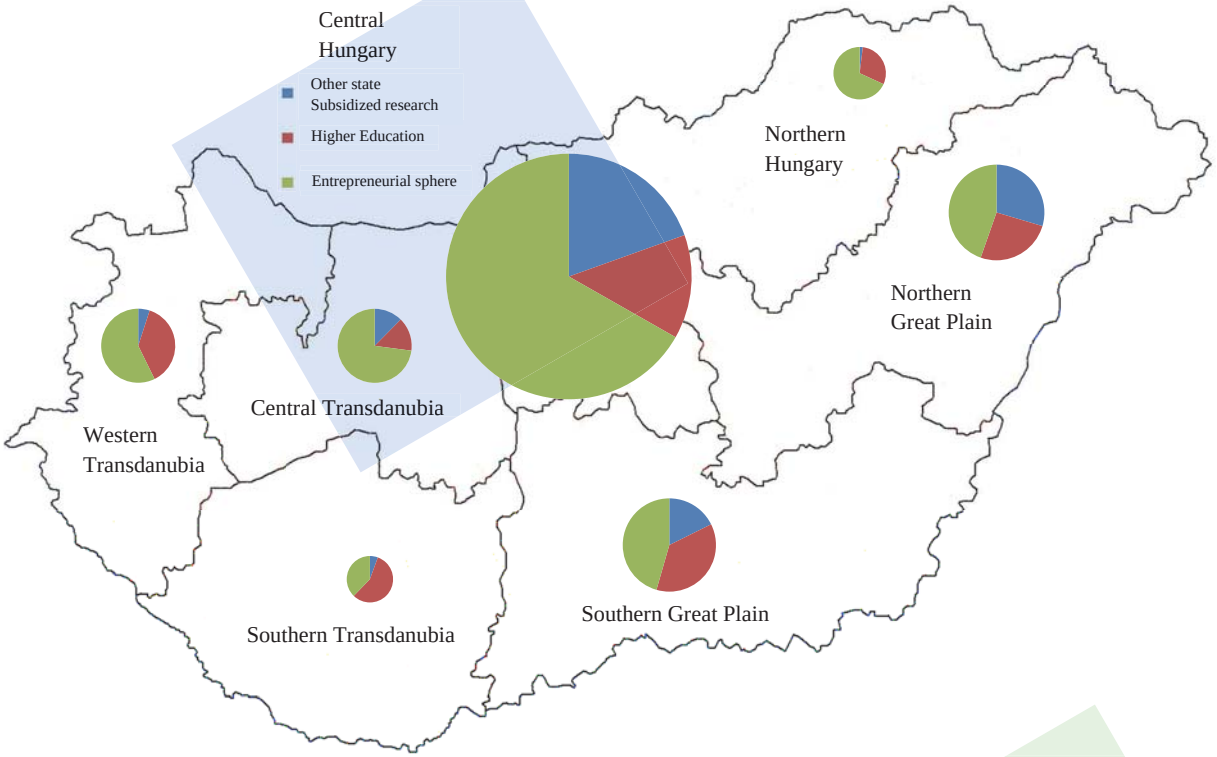
A particular set of criteria for the transformation of the institutional system based on the principles above are included in the following table:

Score	To what extent does the new structure generate competition?	Removing superfluous capacities, reducing parallelism	Increase in efficiency	Alignment with functional urban spatial structures	Does it create a sustainable, competitive institution?
	20%	20%	20%	20%	20%
0	**Reducing competition** Market share will be too high in the resulting new structure (more than 42%)	**Not performed** No significant change in the structure of faculties	**Does not exist or deteriorates** A properly functioning small institute will be connected with a poorly functioning big one	**Low** No conformance	**No** The structure cannot be maintained without additional state (community) subsidy
3	**Minimal increase** Sharing of the market will be essentially unchanged	**Slightly** Aggregation of parallel trainings	**Minimal improvement** Structural change itself forces some changes	**Medium** Competition of the functional urban area is increasing or that of the region does not change	**Minimal improvement** Sustainable structure (it seems to be)
6	**Increasing competition** A better market position, intensifying competition	**To a large extent** The entire programme will be eliminated	**Improvement** Integration of two well-functioning institutions, adoption of ‚best practice'	**High** Competition of the functional urban area increases or that of the country does not change	**Improvement** Sustainability is ensured even in the long term
10	**Strong competition** Two or three priority market participants, with shares between 31-41%	**Drastically** The entire education area will be eliminated	**Substantial improvement** A poorly operating small institute will be consolidated by a properly operating big one	**Critical** Underdevelopment of the region is decreasing or competition of the country is increasing	**Substantial improvement** A competitive structure even on the international market is formed

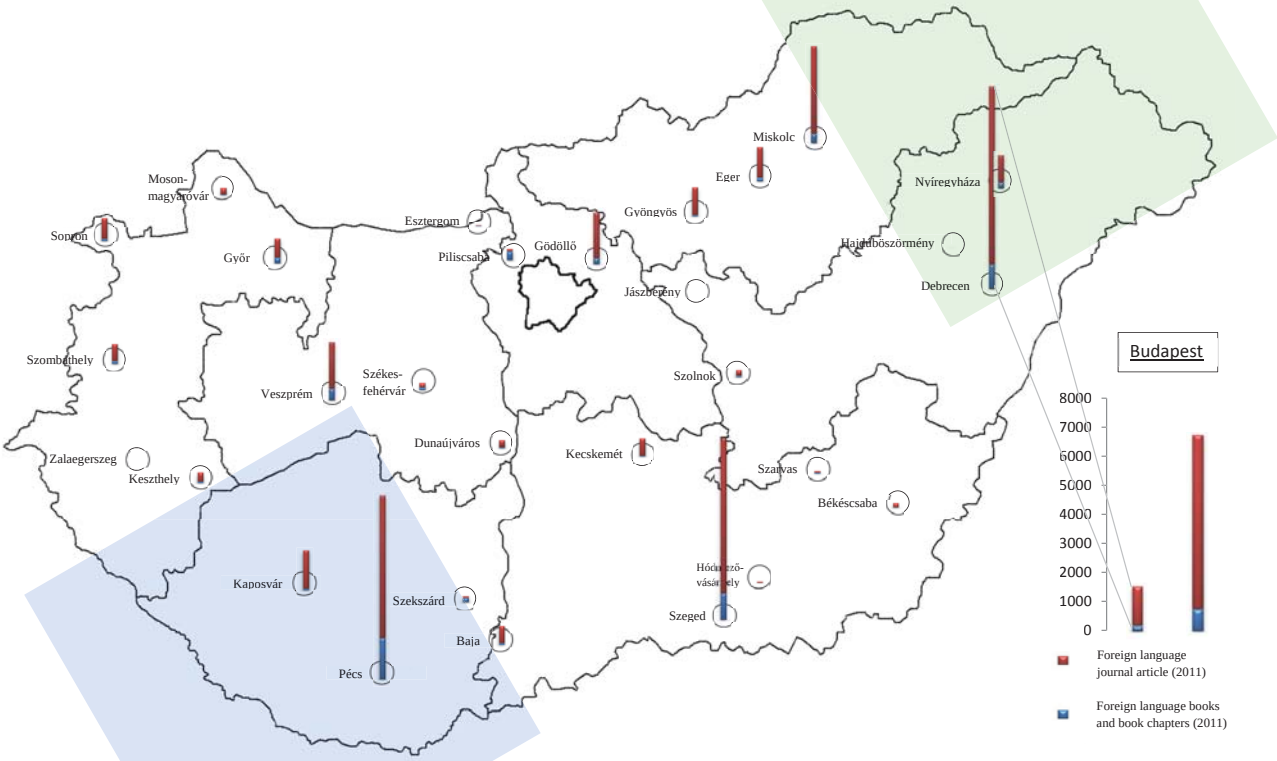
3.2.1. Public Institutions

In the 2014-2020 programming period, ex ante condition of support from Structural Funds, related to R&D thematic objectives, is the establishment of a national or regional, so-called smart specialisation strategy (S3) or strategies on the basis of a given methodology. Guiding principle of S3 is that the EU Member States and regions identify their research capacities, and building on the existing strengths as well as potential chances to break out define directions of development and specialisations in rational number which are adapted most to the innovation potential of the relevant region.

With regard to the spatial structure, the role of higher education in research can be properly characterised based on R&D expenditures and scientific performance. In 2012, R&D expenditures by region and sector were as follows:



Number of foreign language publications, i.e. research results of international relevance based on the Plan for Institutional Development of higher educational institutions created in 2012:



The **Central Hungary Region** has a priority role regarding expenditures and publication outputs, more than half of the R&D capacities, higher educational capacities and scientific outputs are concentrated here. Budapest's dominance is clear also from the aspect of training capacities. At the same time, considering the spatial structure, it can be stated that a white zone is forming between the attraction zone of institutions situated here and those of large rural centres, where the presence of higher educational service providers is

not properly ensured, or not with their full offer. This roughly relates to the route Esztergom – Tatabánya – Székesfehérvár – Cegléd – Jászberény – Hatvan – Salgótarján.

For **Central Transdanubia and Western Transdanubia**, the R&D expenditures fall in the medium (medium-low) interval, in both cases corporate expenditures have the dominant role. The international scientific output of higher educational centres of this region is not significant, R&D activity of the two regions are clearly defined by engineering and IT. The strong industrial presence is coupled with higher educational function for knowledge service and knowledge use, where the existing industrial connections should be strengthened further. At the same time, rationalisation and optimisation by site and portfolio among the institutions of this region is required (University of West Hungary - NYME: Sopron, Mosonmagyaróvár, Szombathely, Győr, Zalaegerszeg, Szeged University (SZE): Győr, University of Pannonia (PE): Veszprém, Keszthely, Nagykanizsa, Budapest Business School (BGF): Zalaegerszeg, University of Pécs (PTE): Szombathely).

There are three problematic regions considering the accessibility of higher educational services: (a) division of trainings of the Zala sites and off-site programmes among higher education institutions is not solved, (b) some areas limited by the attraction zones of Budapest (Esztergom-Tatabánya), respectively, Somogy-Tolna border areas, where the capacities of the College of Dunaújváros should be turned southward. Considering the two regions, institutional and territorial concentration is necessary in the field of teacher training (Sopron, Győr, Pápa, Veszprém, Szombathely) as well as in the field of technical trainings in Zala and Vas county, complementary profiles related to industrial needs should be established.

For **North Great Plain and South Great Plain**, R&D expenditures fall in the medium (medium-low) interval, at the same time, higher educational expenditures have the dominant role. In the two regions, the research and scientific performance are determined by the University of Debrecen and the University of Szeged, R&D and economic development actions can be based on these two institutions or their capacities as well. Life science and medical portfolio is strong in this regions due to the institutions mentioned above. Apart from the two big universities two big college centres (Kecskemét, Nyíregyháza), respectively, several smaller training centres (Baja, Szolnok) and outsourced sites are operated. There is parallelism in performance of regional functions and division among institutions, therefore roles related to research universities, applied sciences as well as vocational training and adult training among the two big universities and two big colleges should be redesigned, furthermore, it is necessary to cover areas considered as "white spots" with regard to higher educational attraction zones situated in the two Great Plain regions: reorganisation of trainings in Jászság and Békés and establishment of community college formations should be performed.

South Transdanubia is a special region due to its poor resources and significant migration indicators. The R&D performance of the whole region is mainly defined by the University of Pécs and the related medical and pharmaceutical research capacity, the vast majority of R&D expenditures is state-based, consequently, decrease in state R&D support would result in severe economic and employment impacts in this region. The training portfolio of PTE (Pécs, Szekszárd) and Kaposvár University (KE - Kaposvár) is basically complementary, at the same time, there are several gaps in the training and research area of both institutions, therefore interventions may be necessary in functions related to research universities and applied sciences, respectively, in pedagogic, technical and art trainings. During ensuring the training coverage of the South Transdanubia region, College of Dunaújváros and Eötvös József College in Baja should be connected as well.

Both the economic development level and R&D expenditures are low for the **North Hungary region**, at the same time, more and more investments were initiated last year which increase the industrial need for higher education trainings and researches. Corporate expenditures have a dominant role in R&D expenditures. Regarding the international scientific output, none of the North Hungarian institutions are significant, they do not represent the research university level, at the same time, internationally relevant research activities are performed in all of the three institutions (University of Miskolc, Károly Róbert University College in Gyöngyös as well as Eszterházy Károly College functioning in Eger and Sárospatak). Parallelism or "half profile" in some areas mean difficulty, i.e. when the related training or research areas belong to two separate institutions. The most serious problem in the region is that there are a large number of areas not involved in higher education (Nógrád and North Borsod areas). The new training type of community colleges combining the practical training and preparatory functions, to be initiated by the individual institutions and the Local Government of Salgótarján provides solution for the Nógrád trainings; similar programmes can be established by the other institutions in the other areas of the region.

During the transformation of the institutional system, development of the world-class *higher education in art*, continuous renewal and modernisation of the special infrastructure as well as the social and financial appreciation of participants in art education shall be taken into account.

3.2.2. Church and Private Institutions

An important element of the transformation of the institutional system is that the system intended for fulfilling the function of state higher education is complemented by the offer in training and research of the religious or privately operated institutions since these are also important segments of the Hungarian higher education. Based on a centuries-old tradition, exclusively religious institutions perform the special tasks related to religious studies. Pursuant to the Act on National Higher Education, the state shall stipulate in an agreement with religious or privately operated institutions what particular tasks under what condition does the given institution undertake or perform in the Hungarian higher education, in the field of secular studies. To this end, the state shall decide within the framework of an individual process with which institution, in which programmes and on what scholarship capacities it enters into an agreement with religious or privately operated institutions (of course, handling religious studies separately). When making this decision, the uniqueness of the given programme at country or regional level as well as size increase of the existing state capacities, if it is relevant in the given programme, in the given region, shall be taken into account. Ensuring the access to the Hungarian state scholarship may be relevant even in the case of programmes where the Government specifies extremely strict conditions for scholarship, to results in the widest possible competition.

3.2.3. Unity of the Hungarian Higher Education in the Carpathian Basin

It is typical of all of the regions with Hungarian population living outside the country that the ratio of those who regard themselves as Hungarian nationals is significantly under-represented among people studying in higher education. The fact that parallel with the growth of training levels - i.e. from Bachelor programme to PhD programme - the ratio of students of Hungarian nationality and the graduated (degree holders) is increasing compared to the members of the majority nation, brings an additional perspective to this situation. On the whole, this means that reproduction of the intellectuals of the Hungarian communities living beyond the country's borders cannot or hardly can realised, which directly results in gradual degradation of the Hungarian language education, indirectly the reduction of communities and the growth of assimilation and migration.

There are still gaps in the structure of the Hungarian language higher education inside the country; whole fields of science (agricultural and technical, often legal, economic and social sciences) are missing from the training portfolio. The offer is mainly focused on areas related to human and natural sciences, more specifically, on teacher training. Over and beyond the above, it is an additional problem that it has not yet been possible to solve the issue related to the establishment of Hungarian language higher educational institutions (faculty, department, and programme) and accreditations finally and in a satisfactory manner in any of the neighbouring countries.

It is our objective to establish a uniform education space in the Carpathian Basin since all the segments of the education beyond the country's borders - in spite of the features being different in regions - is in close relationship with the Hungarian educational system, forms a coherent structure, therefore the Hungarian higher education beyond the borders cannot be separated from the Hungarian higher educational system, either. We have generally handled and examined the situation of the Hungarian communities beyond the borders (both people living in blocks and the Hungarian diaspora) compared to the members of the majority of the nation. However, in order to stop or reverse the above mentioned negative trends, the Hungarian higher education beyond the borders should be developed and considered in the dimension of the uniform Hungarian higher education, in a uniform higher educational space. Through this approach it could be ensured that Government-level education policy ideas based on existing strategies which were created and established in almost every region can be realised with regard to the Hungarian education beyond the borders and in the field of the Hungarian higher education. During the planning related to the Hungarian

higher education beyond the borders, the same qualitative and quantitative expectations should be taken into account which are valid in the Hungarian higher education as well.

Objective: Qualitative and quantitative development of the Hungarian education beyond the borders.

Reason: development of the Hungarian higher education beyond the borders can only be efficient if, due to the applied activities, the skills and knowledge of the Hungarian students living outside the country significantly increases and thereby a gradually piled additional knowledge can be observed among the members of the communities living beyond the borders. The expected effect can be achieved mainly through the quality-oriented development of the Hungarian higher education beyond the borders.

Actions:

- The system of lecturers' mission should be established in order to terminate the lack of professionals. The Government has promoted the increase of qualified young lecturers having a scientific degree in the Hungarian higher education beyond the borders through introducing scholarships for Hungarian young lecturers living beyond the borders in the medium term (in a 3-6-year-long relationship). Still, it is necessary to expand the number of people taking part in the scholarship programme through 3-6 year-long missions of associate professors and professors, during which institutions beyond the borders can employ excellent lecturers in shortage positions in a way that based on the mission, the affected should be considered as full-time employees in Hungary, they do not need to leave the mother institution. This requires legislative amendment.
- Considering native language education beyond the country's borders, expanding Master-level higher education through Master programmes as well as establishing PhD programmes and schools with the involvement of Hungarian lecturers and institutions, is of priority importance. Quantitative expansion of the Bachelor programme itself is not enough for intellectual reproduction, therefore as many Hungarian or bilingual trainings as possible corresponding to master's degree should be initiated in cooperation with the Hungarian institutions. This action could be performed through the coordination of sector management and intensive involvement of institutions.
- Another essential task is to expand the training offer of the Hungarian language higher education inside the country. Taking into consideration the conditions related to the Hungarian higher education beyond the borders, replacement of the intellectuals inside the country can be mostly promoted by expanding the training offer of the Hungarian language higher education inside the country, however, this requires more Hungarian higher educational institutions, faculties, departments, lecturers teaching (also) Hungarian language as well as the development of outsourced trainings of the Hungarian institutions and coverage of shortage areas, decisively in Bachelor programme, mainly in agricultural and technical fields of science. Considering the expansion of training offers, special attention should be paid to the initiation of so-called bilingual trainings provided in Hungarian and in the state language, an illustrative example of this is the recently accredited bilingual law programme of Sapientia in Transylvania. This action could be performed at the level of sector management, through intensive involvement of institutions.

3.2.4. Internationalisation of the Hungarian Higher Education

The need for internationalisation of the Hungarian higher education and development of foreign language trainings absorbing more foreign students has been mentioned several times. Internationalisation, however, is essential in the field of research as well: taking into consideration that the whole R&D expenditure as a proportion of GDP has stagnated in the past decade and even foreign orders could not exceed the 0.2% limit, there is a need for increasing the international integration of domestic institutions, which can be promoted by expanding lecturers' and students' mobility and promoting intensive involvement in Horizon2020 and other international research programmes. To this end, it is necessary to ensure support for joining the Horizon2020 and other ERA programmes and, parallel with this, focusing domestic resources on areas where international resources are not available.

Objective: To position domestic institutions in the international competition.

Reason: relevant to their scientific capacities and efficiency, the institutions with the best research indicators are integrated in the European Higher Education Area and the European Research Area (ERA) to a lesser extent. The regional participation-related data of the 7th Framework Programme are dramatic since 95% of resources were used by the old Member States. As for the new Member states, the most successful applicants applied from the domestic R&D sector, consequently, Hungary gained the second most resources. The trend is reflected by the fact that while the number of researchers is 245 related to hundred thousand residents at the average of new Member States, this number is 560 in the more developed EU countries, which is more than double. Altogether 65 (39 academic and 26 university) Momentum research groups were established in the research institute network and universities between 2009 and 2012, which are important elements of the content-related renewal of the research network, and serve as potential centres of significant researches even at international level. While the 7th Framework Programme was funded by EUR 53 billion, this amount is increased to EUR 81 billion in the next programming period.

Actions:

- The Government actively promotes the internationalisation of higher education through international organisations (EU, OECD, UNESCO) and programme diplomacy faculty.
- The growth in resource obtaining capacity of higher educational institutions, increase in the number of research groups and enhancement of the efficient tendering activity should be developed and supported with all the tools available.

Objective: To increase international mobility of students, lecturers and researchers.

Reason: training of graduates adapting better to the expectations on the international labour market will be available through increasing foreign language contents and enhancing mobility programmes. Integration in international student, academic, professional and research networks is a precondition to the competitiveness of higher educational institutions.

Actions:

- The action comprises the improvement of internationalisation of higher educational institutions, an increase in the international presence of the institutions and in their ability to attract foreign (within and outside Europe) students, and the motivation of students', lecturers' and researchers' mobility, mainly through the additional establishment of the Stipendium Hungaricum Programme.
- An increase in the number of foreign language training programmes is a precondition. Facilitating international student mobility helps get the qualification level and increase the students' competences.
- Resources should be provided for a considerable increase in the budget of researchers' mobility programmes (HDOP), integration, Campus Hungary Programme and Stipendium Hungaricum Programme should become more targeted and expanded.
- The group of international equivalence contracts should be expanded in order to reduce administrative burdens for return.

Objective: To strengthen international relations at institutional level with partner countries of strategic importance.

Reason: facilitating the international exchange of experience, the development and arrangement of popular science programmes and trainings by strengthening international research technological relations. This is assisted by R&D capacity extension for advancing in international ranks.

Actions:

- The on-going bilateral or international projects, professional cooperation (ERASMUS, Fulbright, CEEPUS, TEMPUS, OMAA, MFIA etc.) should be continued and strengthened.
- Incorporating mandatory activities for strengthening international research technological relations in HDOP institutional tenders.

3.3. Educational Innovation

The need for educational innovation can be explained with the fact that institutions and the whole institutional system should continually adapt to the participants of the programmes and their features' change and knowledge covered by education and its amendment.

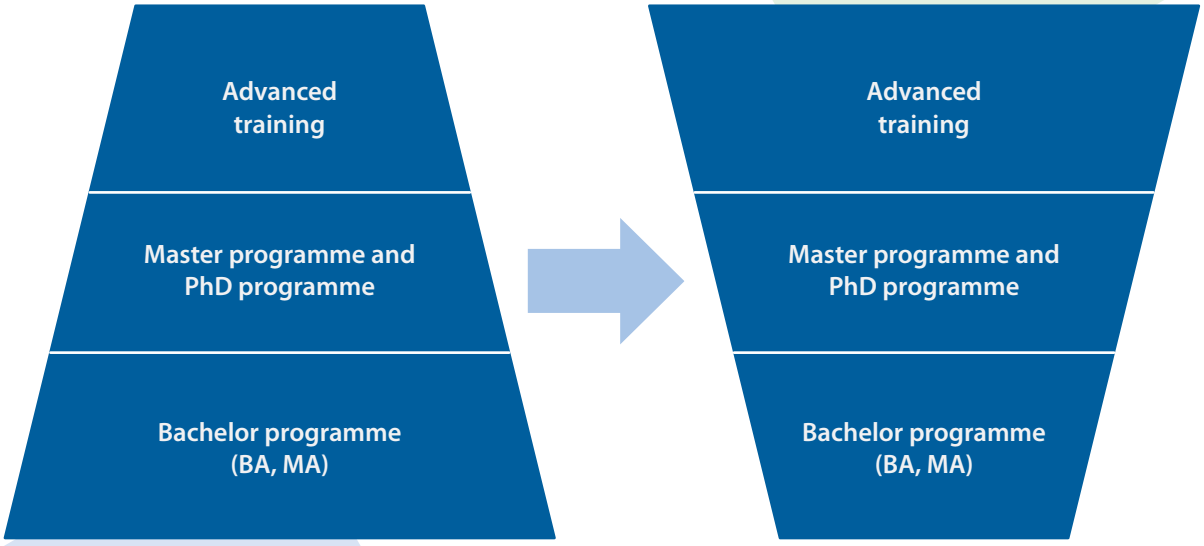
Demographic changes as well as the modified relation between work and learning have clearly terminated the logic "to learn before to work". Due to the drop of the number of students in the age groups preparing for secondary school-leaving examinations, direct need for Bachelor programmes based on secondary school-leaving certificate is constantly decreasing. Based on data of Eurostudent V. and DPR, half of the students start the Bachelor programme not immediately after obtaining the secondary school-leaving certificate; they work for several years, perform volunteer activity or other programmes before choosing a Bachelor programme. Among these "late-starters", the socially disadvantaged are overrepresented.

About half of the students not only learn but work, and 24-33% is the ratio of students having a permanent job, for who the traditional educational schedule is not optimal. The linear structure of Bachelor programmes requiring a 40-hour presence + Master programmes (possibly PhD programme) is not able to react on modified circumstances.

Over and beyond the above, there is a growing demand for re-trainings and extension trainings due to knowledge renewal and the continuous change in professions. The prominence of Bachelor programmes within all programmes will significantly decrease in the future, and the role of re-trainings and extension trainings as well as training forms requiring no or only little physical presence, trainings available through correspondence and distance courses, will increase. Simultaneously with this - resulting from the exhaustion of the higher educational expansion trend and demographic pressure - capacities essentially established for daytime Bachelor programmes should be transformed into capacities related to extension training and distance education.

It should be adapted to the requirements related to lifelong learning and compatibility of work and learning, on the input side, in the training process and on the output side. On the input side, access to higher education trainings should be expanded with an input method which is based on work experience or other non-formally acquired knowledge. Unusual training forms should be more widely introduced, which can provide harmony among work, learning and family. One of the actions of the concept is to introduce and extend dual training but establishing other training forms related to distance education as well as other more flexible trainings meeting employers' and employees' needs is also necessary.

Demographic formation of higher educational training structure in the future (OECD, 2009):

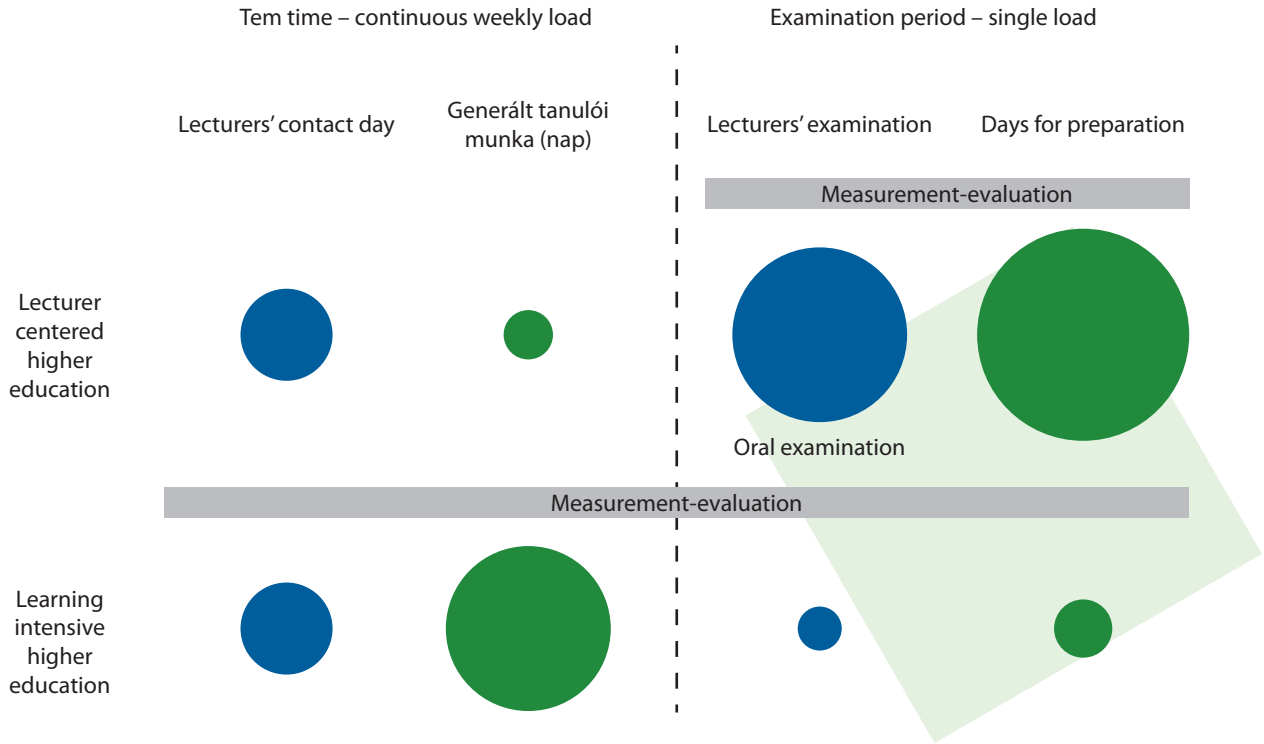


One of the quality-limiting features of the methodological practice of the domestic higher education - which is not present everywhere but significant - is the contact-hour centeredness, specifying high number of lecturers' lessons and the low independent student's employment. This operating method of higher education encourages both lecturers and students to retain performance: students shall perform a large

number of subjects with low credits (generally 2), which can be performed with a minimum effort and coupled with a high number of lecturers' lessons.

This practice is harmful from several aspects:

- does not encourage the student to work alone and thereby to practice for mastering the profession at the level of skills;
- the emerging "learn everything immediately" learning, pedagogic value of preparation within one day can be almost not measured;
- lecturers' training burdens are high due to high number of lecturers' contact hours;
- the high load of lecturers abstracts their energy from personal mentoring, tutoring, research activities as well as self-development;
- the high number of contact hours generates additional use of infrastructure;



Difference between domestic lecturer centred/contact-hour centred and learning intensive trainings
(source: http://www.innovacio.hu/download/StrategiaimegalapozasFTT.pdf)

- The long examination period results in unused and overloaded cycles regarding both infrastructure and the lecturers' and students' lifestyle;
- according to credit monitor studies, two-thirds of domestic credits requiring theoretically 30 working hours can be acquired with considerably less energy input in numerous programmes, mainly in the fields of economy and humanities, however, the medical and pharmaceutical fields represent the opposite end, where 1 credit typically requires much more than 30 working hours.

In the following years, relations between contact hours and students' working hours, term-time and examination period as well as "theoretical subject" and "practical subject" should be considered again. The more intensive learning experience, the practical mastering of skills and the project and result related approach expected from the labour market requires the review of "subject" and "course centred" teaching arrangement.

Education methodology and education technology have rapidly developed in the past two decades, particularly in the past 5 years, which the Hungarian higher education must keep pace with. Spatial limitation is a factor which is not so dominant. This not only means the extension of digital or on-line available contents as opposed to traditional learning in the library; on-line forms of training, courses

(MOOC) become increasingly common, which ensure mastering knowledge blocks or special pieces of knowledge and skills. Virtual collaboration platforms also replace the immobility of training and learning, where on-line practice and research can be performed by sharing the virtual space and real infrastructure.

A precondition of the methodological renewal is ensuring a new generation of qualified lecturers discussed earlier, which is only possible through the reinterpretation of PhD programmes and improving relations between lecturer and student.

It is also essential to ensure that the higher educational institution, in the framework of the ALUMNI programme, keeps contact with the former graduated students again, encourages them to participate in further vocational trainings or in another training providing a higher level then acquired earlier, and to continue their studies.

Objective: To focus the training methodology of higher education on practice and on student work.

Reason: there is a need for eliminating bad habits and pedagogical practice retaining performance and not supporting mastering professional knowledge at the level of skills.

Actions:

- Presenting project performance as credits in programmes.
- Incorporating modules related to the development of transversal skills including entrepreneurship in education and outcome requirements, examining the framework conditions of mastering this skill during accreditation.
- Considering lecturers' obligations, a review of obligations for contact hours and held lessons, and integrating indicators for measuring students' progress in evaluation of lecturers' activity.
- Utilisation of community resources in order to train lecturers and initiate certain educational-methodological programmes, which can be ensured on the basis of decisions on community resources.

3.4. Efficient Institution Management and New Business Models

Transformation of the management system of higher educational institutions was continually kept on the agenda after the end of the communist era, but with the exception of certain partly devised and introduced elements (e.g. establishing and eliminating Fiscal Councils), it was realised only after the last amendment of the Act on National Higher Education (Nftv.). By adopting legislation, the Government has established the chancellor model for managing the state higher education, which ensures a more effective cooperation between the maintainer and institutions, and control over the efficient use of funds for higher education is fully realised. However, introducing the chancellor system has not solved several problems:

(1) The highest level management body of the university is the senate elected following the local government's way, which practically decides in each question connected to the institute:

- It defines the education and research activities of the given higher education institution and controls the execution of these.
- It defines its own operation order.
- It approves the institution's development plan defined for the mid-term for a minimum period of 4 years by defining tasks to be implemented in annual breakdown, as well as the research and development and innovation strategy constituting an integral part of the former.
- It makes a proposal for the content of the rector's call for application; gives opinion and judges rector's applications; elects the candidate rector; evaluates the managing activity of the rector.
- It approves the training programme of the institute.
- It approves the organisational and operational manual, doctoral rules of the institute.
- It approves salary differentiation principles based on quality and performance in the institute.
- It approves the budget of the institute within the frameworks defined by the maintainer.
- It approves the annual report of the institute by following the provisions governing accountancy.
- It defines the system for lecturer evaluation by students.
- It decides on developments with the agreement of the maintainer.

- It decides on the plan of asset management of the institute with the agreement of the maintainer.
- It decides on the foundation of business organisations or acquisition of share in business organisations with the agreement of the maintainer.
- It decides on setting up an academic council, appointing its members and president.
- It decides on ranking applications submitted by lecturers, researchers and the management and awarding titles and rewards.
- It decides on ranking applications submitted by seniors and managers (except for applications submitted by chancellors, financial directors and leaders of the internal audit unit).
- It decides on setting up and closing a doctoral school and starting doctoral programmes.
- It decides on initiating the start and suspension of programmes.
- The Rector may be recalled by the two-third majority vote of members.
- Before the maintainer's decision it gives opinion on the transformation (integration, incorporation, division, separation).
- It shall give a substantive response for the proposals of the student union.
- "Based on its decision the rector may initiate court proceedings, requesting the establishment of the fact that the maintainer's decision violates its autonomy of the higher education institution granted by the Act on National Higher Education."
- It shall discuss the proposal of the chancellor for the amendment of the OOR.

Based on his or her legal authorisation, the chancellor exercises the right of consent in connection with decisions of the senate that have economic consequences, but the representative of the *maintainer* will still not take part in decisions of the highest organisation of the university, or the maintainer's consent is only necessary in some issues. This situation partly means a conceptual problem (why is the representative of the maintainer not authorised to decide in some issues of the institute), and will partly bring up several practical issues in the relationship of the chancellor and the rector-senate.

(2) The operative management system of the university changed significantly by introducing the function of chancellor, based on this it is also necessary to consider the management system of the academic and professional executive of the institute.

(3) The student union system has a significant impact on the management of the university under the present conditions, its future content and the way of taking responsibility shall be considered.

3.4.1. Transformation of the High Level Management System of Institutions

At the moment, the main managing body of the university is the senate, which is elected like local governments, and it basically presents interests in the university, so it maps the internal "power relations" in the institute. This supports the often special relation among the head of the university, the rector and the senate. As mentioned above, the owner is only represented in the senate by the newly appointed chancellor, which does not ensure managability of the functions outside the scope of autonomy of the university under the present conditions. Owing to the above, the maintainer's role of intervention and management must be presented at the functions of the senate written above.

Separation of professional-academic (in the sphere of autonomy) and *strategic-economic management* of universities - or in the latter case the body representing the interests of the maintainer can significantly influence these decisions, having at least 50% of the vote - is not uncommon in international practices (such as in Germany „Hochschulrat" or in Anglo-Saxon countries „Board of Trustees"), but it is typical in the history of the Hungarian higher education system as well. Norma Studiorum published in 1770 clearly separated the academic and economic management but also Ratio Educationis gave similar orders.

Institutional supervisory boards and councils (e.g. Hochschulrat or the Board of Trustees) have an extremely high reputation as their members are experts invited by the maintainer, who are highly respected and accredited in their own fields, and who feel responsibility for the institute.

Objective: integrate external stakeholders (maintainer, society) into the management of the institution, separate academic and economic-strategic decisive competencies.

Reason: The competence of the rector and the Senate mainly covers decisions of strategic level and related to academic and scientific issues, while management and daily operation of the institute belong to the power of the chancellor. The „Consistory" of 5-7 members who are delegated by the maintainer from economic-social agents, in which the rector and the chancellor have voting right, and the representative of students takes part in advisory capacity, can give opinion on any subjects if it feels necessary, but it has the right of agreement to adopt the institutional development plan and the annual budget programme, and in case of electing rectors.

This separation above ensures that both the interests of the maintainer and the external parties (economy, community, etc.) and their participation in operation of institutions appear. Corporative parts elected like in local governments assure the autonomy of education and research laid down in Fundamental Law.

Actions:

- Professional alternatives of the above structure must be elaborated based on the earlier national and foreign experience;
- Having accepted these, modification of the Act on National Higher Education is necessary.

3.4.2. Operative Management Model of Institutions - Rector and Chancellor

Establishing the position of chancellor, the managing model of higher education institutes essentially changed because the chancellor takes significant functions from the rector. So the rector's activity must be readjusted and the management system for both functions must be developed by the maintainer. As the minister in charge of education exercises employer rights of both leaders, the conditions for establishing a coherent system of management are available but, by comparison with the past history, the maintainer will have a more intensive employer relationship with the leader of the institute, the rector.

Now the Department for Institute Management and Financing within the Secretary of State for Higher Education in EMMI performs assisting and managing functions of chancellors but in the second year after deployment of the chancellor system in 2014 it would be useful to examine if setting up the chancellor's central department is reasonable as a medium management organ based on experience. If such an organisation comes into existence, it must be considered to deploy higher education issues from the restructured Educational Authority into the new and unified background institution, and so to establish the "Office of Higher Education".

Furthermore, through the transformation of salaries in executive positions rectors and chancellors must be made interested in the success of the institute based on defined and measured indicators and supplementary compensation must be subject to the compliance with the indicators.

Objective: To establish the management-, evaluation- and motivation system of the rector and the chancellor

Reason: Cooperation between the rector and the chancellor is the fundamental condition for the effective operation of the institute. As the two functions depend on each other, the guidance of the maintainer has become more important than earlier - of course, with regard to differences resulting from the rector's function.

Actions:

- A performance-based qualification system must be developed for both functions.
- An objective-based incentive compensation system must be developed for the rector and the chancellor.
- An operative system to guide both the rector and the chancellor must be developed.

3.4.3. Transformation of the Student System

The present structure of the student system developed in the past 25 years, following its criteria from 1990:

- Representing student interests
- Providing student services
- Ensuring opportunity for students who want to acquire managing competencies beyond the professional activity during the years spent at the university.

Today it is clear that the above concepts were not always followed, mainly because of lack of regulation in the field. Possibilities of student unions are really wide - in a way determined in the Act on National Higher Education - but their obligations are not regulated either by law or by internal rules. Several indications of this are now evident (legitimacy of election, financial abuses, legal problems, moral issues, etc.), so the system must be reconsidered.

Objective: To re-regulate the student union system

Reason: Both the representation of interests and student services must be regulated. In the field of interest advocacy it must be examined what entitlements the student union must have in the different fields, and particularly what responsibility it can take during the later implementation. Participation of students in institutional decisions is not differentiated, or if yes, it is favourable (right of agreement related to Academic and Examination Regulations).

In the field of student services the present situation is not transparent, the student union appears as a part of the university, it is not accountable, its operation is disorderly due to the lack of corporate relations. In the course of redefinition the system of student services must be put onto a market basis, so the relationship to the institute can be disambiguated.

Actions:

- Introduction of an electronic voting system connected to study systems;
- Re-definition of the system of student services based on new concepts, developing quality assurance, and ensuring convergence with the chancellor system;
- Elaborating the Ethical Codex.

3.4.4. New Business Models and the Resulting Strategic Actions

After that a new model of institute management regulating "business" relations in higher education has been established, a new fiscal administration system can be deployed in the higher education institutes maintained by state. This model must have the following features:

- At a similar or slightly increasing governmental participation, financing higher education requires private (non-communal) resources in a much higher rate than at present. To this end, the knowledge that is accumulated in the institutes must be sold abroad and home more systematically.
- For manageability of incomes and achieving interest of institutes, limitations in state finance management in the field of the use of own incomes, practice of locking, usage over a year, purchase limitations, asset management, property administration, copyrights and freedom of the company aiming at R&D must be reduced. The precondition is of course that the chancellor system must be developed, which ensures a strong proprietary control even if reducing partially state finance limitations.
- The employment order must be made more flexible, statuses of employees as public servants who are not trainers, researchers, teachers must be reconsidered, in the field of salary supplements and bonuses freedom and financial sources must be ensured continuously, criteria of appointments must be re-examined and made transparent, and it must be made possible for people who do not have PhDs but have excellent professional experience to be involved in training or research.

Objective: To develop a regulatory environment for the new business model

Reason: Due to external resources that may be involved through the company aiming at R&D, the institutes have a strong presence in the market, but the operation according to the Act on Public Finances means an essential competitive disadvantage, or in many cases it means also exclusion from the given activity, although they could perform a competitive activity based on their abilities. To solve the consequential problems, the institutions choose methods that result in a non-transparent system for both the institute management and the maintainer (subcontractor, companies of university, foundations, etc.). This is also true for the field of employment.

Actions:

- Reducing limitations in state finance management (introducing the chancellor system there is a strong proprietary control)
- Developing a new regulation in the following fields: usage of own incomes, locking, usage over a year, acquisition stop, asset management, property administration, copyrights, company aiming at R&D
- Reducing limitations in employment (status as public servant for non-trainers, researcher, salary supplement, rewards, criteria of appointment, employment of external people, compulsory number of lessons)
- Ensuring a "proprietary" role for companies and local communities and participation in maintenance and operation of the institutes.

3.4.5. Central Services in the Sector

On restructuring responsibilities in higher education, central and governmental services that are essential to operate the higher education sector and to measure its performance must be identified, and must consequently be provided by the state. Considering the performance concept, it is also essential that services, processes, infrastructures that can be ensured more efficiently, cheaper and in higher quality in a centralized and unified national way must be provided by the state centrally. (The services based thereon are developed by the institutions.)

To realize the performance concept, beyond institutional measurements, the measurement and evaluation systems, in addition the career follow-up system must be operated centrally to measure student life cycles from entering to diploma and employment (Eurostudent, AHELO, Graduate Career Tracking System). The base infrastructure includes network infrastructure, computational capacities, operational and cloud-based ICT services that can be provided centrally in a more efficient way, in content services the database procurements in the framework of national licence, and content services that are available centrally for all students, trainers and researchers.

Objective: To effectively provide central sectorial services.

Reason: Central sectorial services, processes, infrastructures that have already been developed or are developed now must be provided in a rational and cost-effective way.

Actions:

- Rationalization and recording of functions of the present background structure of institutions (OH, Educatio Nkft., OFI, EMET, TKA, BI, NIIF, MTA KIK, etc.).
- Annual data integration including all relevant records (FIR, AVIR, DPR, HSO data service), establishing legal conditions thereof.
- Launching a national methodological program financed by HDOP and CCHOP to centralize evaluation systems of measurements and career follow-up systems.
- Providing and developing base infrastructures (NIIF, EISZ) in accord with the relevant sections.

4. Special Areas of Intervention

We have to deal in a separate section with strategic concepts connected to preferential sectors of national economy because in the following years some special interventions will be necessary in some educational fields to keep the Hungarian higher education in focus. It is evident that these interventions cannot include each field simultaneously, so transformation tasks to be carried out must be prioritized in this case as well.

However, it must be clear that each educational area is of the same importance for the Hungarian higher education and the Hungarian science, our society equally needs artists, mechanical engineers, historians, sociologists, veterinaries, economists, IT operatives, lawyers, dentists, teachers, coaches and physicists. Now you can see some objectives related to educational fields where the necessity of intervention is obvious. In other fields - such as humanities or social sciences - there is no need for special interventions as regard to the entire educational field, at most some majors and branches can be concerned by some general steps to implement the strategy.

4.1. Medical, Healthcare and Social Education and Training

Aging is a characteristic feature of society in the 21st century. The average age of people living in the world is growing rapidly. This process is the most prevalent in Europe, where one in five people are 60 years or older already. This ratio is expected to reach one third of the population by 2050. An aging society presents challenges in all areas of life, but the situation is most urgent in the health and social care systems. Accordingly, medical and social care education must be treated as priority training areas in higher education.

Medical education is one of the success sectors in Hungarian higher education. The undergraduate and postgraduate medical training unite therapy, education and research. Nevertheless medical training has to face a number of challenges at the same time. The three units are inextricably linked: treating patients will provide experience. This sets out the issues for education and research. Research provides and education mediates the answers for medical treatment. The presence of these three joint functions ensures the efficiency of the academic environment. Here the students are involved in all three processes and education and research are based on direct clinical experience.

The majority of teachers working in medical and dental training are actively involved in patient care and research also. We can add to this the needs of health care consumerism and the legitimate expectations of the patients. When patients use health services, they must not be the subject of demonstrations or training tools for health education. However, the experience gained by dealing with and treating patients is indispensable during training.

Higher education must provide the Hungarian health care professionals needed for all the necessary fields of the health care system. Doctors, dentists and pharmacists are especially needed, but in recent years the field of nursing education gained importance as well. According to our surveys the increased academic capacities in recent years provide appropriate input for this purpose: According to the 2012 survey of the Health Care Licensing and Administrative Office, until 2020, an average of 1,000 doctors, 185 dentists and 120 pharmacists will retire in every year and need to be replaced. In 2014 the number of Hungarian national students exceeds these numbers. These students almost without exception study in the Hungarian state scholarship training. It means that they undertake the obligation associated with this scholarship that they have to work in Hungary after graduation. Reduction of the student drop-out rate and other policy measures, however, could further improve the situation.

A number of foreign students study in our universities. There is significant over subscription, despite the high tuition fees. It is significantly cheaper to obtain a medical degree in the neighbouring countries. More and more universities offer foreign language training in these countries also. In order to maintain our position and increase the number of foreign students we have to further develop the infrastructure of education, the quality of personnel and training equipment. Previously, a significant part of the German students moved to German universities after the second year of training, and thus relieved capacities for the pre-clinical and clinical training in the upper years. However, in recent years more and more German students decide to finish their studies in Hungary, which means additional revenue for the universities.

However, to ensure that the quality of the training is not compromised, the required additional capacity must be provided. The business utilization of the extra capacity and the recycling of the resultant revenue back into training and into general health care development is an important potential in Hungarian medical training.

Objective: To strengthen, consolidate, and improve the basis of clinical education. To establish organisational structures corresponding to international good practices, and if necessary, to establish medical training centres.

Reason: To maintain a high level of education - in response to the expectations of patients and students also - it is essential to align with international good practice.

Actions:

- Demonstration of standardized and properly focused cases.
- Providing real experience in critical, high time factor decision making situation.
- Availability of interactive reality models.
- Introduction of inter-professional education (physician-nurse team-working experience and practice of teamwork).
- Strengthen practical training efforts: expand skill labs and their involvement in education in many disciplines. Inclusion of standardized patients (learn physical examination, doctor-patient communication). Introduction of a common assessment of the practical performance. Training in simulation exercises in close to life situations, but not on patients. During the encounters with real patients, the students are more experienced and more confident with patients, as they encounter familiar situations (increase patient safety).
- Expansion of education capacity. This could be done by increasing the number of medical staff and university beds and / or by cooperation with affiliated hospitals.
- Clinics represent the highest level of cooperation between theoretical training and practical education. Here the patient care departments responsible for practical education work as an institutional part of the structure of the university. Clinicians working in these clinics - thanks to the regular teaching and research work - have the knowledge and reviewing ability which is essential to the design of the curriculum and the organization of education. In addition to further development of these clinics, the training hospitals could be involved in practical training of the skills learned in the classrooms and labs and also in skills development to a much greater extent than at present.
- By further developing the teaching hospital model into an affiliated hospital, the medical universities could become the intellectual centres of their area's public hospitals. In this model, the universities are responsible for the professional standards of the affiliated hospitals, and they support the professional development of doctors in the affiliated hospitals. Thus these hospitals would be practitioner places that would also function as career goal stations in university teaching careers. Here the teachers with practice in university teaching can achieve careers in management positions.
- The professional standards of the public hospitals increase with this close technical collaboration with the university as the hospital joins the (faculty and research) work stream of the university. These institutions can accommodate a higher number of students, resulting in significant revenue.
- Application of Information Technology platforms in theoretical and practical education, research and medicine, increasing the number of online educational materials (e-learning)

Objective: To improve the physical infrastructure of medical education and training.

Reason: In some of the institutions teaching the first two years of a six-year training course, the relevant infrastructure development is still in progress. The infrastructural background of pre-clinical education starting from the third year is essentially unchanged. Infrastructure development occurred only in certain places in clinical education. In order to further develop training a modern infrastructure must be created which is sufficiently attractive to foreign students, and allows teachers to utilize the most advanced diagnostic tools to teach their students.

Actions:

- In the interest of improving the infrastructure of clinical training, the public hospitals with better infrastructure and with doctors speaking foreign languages have to be partially or fully integrated into the universities. Thus we can create clinical centres with complete patient care and training palette. Ensure the optimum size and number of educational spaces in each clinic and hospital department.
- The development of simulation centres for practical training is emphasized here once more. The capacity for medical training and specialist training needs to be developed.

Objective: To improve the personal background of doctors and health sciences training (professional competence, career model).

Reason: The involvement of foreign students in medical training doubled the number of students, but the number of teachers is not keeping pace with this growth. The talented young teachers can be attracted to return to Hungary and stay here by raising the salaries. It is equally important that current research universities receive greater support and thus academic teachers will gain career opportunities. Ensuring suitable personnel means theoretical and methodological teachers' training of the education professionals, as well as keeping their knowledge level up-to-date. The teachers can only maintain their credibility in education, if they are also involved in practical medical work. Without regular clinical work the instructor's professional credibility is lost in the eyes of student, and this decreases the effectiveness of education. However, the process is also true vice versa: the instructor must use an appropriate teaching methodology and has to have knowledge and skills in order to pass the theoretical knowledge and clinical experience in a well-planned educational process.

Actions:

- Development of special medical and pharmacological research support system.
- Practice spent with the clinical instructors can significantly increase problem-solving skills, situational awareness; it helps to acquire quick and effective decision making competencies. Basic condition is the continuous and high-level professional training of instructor clinicians (academic, public hospital), and assessing them according to objective criteria.

Objective: To improve the healthcare professionals' training higher education, and make the training methodology marketable, in accordance with the domestic and foreign demand.

Reason: Graduate training of health care workers has been in existence for about four decades in Hungary. Necessary factors to ensure human resources for the health care system are (a) providing lifelong learning needs and opportunities for health care workers, (b) providing career models for health care workers, through this construction of mobility and career opportunities, moreover building social prestige, (c) teaching of modern, practical, easy to apply knowledge.

Actions:

- Substantive and methodological development of the health sciences faculties training program, the availability and support of doctoral training for the instructors. The further development of foreign language training both in BSc and MSc courses.
- The academic integration of mandatory qualification training of health care workers. Development of new educational programmes.
- The addition of Far Eastern, Western European and North American connections to the already operating international short training programmes.

Objective: To extend and improve adult education in health care.

Reason: The primary purpose of the university's adult education activities is compliance with the current professional requirements and providing trained personnel for the work force. However, the institutional commitment and activity can be increased in this area. The medical / dental / pharmacy continuing education (CME) has a market value.

Actions:

- Complying with the Adult Education Act provisions, launching new training courses in adult education programmes
- Organizing CE vocational training programmes for health care workers.
- Improvement of the infrastructural conditions of adult education.

Objective: To develop the trainings in the social field, and to make them more practice-oriented

Reason: In an aging of society, more and more attention must be paid to the operation of the social security system, and the training of professionals in this necessary task.

Actions:

- During the restructuring of education, knowledgeable, experienced, committed professionals must be provided in the social care system

4.2. Education and Training in Natural Sciences, Engineering and IT

4.2.1. Education and Training in Natural Sciences

Cultivation of natural sciences at a high level provides the opportunity for international emergence and it is essential for all other research and development trends; its prestige is high, and has a long tradition in Hungary. However, if reversing the negative trends proves to be unsuccessful, the quality level of the education in universities will become that of the colleges, and our institutions will have even worse ranks in international comparison than they currently do. It is highly probable that by developing the teaching staff to the level of the previous years, by attracting young and dynamic research teams, and by quality assurance the academic performance could be increased approx. by half (40-60 percent) even with little financial investment. It is self-evident that growth of headcount, more time that can be spent on research, preferring better research performance (quality assurance) are even individually steps that cause a 10 to 20 percent increase in performance, so applying simultaneously 2-3 of these reaches the desired effect.

In order to increase and make better use of quality, solving the problems requires partly legislative amendments, partly the transformation of the financing system, and partly the improvement of the internal structure and the decision-making mechanism of universities of arts and sciences. The chancellor system is a good opportunity to the implementation of remedying the problems.

Objective: To ensure the adequate student input for programmes in natural sciences.

Reason: At present, the admission score for the Faculties of Natural Sciences are excessively low. The masses of unprepared students have a negative effect on the studies of talented students as well. At most only half of the enrolled students graduate from the bachelor programmes. The others leave the university with frustration, waste their own time and money, but public resources are wasted as well and we divert the manpower from areas where these students could be effective citizens of the society.

Actions:

- The requirement of the advanced level school-leaving examination should be introduced as soon as possible at least for one of the subjects related to the training
- It would be reasonable for the minimal admission score for trainings in natural sciences to be determined so that approximately as many first year students enter the training as are expected to graduate.
- In secondary schools the natural science education should be strengthened in order to increase the teaching time of the natural science subjects (mathematics, physics, chemistry) and/or grammar schools specialized in science are required.
- Further specific financial support of natural science teacher training is needed (it has already started) to stop the accelerating decrease in the number of the secondary school teachers and improve the quality of the teaching staff.

- Intensive support of the secondary school talent development in new forms like (i) extending the Hungarian "Research Student" movement to 3-4-week summer practices, where during the 15-20-weekday intensive work the students get acquainted with the details of science fields; or (ii) creating job opportunities for public benefit at the institutions of the Faculties of Natural Sciences (arranging, cleaning, and maintaining storerooms, collections, exhibitions, laboratories); moreover, (iii) making strategic partnership agreements with certain secondary schools to support or supplement training forms mentioned above or in other forms not mentioned herein.

Objective: To improve the quality level of bachelor and master programmes.programmes.

Reason: conversion to the Bologna system happened in an ill-considered and sudden way, the level of basic subjects' education has decreased on many faculties, while too much knowledge has been squeezed into the 3-year training. A great number of problems now inducing high tension would be solved (even if the governmental expenditure cannot be increased significantly) if the sources currently available were invested in the higher-standard education of fewer students with a higher level preliminary training and thus higher graduating rates. Although fewer students would be admitted into the system, slightly less but much better qualified students would graduate. The condition of quality development is the assurance of the additional costs arising from the practical nature of the trainings in natural sciences. The maintenance of student laboratories has generated additional costs on several points:

- Personnel costs: for technical and security reasons, only a few (2-20) students can stay in a laboratory, therefore a greater teacher capacity is needed. Moreover, employing laboratory assistants is also necessary, which is not characteristic of other disciplines.
- Material costs: laboratory consumables.
- Investment: instruments rapidly becoming obsolete / rapidly aging instruments. It cannot be further postponed that the domestic universities be equipped with instruments of international level, and that these instruments be maintained in accordance with their amortization.
- Overheads, operation: because of the laboratories, the training in natural sciences needs larger territory expressed in square meters with all of its utility and operational implications.

Actions:

- It is necessary to examine under what conditions it is possible for the support for the faculties not to decrease while the number of first-year students admitted to the trainings in natural sciences does decrease, provided that the number of students receiving a diploma does not decrease (significantly).
- Review of the training structure: the possibility of conducting an undivided training for those fields of study where the value of the BSc degree on the labor market is little (e.g. physicist, chemist) but – for international compatibility reasons – the bachelor branch is necessary for those who realize that they do not wish or are not able to meet the master program's expectations.
- The number of contact hours of the students majoring in natural sciences should be decreased significantly, and they should deal with more self-sufficient tasks ("project work"). From the teachers' point of view, this does not require less work, only another type of activity (master-student relationship). During project work, the students creatively learn the research methods, and they actively contribute to the academic research of the university as well.
- As for the financing system, the additional costs that arise from the character of the trainings in natural sciences should be taken into account (practical training, laboratories). To this effect, real cost accounting should be carried out.
- Protecting the training portfolio. The trainings in natural sciences should be well-established, and they should contain the adequate knowledge of related disciplines as well. To this end, the whole natural science spectrum is needed in the training locations.
- Protecting national aspects. Certain disciplines have specific national aspects (e.g. the geography or geology of Hungary). Clearly, these trainings are close to the industrial and administrative applications.
- Protecting the fields of study few in numbers. In some cases, it is especially true that a field of study is indispensable, but only a very few students need to be trained (e.g. meteorologist, astronomer). These fields of study need special financing structure.

Objective: To improve PhD programmes: internationalization, strengthening the scientific character, establishing the systematic scheme of pre- and postdoctoral scholarships.

Reason: high-standard PhD training is one of the foundations of academic research. There is an obvious correlation between international recognition and the number of PhD's issued by the given university. Therefore, in order to improve international competitive positions, increasing significantly the number and quality of PhD students is fundamental, if necessary, even by training foreign students.

Actions:

- A step forward in international competition. Scholarships for non-domestic doctoral students; attracting capable students from the Carpathian Basin and farther is necessary, and – beside high-standard trainings in English – they should be joined to intensive academic research as well.
- Attending fewer classes, giving more credits for research. Passing the final exam after the second academic year should be permitted, what is more, recommended (this could be a kind of filter before continuing the doctoral activity). Passing the final exam or even handing the dissertation in does not imply the termination of the scholarship – it is granted for 2+2 years in the case of appropriate advancement and continuous research activity.
- Significant reduction of the doctoral procedure. Students graduating in our country will only have a chance to join the fight for postdoctoral jobs provided an internationally compatible procedural speed. To this effect, it is necessary – and it is the international practice – for the dissertations to be judged within 2-3 weeks, and for the defense to be organized and completed within 1-2 weeks, even in summer. During this time, the candidate continues to work, and the defense, as well as the preparation for it; are part of their work.

Objective: To increase the effectiveness of research.

Reason: In order to be effective, research should meet personnel and non-personnel conditions. As for the personnel conditions, the current system is in a disadvantageous situation, since – uniquely in international comparison – assistant lecturers without PhD or young graduates with freshly obtained PhD's are "granted tenure" (employed for indefinite duration). Instead, a system of fixed-term postdoctoral jobs and the related lecturer-researcher career are needed. Internationalization of higher education is important from the personnel conditions' point of view, too, but this is currently hindered by the constraint and slow bureaucracy of naturalizing the degrees. As far as the non-personnel conditions are concerned, it is necessary to develop the instrument infrastructure, to transform the tender system, to establish a legal environment that supports research, to increase the salary of those over-performing the average, and quality assurance is also needed (we have already discussed these in detail in chapter 2.2).

Actions:

- Be the postdoctoral scholarship system general, be the postdoctoral and senior lecturer jobs obtained in strict competition, and be the applications declared successful only if a required number of suitable candidates apply provided that the unsuccessful application can be repeated and that it does not imply the withdrawal of the financial framework (this guarantees the quality applicant to be found).
- Revision of the set of rules concerning the naturalization of foreign doctoral students' and post doctors' degree.
- On the basis of the objective contest, providing an accentuated salary for the best members of the lecturer/researcher staff (institutional introduction and financial appreciation of a category equivalent of the title "distinguished professor").

Objective: To strengthen industrial relationships in order for the scientific results of the universities of arts and sciences to become closer to the application as soon as possible.

Reason: Although the most important tasks of the universities of arts and sciences are basic research and the training for research, preparing students for applied research and innovation is also essential. It is of public interest for the results applicable in the practice emerging from basic research from time to time to

be implemented. The relationship between the industry and universities also inspire basic research, and the special knowledge that has been accumulated can be well applied to solve the special problems emerging in the industry.

Actions:

- Where relevant, direct industrial relationships as well as the education of the industrial-economical view should be stimulated.
- The understanding of the industrial research environment, too, should be a part of the researcher trainings for two reasons: on the one hand, in order for the labour requirements of industrial research locations to be satisfied, on the other hand, in order for all of the college leavers to know the culture of industrial R+D differing from that of the basic research.
- Establishing and strengthening technology transfer offices, as the industry, in the course of its research activities, is more and more relying on the academic sphere.

4.2.2. Education and Training in Engineering

The exceptional role and significance of technical training that helps develop economy and the ability to generate a high added value is unquestionable. The situation of trainings in engineering is special because its body of knowledge doubles in some years due to the fast technological development, in addition, cooperation between the prospective employers and higher education institutions must be expressly tight to reach the objectives - equally in education, research-development and innovation.

Accordingly, curricula, including each - mainly professional - subject must be renewed after some years. Students must be prepared that they will work in the major part of their active professional career with tools and technologies that did not exist at time of their higher education. They obtain the knowledge and competences that are strictly necessary to this in natural scientific and professional introductory subjects. The scope of specialised professional knowledge expands in two directions: within a given specialization new tools and technologies appear, in addition, new specializations emerge.

The two-cycle education can adapt to these features very well. It is generally accepted and it was an objective when the introduction in Hungary was prepared that bachelor trainings (BSc) must give comprehensive knowledge, natural scientific basics, general engineering knowledge, and it must help develop the general engineer attitude. The proportion of specialization must not be high, special knowledge must significantly be gained through the student's independent work. Master degree programmes (MSc) must give detailed knowledge in a narrow area, students must possibly study the methods of planning, implementation and evaluation (testing) in connection with projects. In the two-cycle education less bachelor programmes are necessary than there were earlier at universities and colleges. Technical trainings were in an advantageous position in this respect: the number of university and college programmes were practically cut in half by collective work of the involved higher educational institutions already before signing Bologna Statement.

Objective: To renew the structure of bachelor programmes and master programmes in in education in engineering.programmesprogrammes.

Reason: Bachelor programmes must give general knowledge in the special field. In Master programmes only targeted natural scientific knowledge must be taught, teaching special knowledge of a narrower field and involving students into projects must be emphasized. After the Bachelor degree there must be more alternatives in Master programmesprogrammes to choose from.

Actions:

- Analysis of objectives of Bachelor training programmesprogrammes, then modification if necessary.
- Decision on length of Bachelor programmes after a comprehensive analysis, and decision on modification to 180-credit programmes.
- Transforming and content-relevant renewing of the structure of educational and output requirements.
- Development of a financing system that takes into consideration the human resource needs of élite training.

Objective: To establish and regulate a new partnership between among higher education institutions and companies employing graduating students.

Reason: In the engineering field, companies and higher education institutions cooperate now as well but there is no unified model or supporting mechanism. These cooperations are very diverse, there are cooperations for short-distance interests (to meet workforce need) and strategic cooperations as well. The dual education system allows the collective training and cooperation therein. This can be applied in (professional) Bachelor trainings that give employer knowledge. It can also be connected to a similar Bachelor or Master training that prepares for the dominantly planning-researching (academic) career: the higher education institution and the company cooperate in research and development; students participate in collective projects, in the frame of independent work, thesis writing, and degree projects.

Cooperation (partnership) agreements provide a calculable, medium- or long-term relationship for both parties. By a central assistance companies can be made more interested to support technical higher education, going beyond their own workforce need. Involving experts from the business sector into education helps demonstrate what else must be taken into account over and above technical viewpoints to create and market a successful product or service. It is also important to present that expectations of employers are different regarding graduates: big companies search for specialists for each task, small companies generally need a graduate with a universal degree: e.g. an engineer who is familiar with legal, economic and marketing issues. Among measurement leaders in labour activities there is a great need for people with industrial experience.

Although professional knowledge in technical fields is changing very fast, it is not compulsory to participate in regular extension trainings like for practitioners. Making this criterion compulsory helps maintain the knowledge of former graduates up-to-date.

Actions:

- Development of a regulation that stimulates a new partnership between companies and higher education institutions.
- Elaboration of details to involve working experts into the training: in what rate can they participate and what knowledge can they convey in technical higher education, how must this be taken into account while controlling conformity of trainings by HAC.
- For technical graduates it must be outlined how and how often the newest experience of the branch must be acquired after graduation. In this question the opinion of chambers and corporate unions is as much important as that of higher education institutions.

Objective: To increase effectiveness of educational methods in the field of engineering.

Reason: In technical fields students can successfully work independently which develops necessary competencies, but the possible extent of it is reduced by the high number of contact classes. The Act on National Higher Education prescribes at least 300 classes for a semester in daily education, which is less than 22 classes per week, counted 14 weeks. At present, curricula generally include 28-30 contact classes weekly, which is more than this by 30-40%. In Bachelor programmes a high number of contact classes in the first 1-2 semesters is reasonable like the routine in secondary schools, then it must gradually be reduced in each semester. In Master programmes it is reasonable to have a number of classes that is close to the minimum prescribed by law.

Distance learning and e-learning can be applied in technical education very well. In a part of laboratory practices this is supported by virtualisation spreading faster and faster. Many students study in Master programmes while working. But there are only few correspondence trainings. The reason for this is that many people connect this form of training to inferior quality. Thanks for the IT possibilities that are available today, correspondence trainings can safely be organized mainly for employees in the sector.

In many countries it is compulsory to take part in a training held in foreign language - chiefly in English. Successful and rich countries, which devote notable resources to higher education (e.g. South-Korea, Singapure, Brazil), provide students with a substantial support for their study abroad. In Hungary, a technical training in foreign language must be organized mainly in Master programmes. Students in Master programmes must be treated distinguished, supporting mobility.

In the technical structure there are only few interdisciplinary majors. Competencies that can be acquired in these (ability for cooperation with specialists in other fields, good communication skills, ability for team work) are also important in other engineering fields. Particularly entry conditions to the programme, prescriptions to credits that must be gained beyond compulsory credits in curriculum model are different from those that can be applied in other majors.

Actions:

- Reducing the number of weekly contact classes, increasing the rate of independent work.
- Assistance to participation in education in foreign language and exchange programmes, support mobility. For this inflexibility of rules of credit transform must be eased.
- Stimulation and support of elaboration of Master programmes organized in foreign language (mainly in English) (developing syllabi, educational materials for distant learning).
- Establishing a regulation that takes specialities of interdisciplinary majors into account.

4.2.3. Education and training in IT

In section 1.3. we identified some far-reaching socio-economic processes in connection with which we can meet very different paradigms in the various fields of informatics. The emerging informatics (information) revolution may be described the best by the term „internet of things" that refers to the fact that the borderline between the physical and the virtual world gets thinner and thinner. Simultaneously with this merge the role of data is growing, it is more and more important to be able to navigate in the high amount of information (capacity of internet doubles every year, that means it is growing exponentially) - who can find the way in it and can exploit the possibilities of information, is the winner in the competition on a global basis.

Trends known based on international literature and the newest analyses in the sector can be summarized as follows:

- a new digital citizenship is taking shape due to the lifestyle that depends on networks - mobile phones provide millions of people with information through internet;
- explosion-like expansion of digital business life is expected;
- new consumer habits are developing based on habits of the internet society;
- five drivers of technological development are useful for the socio-economic development: „big data" → „big wisdom" and real time systems; cloud-based Internet is getting general; gigabyte networks; new network architectures are developing due to the change of software environment; context-conscious terminals; intelligent sensor abilities; commoditisation and virtualisation.

If we try to summarize large integration trends in the sector, then we can see that informatics (that is now identified as software) will centralize in three points. These are: pipe, cloud and device - related to the terminology of Huawei. Main technical dilemmas of data transfer pipes will remain the general availability and bandwidth. The cloud will provide possibility for storing data, work and entertainment (beyond background utilization of data) but in a much more customizable manner then today. Finally, the number of devices will continuously increase, interactivity and full sync will be the new element here. New network devices will appear like the car.

The above transformation processes do not affect directly the IT programmes in an internationally medium-level higher education in a country (Hungary) that goes after technology. Trainers as the most stable fundamentals slow down adaptation, but the corporate embeddedness of institutions is not developed enough either to put inevitable pressure on the content, structure and methods of education. Therefore based on the analysis of sectorial trends, in the first round adaptation in the attitude is possible, then some more practical measures may be taken.

As demonstrated above, IT training in Hungary has two strategic dilemmas:

1. First strategic dilemma relates to the general *mission* of IT training. Educational traditions in domestic universities and colleges rest on long-established mathematics and technical (mainly electronics engineer) training practices. IT is now moving away from these training methods to

become an independent discipline, and through the Bologna-process a part of dilemmas has been solved, but some fundamental questions are not answered yet. The most important element of the evolving structure is that graduates will be continuously trained further, in short modules as required.

2. The second strategic dilemma includes the regional *profile* of domestic institutions that offer IT trainings. All the domestic institutions perform the same „mainstream" IT training as the regional competitors. The main principle is „small amount of everything", as the accreditation system assists to similar contents and number of lessons. We assume that this low level in specialization can only be maintained at most in the Bachelor programmes in the future.

Objective: To review education and outcome requirements in Bachelor IT trainings in the view of sectoral trends, domestic corporate requirements and international experience.

Reasons: comparing Bachelor level IT education internationally, it can be stated that the curriculum for the domestic courses reflects the conservative approaches that seeks a comprehensive training, providing a „small amount of everything". However, international examples see informatics nearly without exception as an interdisciplinary field of knowledge, which cannot be observed in the domestic Bachelor curriculum. Each international example gives a very concise basis and offers broad possibilities for specialization, which is an answer to the questions of student motivation and employment as well. IT's penetration into the society and the material world is included everywhere in the specializations. In the domestic curriculum only fragments of these elements are present.

Actions:

- The emphasis on introductory subjects that drop out students must be reduced. Students with outstanding skills can study mathematics, physics, etc. in advanced level in the semesters following the basics, which opens a wide intellectual horizon and provides researcher abilities for them.
- Practice projects must be present in the curricula in the first year. On one hand, this motivates students of practical approach, on the other hand, it brings back a part of energies put into home study and private work into the institutes.
- Students who drop out need a vocational higher education that prepares them for web/hardware maintenance tasks, without advanced mathematics, statistics, etc., and students may quit the Bachelor training without any setback.
- A wide variety of optional courses must be offered from the first semester. To this, trainers must be diversified among institutions, research institutes and industrial partnerships. Instead of involving trainers which is expensive and legally difficult, MOOC programmes must be offered.
- Specializations must not be developed based on traditional hardware-software logics rather based on competency analyses or concepts of higher abstraction level (e.g. interaction between people and machine).
- In the period of specialization, dual training must be offered for average students, and innovation laboratories and business incubators for outstanding ones.
- A new curriculum alone will not improve the quality of the training if it is not associated with the modernisation of training methods and student evaluation.
- Stop in investments for years is leading to the impossibility of IT trainings because the amortisation of devices is much faster than the average in this field.

4.3. Education and Training in Economic Sciences

A new financing model has been introduced in higher education for economics recently, the most important element of which is that only a small part of applicants receive bursaries from the Hungarian state, the majority of students pay self-financed costs for their training - by student loan if necessary. Demographic changes (decreasing number of the age-group at university) and the intensifying international migration of students envisage the decline of demand for higher education. This declining tendency in

economics is counterbalanced by the fact that business organisations (enterprises, companies) and public administration, civil and community service organizations have an increasing demand for graduates with such qualification. In some top institutes there are competitive foreign language courses, which can also attract foreign students to Hungary, increasing the demand.

The following trends of change must be realized to operate trainings in economics in a sustainable, successful and internationally competitive way:

1. Reducing the number of Bachelor courses as the present structure requires students to select a career path unreasonably early, it makes impossible to organise the training cost-effectively (now there are 3+7 Bachelor programmes in three types: daily, evening and correspondence courses, in two financing model, in almost 40 institutions).
2. Master programmes must be adjusted to local needs and made more practice-oriented.
3. The preferential institutions must enter the international educational market, and the capacity of institutes to admit foreign students must be increased.
4. Intensifying participation in specialized extension training and adult education, harmonized with employers.

Objective: To decrease the number of Bachelor programmes in economics, strengthen their interdisciplinary nature in certain fields, increase the proportion of methodology- and social science knowledge.

Reason: To improve the efficiency of trainings by reducing the number of Bachelor programmes and ensuring specialization options within the major (student groups in optimal size in the introductory phase of the training); to perfect the time of career selection for entrants (faster trainings, less career changer), to increase the availability of professional intellectuals from several sectors and fields.

Actions:

- Starting and shortly closing the review process of Bachelor programmes in economic science, striving to gain understanding in the field.
- Optimization of training options in the institutional network (determining quality and quantity parameters for starting trainings; regional and institute-typical coordination of training levels and specializations).
- Introduction and implementation of the dual education.

Objective: To broaden the scope of offers of MSc programmes in Economics , in cooperation with local employers with regard to the financing of the programmes and the content and implementation of practical trainings.

Reason: The objective of Master of Economics courses is to provide future economists with specialized, location-, sector- and field-specific knowledge, preferably in a flexible time period, meeting labour market needs. Less subjects and a more complex knowledge base included in each subject shall be sought, with higher credit values, which would help students learn professional knowledge deeply and practice different models and methodologies.

Actions:

- Start and complete the development of Economics MSc course offers tailored to local labour market needs as soon as possible.
- Provide recognized lecturer statuses for highly experienced professionals coming from the market but not having a previous academic career.

Objective: To exploit the potential for internationalization and to strengthen the competitive programmes in economics taught in foreign-language, primarily in the case of MSc programmes.

Reason: Few institutions of the country meet the requirements for internationally competitive basic- and MSc training; therefore, the focus of meeting international market demands should be concentrated in these institutions.

Actions:

- Promote foreign language training- and content development.
- Start online foreign language training programmes in the priority institutions.

Objective: To strengthen involvement in postgraduate specialisation trainings and adult trainings in economics, coordinated with employers.

Reason: Employers bring forward a number of requirements which an economics training institution can well and expertly meet through its knowledge and capacity. These cooperation schemes (lecturer- and developer statuses financed by companies and organizations, joint curriculum- and methodology development, joint researches, company staff- and management succession), which are widely used in the international practice, excellently serve the institutions' local embedment, responsiveness to solve actual economic- and social problems, and sustainable funding.

Actions:

- Define precisely the specialized role of economics higher education institutions in extension trainings and adult trainings, and establish the conditions thereof.
- Promote structured, targeted cooperation schemes with employers.

4.4. Eduation and Training in Agriculture

How Hungary can provide livelihood and further education for people living in rural areas is decisive regarding the country's competitiveness. The agricultural sector has always had an important role in the successful periods of our history; however, today the age composition and educational level of the sector's employees is behind the requirements of other sectors. The employment and education of professionals with high-level, up-to-date knowledge is essential to ensure the competitiveness of agricultural enterprises. Agricultural higher education shall be popularized to young people again.

As regards the employment rates of the sector, the number of applicants for agricultural higher education is about the half of the needs, and the dropout rate is high (fewer than 7% of applicants applied for agricultural higher education in 2014, their number not reaching 5000), and the training marketing of the sector is also unsatisfactory. The objective is to have the number of applicants rise above 10% within 4 years, thus the admitted students' qualitative indicators will increase and dropout will decrease. The agricultural engineering system required by the large enterprise/co-operative structure does not meet the 21st century expectations in many aspects; and the new educational courses have fragmented the structure, as today there are 53 different kinds of tertiary vocational-, Bachelor-, and MSc courses in this field. The quality of agricultural education can be improved by concentrating the educational structure and performing the necessary transformations, better adjusting to the requirements of SMEs. Agricultural training is a key element of rural development; however, to meet the requirements, new and modern trainings - such as dual agricultural training - shall be introduced, farmer extension trainings shall be implemented, and the content of distance education or vocational training shall be broadened. With regard to the higher educational institutions concerned in degree programmes, research and consultancy in agriculture the Ministry of Human Capacities cooperates closely with the Ministry of Agriculture and the Hungarian Chamber of Agriculture in addressing the issues on content development of programmes, research directions and development policy interventions.

Objective: To increase the proportion of applicants to higher education in the field of agriculture.

Reason: The number of applicants for agricultural education is below 5000 today. With the increase of the number of applicants - if competition also strengthens - the quality of education will increase and dropout will decrease.

Actions:

- Popularization of agricultural higher educational courses with the involvement of the National Agricultural Economics Chamber and higher educational institutions.

Objective: To review the offer of programmes in agriculture, merger of programmes , if necessary, introduce new dual training forms, start farmer training, broaden bilingual education.

Reason: Education course offers are highly fragmented at the moment: There are 16 Bachelor courses, 26 MSc courses, and 11 tertiary vocational trainings. The efficiency of trainings can be improved through the integration of several courses, with better adjustment to the requirements of the SME sector and family farms. By increasing the number of bilingual trainings, both the number of foreign students and the international competitiveness of trainings can be increased. Introducing the dual training form will allow obtaining farm practice in the relevant sector during the training period, which creates the harmony of practical and theoretical educations.

Actions:

- Introduce farmer training.
- Decrease training course offers, in several stages if appropriate, and by minimum 20%.
- Extend the scope of foreign language training offers.
- Introduce and implement dual trainings.

Objective: To strengthen agricultural training centres and facilitate regional networking.

Reason: The revision of training course offers of state agricultural educational institutions, the cleaning of profiles, and the concentration of trainings is inevitable. Maximum 2-3 centres are required (and possible) nationally to achieve total area coverage. These centres would cover the whole agricultural higher education and R&D spectrum from Bachelor training to doctoral school and research institutions; while other institutions would provide agricultural trainings on specialized fields, better tailored to regional needs. The specialized institutions would serve as feeders and assist the scientific and innovation tasks of agricultural centres, as well as the research institutions and doctoral schools operating there. It is the agricultural centres' responsibility to coordinate research tasks and create and maintain cooperation among other public institutions.

Actions:

- Professionally strengthen training centres, concentrate training offers.
- Specify regional specifications.
- Perform institutional profile clarificationprofile clarification.

4.5. Teacher Training

Teacher training is a specific, strategic branch of higher education, where future changes must serve the renewal of public education. That is because a quality school system (according to both the experience and research results) can only be maintained with excellent teachers. However, the effects of the renewal of teacher training content and structure will be noticeable and measurable decades later, that is why it shall be considered in combination with extension trainings and teacher's career model.

The legal framework for the renewal of teacher training was implemented by the Act on national higher education and public education, adopted in 2011. Aptitude examination, where teachers have to personally

appear, have been introduced as a general proposition; teacher training is now a two majors education again as a general rule, as school educational work demands that teachers shall meet their students on occasions of teaching more than only one subject. The whole of teacher training has returned to undivided training, and new training- and outcome requirements have been issued. The college- and university levels, that is: teacher training courses for primary schools and secondary schools have been differentiated in such a way that the content is common in the first three years, and the two branches are divided from the fourth year. This system leads to fewer dead ends and allows quality selection between the two branches based on scientific knowledge. However, there is no difference regarding the amount of pedagogical content.

People working in public education used to have the substantiated complaint about the fact that even though many new graduates knew theory on a high level, they were hardly able to cope with everyday practical challenges of the school. No doubt, candidates can be well prepared for that only through a long practical training. A one-year school internship is built on the four- and five-year trainings, the successful completion of which is a prerequisite for taking a final exam and receiving a diploma. Qualified mentor teachers assist the candidate throughout the school internship, which is also the first step of the teacher career model. In parallel with the renewal of internships, the current system and capacity of practice institutions shall also be reviewed.

The conceptual reform did not affect the well-functioning system of the conventional primary school teacher-, nursery teacher-, and conductor trainings; so the training portfolios are to be reviewed also in this field in the future, to further improve the conditions of training.

An important future requirement is that the system of teacher training shall better relate to the needs of public education both professionally and regarding the volume of trainings. We must take into account here that about 50,000 teachers will reach the age of retirement in the next ten years, half of whom are primary school teachers and nursery teachers. The fact that a reduction in the number of children is expected in public education in the next several years mitigates the situation, so probably not all retiring employees will need to be replaced; nevertheless, at least 2000-2500 graduates of teacher-, primary school teacher- and nursery teacher training will be needed in the coming years. This customer demand - the precise definition (possibly on the level of faculties and regions) of which is the responsibility of the public education, and which the higher education must consider in establishing the training capacities - shall be taken into account in the selection process.

The reconsideration of the system of extension trainings has also begun. In order to consistently coordinate the content- and organizational issues of teacher training and extension training, the universities and colleges organize teacher training centres and are able to perform extension training tasks. Given that the infrastructure and educational capacity necessary for extension trainings is available at institutions which conduct trainings in general, this task can be performed most efficiently by the higher educational institutions.

Klebelsberg Training Scholarship was founded in 2013 with the aim to make the shortage areas of the profession more attractive and promote the orientation of talented students. Its positive effect was observed during applications already in 2014: the number of applicants for undivided teacher training in natural science increased significantly.

Objective: To implement the thorough renewal of initial and further teacher training by 2017.

Reason: The renewal of public education is one of the most urgent tasks Hungary is facing currently. A key to our survival and evolution lies therein. However, public education cannot be renewed without changes in teacher training.

Actions:

- The requirements and control methods, as well as financing conditions of the internship year shall be established.
- The operation of public educational institutions and training schools run by higher educational institutions; as well as their capacities necessary for practical training shall be reviewed.
- The content control of teacher training shall be started in the frames of traditional accreditation, as well as by creating the legal conditions of process control and possible intervention.

- A new system of teacher extension training shall be created with solid financing, defining the roles and responsibilities of the training sites.
- The legal conditions of controlling of content- and organizational work of teacher training centres shall be established, after which recurrent monitoring shall be started.
- Further development and the preparation of future monitoring of the Klebelsberg Training Scholarship is necessary.
- In the frames of profile clarificationprofile clarification of institutions, the activities and training offers of teacher training institutions shall be reviewed, further improving the conditions of training.

5. Financing

Having defined the strategic directions, a separate chapter is dedicated to the financial foundations which create the force field to move the institutional system towards the objectives set.

The higher educational institutions are expected to increasingly rely on their own incomes, external- and market sources while performing their basic activities, educational and research activities; thereby reducing their dependence on the prevailing budgetary resources, through the stabilization of external sources of income. This objective is significantly impeded by the anomalies, problems arising due to the current stringent regulatory environment of fiscal management (restrictions of asset management, asset acquisitions, constraints on the use of own income, etc.), which make the institutions disinterested in achieving effective financial management and developments.

Another important element will be the task-based budget planning and financial management system to be introduced in 2016, which will put the real costs and financing of the „ordered" public functions performed by the institutions on transparent foundations; clearly separating these from business-, entrepreneurial activities. The elementary and therefore clearly tangible output unit of the educational activity is the credit, that is why the *amount of credits* achieved by students should be taken into account in the funding of training activities, as these ensure the greatest flexibility.

The strict regulations on financial management of budget resources, and at the same time the strategic objectives of greater involvement of market resources and effective financial management all require that the public duties performed by use of budgetary resources, activities and projects carried out using community funds, and „business" activities performed using external and market sources shall be clearly separated from each other in the financial management of institutions and in the relevant regulations. So, while the public duties performed using budgetary resources and projects carried out using community funds require strict limitations on the purpose and strong accountability obligations, a much more flexible financial regulation system fitting in the economic environment shall be established for the use and management of market sources.

Financing principles:

1. There are no inherited rights, funding is clearly based on the output.
   a) The scope and extent of public duties to be performed by higher educational institutions is determined by the state on the basis of available budgetary resources.
   b) The establishment of performance indicators in determining and financing the public duties ensures meeting quality requirements.
   c) The financing of trainings is based on prime cost calculations determined by uniform principles; its amount is differentiated for institutions as adjusted on the basis of predefined performance indicators.

1. The budgetary financing provides the recognized costs of public duties (primarily training, research, public education-, health care-, and cultural services, protection and maintenance of national values, sports activities, community engagement) „ordered" by the state.
   a) The financing of public duties shall cover all recognized costs arising during their performing – as calculated using a uniform methodology.
   b) The public duties to be performed, their performance indicators, and the principles and methodology of the associated financing shall be established in such a way to provide the institutions with the requirements for sound financial management, also for medium-term planning.
   c) An objective is to eliminate cross-financing between different public duties (especially education and research, education and health care) in using the resources allocated to each field of public duties.
   d) Special tasks and those which are a national economic or social priority (e.g. regional role, trainings outsourced to community colleges, priority research disciplines) *may* receive premium support.

2. Such a regulatory and management environment shall be created in which the operation and financial management of institutions can be stabilized, their dependency on state and community resources can be decreased, and the requirements for the introduction of new business models can be established.

a) The uniform prime cost calculation methodology shall be created in such a way to promote the reduction of operating costs and the effectiveness of the whole financial management.
b) The requirements of project-based funding elements shall be designed so as to improve the institution's ability to raise funds in the long run.
c) The regulatory environment of institutional finance management and asset management shall be established so that the institution be willing to significantly increase the ratio of own incomes and develop an effective financial management system.

Objective: To establish a stable, predictable, realistic, task- and performance-based system which is adjustable to the labour market requirements and prevailing budgetary sources, based on a recognized prime cost calculation model.

Objective To make the public - and other community funding of scientific and research performance transparent, clear, and systemic; so ensuring the sustainable operation of a solid research basis..

Possible performance- and success indicators

The indicators of funding of training tasks:
- Prime cost of the faculty
- The ratio of credits of the sample curriculum and actually achieved credits

Indicators determining task performance agreements and performance measurement:
- The improvement of students' competence results between the training input and outcome (high weighting)
- Other success indicators from the quality assurance system
  - Issued Bachelor-, Master- and PhD degrees (medium weighting)
  - Graduates in the fields of mathematics, natural sciences, technical, IT, agricultural, medical sciences, teaching (additional medium weighting)
  - Graduates completing studies within the period determined by the corrected sample curriculum (high weighting)
- Dropout (low weighting)
- Creating opportunities for disadvantaged people (low weighting)

Indicators of funding research tasks:
- Foreign language publication (medium weighting)
- Number of technological know-how transfer / tech-transfer projects (medium weighting)
- Patent / protection (medium weighting)
- Number of doctoral candidates and students obtaining a degree (medium weighting)
- Number of people graduating in the Momentum Programme of the Hungarian Academy of Sciences, in the National Excellence Programme, or in other recognized scholarship systems (low weighting)
- Places in recognized scientific competitions (low weighting)
- Presence of award winners (Abel, Wolf, etc.) (low weighting)

Objective: to rationalize the asset management of institutions, disburden higher education institutions of debts from mistaken PPP constructions, which they cannot pay off on their own.

Objective: to reduce the institutions' exposure to state- and other community resources, improve their ability to raise market funds and improve their social-economic engagement.

Reason: the financing of Hungarian higher educational institutions has been following the below pattern since 2012:

1.	Direct state support (on several grounds)	**50%**
2.	Community tender resources (about one-third being R&D projects, and the rest mainly EU sources)	**24%**
3.	Direct incomes (for non-R&D tasks, mainly tuition fees and services, etc.)	**22%**
4.	Direct R&D incomes (from third party)	**2-4%**
5.	Patronage, donations	**< 1%**

Taking into consideration that direct state support cannot be increased significantly in the coming years and such an exposure to a single channel of income is not desirable given the robustness of the system; as well as that EU community resources will be available only in the coming 5-6 years; it is particularly important to address the increasing of *direct R&D* and other incomes resulting from the activities of institutions, as well as *sponsorship*-type incomes.

Although direct state support will continue to play a dominant role, and its amount will stay the same – despite the decrease in the number of students, – the sources being freed on account of decreasing of tasks and optimizing the system will be used for the quality development of higher education. In the next 5 years the EU community funding shall be used to create the structures and business models which will represent the funding corresponding to the scales of this source, which then will come from direct activities; largely due to the students' individual engagement and the sale of R&D&I activities.

The generation of financial resources in the form of donations in the institutions is not typical in Hungary, and also not supported by the existing legislation - especially tax legislation - however, in many countries (USA, Germany, England), these incomes represent an important funding element for higher educational institutions.

6. Key Points

A number of strategic objectives and indicators for their measurement have been defined for the establishment and development of a performance-based higher education. These will be summarized below.

6.1. Performance-based teaching and learning environment

Objectives:

- The relations with the employers (corporations) shall be strengthened on national and institutional level, demands for qualifications shall be channelled into the programmes to renew the content of higher education programmes, especially regarding foreign language courses for professional purposes.
- We encourage the establishment of educational and research cooperation between institutions, the launching of joint programmes, the strengthening of the mentoring role of decisive institutions, and the creation of networks facilitating faster development of students.
- The education and outcome requirements will be renewed in content and in structure in compliance with the renewed programme structure.
- Increasing interoperability among higher education training outputs and output alternatives. Introduce and continue solutions and programmes enhancing access to higher education.
- A performance-oriented promotion system for teachers and researchers shall be introduced, teachers' as well as researchers' performance shall be measured, and the conditions for competitive compensation shall be established in order to enhance personal excellence.
- The students' entry and outcome quality requirements shall be increased.
- Redefining quality assurance and the role of the Hungarian Higher Education Accreditation Committee on the basis of the principle of performance..
- The system of PhD training and the system of incentives will be reformed

Performance indicators:

	BASE VALUE (2013)	TARGET VALUE (2020)
The number of programmes offered while retaining the capacities concerned is reduced on a national level by 15%	10,732	9,122
The drop-out rate decreases by 10 percentage points on average in Bachelor and single-cycle long programmes	35%	25%
Number of foreign students	23,000	40,000
Number of students in dual Bachelor programmes in the relevant fields of study among first-year students	0%	8%
Ratio of persons with tertiary level education or equivalent in the age group 30–34 years	29.9% (2012)	35% (2023)
The proportion of students participating in foreign partial training sessions of at least 3 months or of a value of minimum 15 credits, in the frames of foreign travel or professional training	10.41%. (2012)	20% (2023)

6.2. World-class Research

Objectives:

- To establish R&D&I networks between institutions, strengthen R&D&I focus.
- Higher education takes part in the establishment of the innovation competencies of technologically intensive companies - primarily SME's - in line with the specializations and directions dedicated by the National Intelligent Specialization Strategies.

- The research and funding system should support the internationally competitive quality and resource concentration, as well as increasingly build on resources outside government finances, obtained by institutions, which will be promoted also by amendment of the Act on public finances (business activity).
- Increasing the international integration of researches in higher education
- Ensuring the human resources for R&D&I in the long term.
- Renewing the R&D&I infrastructure.

Performance indicators:

	BASE VALUE	TARGET VALUE
Number of researchers [person]	37,000 (2012)	56,000 (2020)
Number of R&D employees per 1,000 employees	8 (2011)	12 (2020)
Higher educational R&D&I cost as percentage of GDP	0.24 (2012)	0.5 (2020)
Direct R&D&I revenue of the institutional system [as percentage of the total budget]	1.5% (2012)	10% (2020)
The proportion of students obtaining a PhD degree [total number of students admitted in the relevant year]	22% (2013)	30% (2020)
Number of patents in higher education [as a % of patents registered in Hungary]	13% (2013)	25% (2020)
The number of domestic centres of excellence appearing in the professional measurements of the Centre for Higher Education (CHE)	2 (2014)	10 (2020)
Number of institutions included in the League of European Research Universities (LERU)	**0 (2014)**	**1 (2025)**
Number of higher education international research projects funded from framework programmes (FP7 / Horizon2020)	397 (2007–13)	635 (2023)
The number of foreign language publications written in higher education	10,177 (2012)	13,000 (2023)

6.3. Higher Education is the Catalyst for Urban and Regional Development

Objectives:

- To increase the impact of higher education on local economic development.
- To increase the activity of higher educational institutions in addressing social challenges and in the dissemination of social innovation.
- The number of science-popularization, awareness raising and attitude-forming services is expanding and accessibility to higher educational knowledge bases also increases.
- To produce up-to-date information contents and to guarantee wide access to them.
- Strengthening the service functions of higher education both for students and the local society.

Performance indicators:

	BASE VALUE	TARGET VALUE
Number of higher educational, chamber and local government collaborations / discussion forums	2	12
Number of spin-off companies	*Survey ongoing*	+20%
Creative urban strategy, in the implementation of which a higher education institution is involved	2	5
Exemplary higher educational energy systems renovation with presentation function / passive public institution	2	10
Number of participants in higher education services related to sport and physical exercise as well as health-improvement services and health education	*Survey ongoing*	+20%

6.4. Profile clarification and specialization

Objectives:

- Restructuring training programmes in order that students – according to their rights guaranteed by the Fundamental Law – acquire knowledge, which can be used at the labour market and meets their skills and opportunities. Ensuring the higher educational transition from the vocational training system, establishing a new training structure and Bachelor programme (e.g. business engineer, business economist).
- Differentiating the profiles of institutions, proper operation of the primary functions of institution types (university, university of applied sciences).

6.5. Transformation of the institutional system

Objectives:

- To rationalize the higher education's institutional network; and create a hierarchical institutional system adjusted to the spatial structure of Hungary, directed towards quality improvement, and creating a competitive situation.
- Qualitative and quantitative development of the Hungarian education beyond the borders.
- To position domestic institutions in the international competition.
- **To** increase international mobility of students, lecturers and researchers.
- To strengthen international relations at institutional level with partner countries of strategic importance.

6.6. Educational innovation

Objective:

- To focus the training methodology of higher education on practice and on student work.

6.7. Efficient Institution Management and New business Models

Objectives:

- To integrate external stakeholders (maintainer, society) into the management of the institution, separate academic and economic-strategic decisive competencies.
- To establish the management-, evaluation- and motivation system of the rector and the chancellor.
- To re-regulate the student union system.
- To develop a regulatory environment for the new business model.
- To effectively provide central sectorial services.

6.8. Special areas of intervention

Objectives:

- To strengthen, consolidate, and improve the basis of clinical education and to raise its quality level.
- To improve the physical infrastructure of medical education and training.
- To improve the personal background of education and training in the field of medicines and health sciences (professional competence, career model).
- To improve the healthcare professionals' training in higher education, and make the training methodology marketable, in accordance with the domestic and foreign demand.
- To extend and improve adult education in health care.
- To develop the trainings in the social field, and to make them more practice-oriented.

- To ensure the adequate student input for programmes in natural sciences.
- To improve the quality level of bachelor and master programmes.
- To improve PhD programmes: internationalization, strengthening the scientific character, establishing the systematic scheme of pre- and postdoctoral scholarships.
- To increase the effectiveness of research.
- To strengthen industrial relationships in order for the scientific results of the universities of arts and sciences to become closer to the application as soon as possible.
- To renew the structure of bachelor programmes and master programmes in in education in engineering.
- To establish and regulate a new partnership between higher education institutions and companies employing graduating students.
- To increase effectiveness of educational methods in the field of engineering.
- To review education and outcome requirements in Bachelor IT trainings in the view of sectoral trends, domestic corporate requirements and international experience.
- To decrease the number of Bachelor programmes in economics, strengthen their interdisciplinary nature in certain fields, increase the proportion of methodology- and social science knowledge.
- To broaden the scope of offers of MSc programmes in Economics , in cooperation with local employers with regard to the financing of the programmes and the content and implementation of practical trainings.
- To exploit the potential for internationalization and to strengthen the competitive programmes in economics taught in foreign-language, primarily in the case of MSc programmes.
- To strengthen involvement in postgraduate specialisation trainings and adult trainings in economics, coordinated with employers.
- To increase the proportion of applicants to higher education in the field of agriculture..
- To review the offer of programmes in agriculture, merger of programmes , if necessary, introduce new dual training forms, start farmer training, broaden bilingual education.
- To strengthen agricultural training centres and facilitate regional networking.
- To implement the thorough renewal of initial and further teacher training by 2017.

6.9. Financing

Objectives:

- To establish a stable, predictable, realistic, task- and performance-based system which is adjustable to the labour market requirements and prevailing budgetary sources, based on a recognized prime cost calculation model.
- To make the public - and other community funding of scientific and research performance transparent, clear, and systemic; so ensuring the sustainable operation of a solid research basis.
- To disburden higher education institutions of debts from mistaken PPP constructions, which they cannot pay off on their own.
- To reduce the institutions' exposure to community resources – with an unchanged government involvement – and improve their ability to raise market funds and improve their social-economic engagement.