National Research University Higher School of Economics

Global competitiveness program

Strategic academic unit

FORESIGHT AND SCIENCE, TECHNOLOGY AND INNOVATION STUDIES

Description

Moscow, 2016

CONTENTS

1. STRATEGIC ACADEMIC UNIT "FORESIGHT AND SCIENCE, TECHNOLOGY AND INNOVATION STUDIES"

1.1 Project summary

Goal: to create a world class center of excellence in the Russian Federation in measurement, foresight and policy design in science, technology and innovation (STI).

Main Objectives:

- Performing research in measurement, modelling, and foresight of STI, including global research fronts, emerging technologies, evidence-based policy tools, social and economic impact, intellectual capital;
- Developing empirical databases on innovative behaviour of economic actors, global technological trends, network interactions within STI domain, human resources, knowledge-intensive business services, etc.;
- Translating research results into policy advice for government agencies, development institutions, and businesses;
- Participating in expert groups of international organizations (OECD, Eurostat, UNIDO, APEC, and others) and research networks (ERA.Net RUS, BILAT.RU, Globelics, UNU-MERIT, International Foresight Academy, and others);
- Implementing an international Master's program in English (unique in the Russian Federation) with extensive research components, to train experts in STI governance (https://www.hse.ru/en/ma/sti/).

Main Anticipated Deliverables:

- HSE will set the agenda for research in Russia in a number of domains, including STI measurement, science and technology foresight, modelling innovation behaviour of the economic actors, research of knowledge-intensive business services;
- Raising *the Foresight and STI Governance* journal, published by HSE (https://foresight-journal.hse.ru/en/) up to the second quartile (Q2) of the Scopus Citation Index (by 2020);
- HSE will become a leading national think tank for the business sector in the area of STI;
- HSE will become a coordinator and key actor in the international network of leading global foresight centers;
- HSE experts will take lead roles in task forces within international organizations (OECD, EU, Eurostat, UNIDO, WIPO, APEC, ITU, and others);
- The Master's program on STI governance will obtain accreditation the EPAS international accreditation (by the European Foundation for Management Development) and will become one of the most prestigious educational programs in its domain with a share of foreign students as high as 30% (by 2020).
- HSE joins the TOP-100 universities in the QS ranking on "Social Sciences & Management", and TOP-100 in the QS ranking on "Development Studies" and "Economics & Econometrics".

Brief description of the STRA-U role and contribution into the University development and achievement of goals and target performance indicators of the Global Competitiveness Program

Being a leading center for STI measurement, analysis and foresight for to the Government of the Russian Federation (https://issek.hse.ru/en/napravlenia#exp_), the STRA-U

contributes to HSE's reputation as the key center of excellence that provides expert knowledge and analytical support to governmental policy making and designs state programs in the domain of STI. Competing with large international companys (McKinsey, Deloitte, PWC, and others), the STRA-U performs projects for federal entities and companies and contributes greatly to the University's applied research: the volume of R&D contracts per employee of the STRA-U is three times higher than the HSE average.

The STRA-U educational activity is strongly geared to the global market: the share of international students of the Master's program has already exceeded 20% in the first few years of operation of the program, and research of the STRA-U is headed by leading international experts (h-index = 10 or higher).

The STRA-U has already contributed greatly to the HSE ranking by subject in 2015 in the QS Social Sciences & Management (161st place, ranks 2nd in Russia after Lomonosov Moscow State University), the QS Development Studies (51-100, the only University in Russia) and Economics & Econometrics (151-200, the only University in Russia).

1.2 Project Fact-sheet

The Foresight & STI Studies STRA-U is organised on the basis of the HSE Institute for Statistical Studies and Economics of Knowledge (ISSEK) (https://issek.hse.ru/en/) — the leading center of excellence in the Russian Federation for the STI statistics, policy and foresight. In 2014, the Center for Advanced Studies in STI, which also comprises two international laboratories, was organised in the NRU HSE based on ISSEK.

Key features and achievements:

- increase in the volume of applied research from 47.5 to 250 million rubles in 2003-2015;

- increase in the number of articles in academic journals indexed by the Web of Science and Scopus from 16 to 36; while the share of articles in the Q1-Q2 journals rose from 40 to 73% during 2013-2015 (https://issek.hse.ru/en/intpubls);

- publication of monographs in the *Springer* publishing house (http://www.springer.com/de/book/9783319256269;http://www.springer.com/jp/book/9783642318269; http://www.springer.com/us/book/9783319272085#aboutBook);

- increase in visibility and competitive positions of the *Foresight and STI Governance* journal (published since 2007): 1st place in "Science Studies" and "Organization and Governance" in 2014, Russian Science Citation Index (RSCI); coverage by Scopus since 2013 (in 2014, SJR (SCImago Journal Rank): 0.19; SNIP (Source Normalised Impact per Paper): 0.47 (Q3)). Since 2014, the journal is published in English;

- publishing branded statistical databooks (https://www.hse.ru/en/primarydata/), analytical reports and methodological guidelines (https://issek.hse.ru/en/editions), and contribution to international reports (*OECD STI Outlook, OECD STI Scoreboard, Global Innovation Index, UNESCO Science Report, US Science&Engineering Indicators,* and others) and the working papers series "*Science, Technology and Innovation / STI"* (https://www.hse.ru/en/org/hse/wp/prepfr_SCI).

- regular information bulletins (https://issek.hse.ru/expressnews) based on the results of monitoring studies (https://www.hse.ru/en/monitoring/) that are used by the Government of the Russian Federation for decision making;

- exclusive rights for various software, databases and related know-how;

- experience in designing innovation programs for large companies: *Gazprom, Gazprom Neft, Transneft, Alrosa, Rosneft, Energy Systems of the East, Aeroflot, Ruselectronics, Russian Post, and others;*

- participation in research networks, expert communities and projects (https://issek.hse.ru/en/internationalactivity);

- support of science and technology cooperation between the Russian Federation and the EU (http://issek.hse.ru/en/dep_intproj);

- organising international conferences on the basis of ISSEK (twice a year) (https://issek.hse.ru/en/forsconf-2015/).

Key STRA-U subdivisions and Associated Units:

ISSEK comprises the International Research Laboratory for Economics of Innovation (LEI) managed by Ian Miles, professor of the University of Manchester (https://lei.hse.ru/en/) and the International Research Laboratory for Science and Technology Studies (LST) managed by Jonathan Linton, professor of the University of Ottawa, chief editor of *Technovation* (Q1 in Scopus and Web of Science) (https://lsts.hse.ru/en/).

As a center for advanced studies, ISSEK actively cooperates with other HSE subdivisions (the Institute of Education, the Institute for Public Administration and Municipal Management, the Faculty of Economic Sciences, etc.).

In 2011, ISSEK established an International Advisory Board, headed by professor Luke Georghiou, Vice-President of the University of Manchester. The Board includes leading scientists from the UK, the USA, Canada, Germany, Japan, Korea, China, and other countries.

STRA-U Research Adviser: Professor Nicholas S. Vonortas, Elliot School of International Affairs, George Washington University, São Paulo Excellence Chair, Innovation Systems, Strategy and Policy, University of Campinas, Brazil.

STRA-U Academic Leader: Professor Leonid Gokhberg, First Vice-Rector, Director of ISSEK.

Key educational programs and their development

The Master's program "Governance of Science, Technology and Innovation" in English has currently seventy students enrolled, 22% of which are international students. The International Academic Council appraises the contents of the program (https://www.hse.ru/en/ma/sti/academ_council).

The list of key Russian partner organizations of the program include: Gazprom, ABB Russia, Skoltech, Russian Venture Company, Bright Capital, the Ministry of Education and Science of the Russian Federation, the Ministry of Economic Development of the Russian Federation, and the Moscow Innovation Agency. Their representatives are members of the Academic Council of the program, participate in the work of the State Examination Commission, give lectures and offer internships for students.

The program implies close interaction with international partners:

- students of the program can join double-degree programs at the Technical University of Berlin and the Maastricht University;

- academic student exchange programs are in place with the Seoul National University and the University of Bremen;

- training and internships are arranged on the basis of the OECD and Joanneum Research (Austria);

- lectures are delivered by professors of the Harvard University, the University of Manchester, the George Washington University, the University of Ottawa and experts of the National Research Council (Italy), the European Commission, and the OECD.

Program plans:

- get the EPAS international accreditation (by the European Foundation for Management Development): start - 2018, accreditation - 2020;

- develop English-taught online courses (30% of elective courses by 2020);

- invite lecturers from the business community (double the number of lectures and master-classes by lecturers from the business community by 2020 compared to 2016);

- raise the academic personnel outgoing mobility (up to 30% of academic personnel annually by 2020).

Key Research Projects and their Development

Dozens of research projects have been accomplished on the basis of the STRA-U (https://issek.hse.ru/en/ISSEK_projects). Many of them were pioneer projects and made a major contribution to the original methodology and tools of statistical measurement of R&D, emerging technologies (nano- and biotechnologies, ICT, photonics, and others), knowledge-intensive business services (engineering, design, and others), innovation activities in mining and manufacturing, services, agriculture, etc. Also, the research results have largely contributed to the development of methods and practices of foresight studies in science and technology, in various sectors of the economy (energy, aircraft, motor vehicles, shipbuilding, oil extraction, petrochemistry, transportation, agriculture, media industry, and others), as well as to the design of evidence-based STI policies and the evaluation of their mechanisms and outcomes.

Key projects:

1. Advanced methodologies and tools for the measurement of STI dynamics and socio-economic impacts.

Heads: Leonid Gokhberg, PhD, professor, First Vice-Rector, HSE ISSEK Director; Ian Miles, PhD, professor, Head of the HSE ISSEK Laboratory for Economics of Innovation.

The project is focused on defining global priorities in the STI measurement, harmonization of national statistics with international standards, representation of the Russian data in the OECD and Eurostat databases and the development of new metrics for the comprehensive evaluation of the STI domain.

Major subprojects until 2020 are:

- Contribution to the update of the Oslo Manual (the international standard for statistical measurement of innovation) (2015-2017) in cooperation with the European Commission, the OECD, Dialogic (Holland), and DevStat (Spain);

- Emerging technologies, trajectories, and implications of next generation innovation systems development in China and Russia (2014-2016) in cooperation with the University of Manchester, the Beijing Institute of Technology and the Georgia Institute of Technology;

- Developing a toolkit for measurement and analysis of global research fronts in cooperation with the Georgia Institute of Technology and the University of Manchester;

- Improved measurements of new and emerging technologies (nanotechnologies, biotechnologies, photonics, and others) and studies on the evaluation of the social and economic consequences of their development in cooperation with the OECD, the WIPO, the Ministry of Industry and Trade of the Russian Federation, and the Federal State Statistics Service (Rosstat).

2. Foresight instruments for sustainable economic growth, social welfare, and industrial competitiveness.

Heads: Alexander Sokolov, PhD, professor, HSE ISSEK Deputy Director. Ozcan Saritas, PhD, professor, HSE ISSEK LST Lead Researcher.

Project objective: convergence of quantitative and expert methods of foresight, development of a toolkit for the processing of large arrays of non-structured data, text mining and the integration of foresight procedures into the decision-making system.

Major subprojects until 2020:

- Science and Technology Foresight 2040 (commissioned by the Ministry of Education and Science of the Russian Federation);

- Technology roadmaps for various sectors of economy (energy, agriculture, healthcare, and others);

- Establishment of international and national networks of science and technology foresight centers (from the Russian Federation, Japan, Brazil, the USA, Canada and other countries);

- Developing the methodology and 'smart toolkit' of foresight studies in cooperation with the University of Manchester, the Delft University, CGEE, JRC/IPTS, and others;

- Identification, monitoring, and evaluation of global trends in socio-economic and S&T development in cooperation with universities participating in the Project 5-100, the Singularity University, the OECD, and others;

- Establishing priorities in S&T development: required resources and expected outcomes (in cooperation with the JRC/IPTS, KISTEP, and NISTEP).

3. Design and evaluation of impact-oriented policies for innovation-driven growth: theory, toolkit, empirical studies.

Heads: Tatiana Kuznetsova, PhD, HSE ISSEK Center for S&T, Innovation and Information Policies Director; Jonathan Linton, PhD, professor, Head of HSE ISSEK LST.

Major subprojects until 2020:

- Comprehensive evaluation of the efficiency of state STI policies (for the Ministry of Education and Science of the Russian Federation, the Ministry of Industry and Trade of the Russian Federation, in cooperation with OECD);

- Elaboration of mechanisms and tools for the improvement of the R&D performance (for the federal ministries and agencies);

- Design and analysis of corporate innovation strategies (for the Ministry of Economic Development of the Russian Federation, the Russian Venture Company, and other companies);

- Development of sectoral and regional innovation strategies - smart specialization approach (in cooperation with the Zurich University of Applied Sciences (ZHAW), the Ministry of Economic Development of the Russian Federation, the Ministry of Industry and Trade of the Russian Federation, companies, OECD).

Connections Between Research and Educational Programs

The developed theoretical concepts and the results of empirical studies will be implemented in the following courses within the STRA-U Master's program: Governance of STI, Comparative Social Research, Foresight and Strategic Planning, Corporate Foresight, STI Policy, Regional STI Policies, etc.

Key External Parties Who Benefit from STRA-U's Activities

- International organizations: OECD, European Commission, Eurostat, the UNESCO Institute for Statistics, UNIDO, APEC, the International Telecommunication Union, and others.
- Federal authorities of the Russian Federation: the Ministry of Education and Science, the Ministry of Economic Development, the Ministry of Industry and Trade, the Ministry of Energy, the Ministry of Telecom and Mass Communications, the Ministry of Agriculture, the Ministry of Natural Resources and Environment, the Ministry of Transport, Russian Federal Space Agency, Federal State Statistics Service, and others.
- Regional authorities: Moscow, the Republic of Bashkortostan, the Republic of Mordovia, Samarskaya Oblast, Tulskaya Oblast, the Khanty-Mansiysk Autonomous Okrug – Yugra, and others.
- Companies: Gazprom, Gazprom Neft, Transneft, Alrosa, Rosneft, Energy Systems of he East, Russian Railways, Aeroflot, Ruselectronics, Russian Post, and others.
- Development institutions and scientific foundations: Russian Venture Company, RUSNANO, Skolkovo Foundation, Russian Foundation for Basic Research, Foundation for Assistance to Small Innovative Enterprises in the Science and Technology, Russian Foundation for Humanities, Industrial Development Fund, and others.
- Universities and research centers: the Moscow Institute of Physics and Technology, the National University of Science and Technology MISiS, Far Eastern Federal University, the Bauman Moscow State Technical University, the Krylov State Research Center, Research Institute of Economics and Management in Gas Industry (NIIgazekonomika), Central Research Institute of Machine Building (TsNIImash), Central Aerohydrodynamic Institute (TsAGI), Research Institute for Genetics and Selection of Industrial Microorganisms (Genetika), and others.

STRA-U Infrastructure

A wide range of HSE information resources as well as resources that belong to the STRA-U: Information System 'Statistics and Monitoring of Knowledge Economy', including indicators in the areas of S&T, innovation, education, information society; registries of the Russian scientific institutions and experts; technologic trends database; results of national and foreign foresight studies, and others.

Current STRA-U personnel composition

Average number of academic personnel members per year – 45.

Average age of academic personnel members – 41.

Share of academic personnel members holding an academic title - 64%.

Key academic personnel profiles can be found in sections Key Research Projects and their Development and STRA-U Structure and Management System of this Project Fact-sheet.

Personnel development:

- Competition-based recruitment of international scholars (in 2016 - 2 professors from the Singularity University (USA) and the University of Ottawa);

- Research projects competition for young scientists from other universities and research organizations (on an annual basis);
- Involvement of students and postgraduate students in research projects (at least 50 annually);
- Advanced training of employees at HSE and abroad;
- Lectures, master-classes, and workshops held by foreign scientists (10-15 annually);
- International conference on the STI policy and foresight, and a subject-based section within the HSE April International Conference (annually).

Additional information regarding the development of academic personnel is provided in section 2.5.

STRA-U's structure and governance

The Foresight and Science, Technology and Innovation Studies STRA-U belongs to the 2nd type of HSE STRA-Us. The information regarding the STRA-U structure, organizational changes, the level of STRA-U's autonomy, and functions of the STRA-U governance bodies is provided in sections 2.1, 2.2, and 2.6.

STRA-U Governing Board (Heads of Key STRA-U Units)

1. Leonid Gokhberg, PhD, professor, First Vice-Rector, HSE ISSEK Director, Head of the Steering Committee, https://www.hse.ru/en/staff/gokhberg;
2. Ian Miles, PhD, professor, Head of the HSE ISSEK Laboratory for Economics of Innovation, https://www.hse.ru/en/org/persons/14723996;
3. Alexander Sokolov, PhD, professor, HSE ISSEK Deputy Director, https://www.hse.ru/en/org/persons/500997;
4. Tatiana Kuznetsova, PhD, Head of the HSE ISSEK Center for S&T, Innovation and Information Policies, https://www.hse.ru/en/org/persons/203752;
5. Jonathan Linton, PhD, professor, Head of the HSE ISSEK LST, https://www.hse.ru/en/org/persons/114685982;
6. Ozcan Saritas, PhD, professor, the HSE ISSEK LST Lead Researcher, https://www.hse.ru/en/org/persons/26823039;
7. Mikhail Gershman, PhD, the HSE ISSEK Lead Researcher (secretary of the Board), https://www.hse.ru/en/staff/gershman.

STRA-U International Expert Committee:

Eleven lead experts (average h-index = 10).

1. Chair: Luke Georghiou, PhD, Vice-President for Research and Innovation the University of Manchester; Professor of Science and Technology Policy and Management, the Manchester Institute of Innovation Research, Manchester Business School, UK.
2. Angela Wilkinson, PhD, Strategic Foresight Counselor, OECD, France.
3. Michael Keenan, PhD, Analyst, Directorate for Science, Technology and Innovation, OECD, France.
4. Attila Havas, PhD, Senior Research Fellow, Institute of Economics, Center for Economic and Regional Studies, Hungarian Academy of Sciences.
5. Jonathan Calof, PhD, Professor, Telfer School of Management, University of Ottawa, Canada.
6. Jennifer Casingena Harper, PhD, Board Member, National Commission for Further and Higher Education, Malta.

7. Kerstin Cuhls, PhD, Scientific Manager, Fraunhofer Institute for Systems and Innovation Research (ISI), Germany.

8. Kuniko Urashima, PhD, Senior Research Fellow, National Institute of Science and Technology Policy (NISTEP), Japan.

9. Philip Shapira, PhD, Professor, Manchester Institute of Innovation Research, University of Manchester, UK; Professor, Georgia Institute of Technology (Georgia Tech), USA.

10. Cristiano Cagnin, PhD, Senior Advisor at the Center for Strategic Studies and Management Science, Technology and Innovation, Brazil.

11. Nicholas S. Vonortas, PhD, Professor of Economics and International Affairs, George Washington University, USA; São Paulo Excellence Chair, Innovation Systems, Strategy and Policy, University of Campinas, Brazil.

1.3 Performance Indicators of Strategic Academic Unit

№	Indicator	2015 actual	2016 plan	2020 plan
1.	Position in broad field (specific subject) rankings (ARWU, THE, QS) as university KPI for which the STRA-U is valuable (according to the "roadmap" of the relevant university)			
1.1.	QS «Social Sciences & Management» by faculty	161		51-100
1.2.	QS «Development Studies» by subject	51-100		51-100
1.3.	QS «Economics & Econometrics» by subject	151-200		51-100
2.	Number of publications in the Web of Science per one faculty member of the STRA-U	1,01	1,23	2,47
3.	Number of publications in Scopus per one faculty member of the STRA-U	2,15	2,80	5,05
4.	Average citation index per one faculty member of the STRA-U calculated on the basis of the total number of publications indexed by the Web of Science	1,17	1,50	4,15
5.	Average citation index per one faculty member of the STRA-U calculated on the basis of the total number of publications indexed by Scopus	2,78	3,59	8,08
6.	Percentage of international faculty in the STRA-U's team including Russian citizens with PhDs from foreign universities	17,9%	17,9%	31,4%
7.	Percentage of international students enrolled in higher education degree programs provided by the STRA-U (including CIS students)	21,1%	23%	30%
8.	Average Unified State Examination (USE) grade for students enrolled in full-time federal funded Bachelor and Specialist-level programs delivered by the STRA-U	Master's programs only		
9.	Percentage of the STRA-U's income from non-budgetary (non-government) sources	60%	no less than 60%	no less than 64%

1.4 Quantitative characteristics of the STRA-U's development

№	Indicator	2015 actual	2016 plan	2020 plan
1.	Number of higher education degree programs with international professional or public accreditation delivered by the STRA-U	0	0	1
2.	Number of higher education degree programs delivered by the STRA-U entirely in a foreign language	1	1	1
3.	Number of higher education dual degree programs delivered by the STRA-U	1	1	1
4.	Percentage of the STRA-U's students involved in R&D of this unit and enrolled in higher education degree programs provided by this unit, among the total number of students enrolled in the STRA-U's higher education degree programs	42,25%	43%	43%
5.	Percentage of the STRA-U's students enrolled in higher education degree programs among the total number of students enrolled in higher education degree programs of the relevant university	0,35%	0,39%	0,37%
5a.	Same for Bachelor-level programs (Specialist-level)	0%	0%	0%
5b.	Same for Master's programs	1%	1%	1%
5c.	Same for Ph.D. programs	0%	0%	0%
6.	Percentage of the STRA-U's faculty members who authored publications indexed by Scopus or the Web of Science among the total number of faculty of the STRA-U	84%	86%	95%
7.	Percentage of the STRA-U's employees among the total number of employees of the relevant university	2,9%	2,9%	2,9%
8.	Number of intellectual deliverables/intellectual products (IP) created by the STRA-U's employees	1,00	1,00	2,00
9.	Source-Normalized Impact per Paper (SNIP) of journals indexed in Scopus where the articles authored by the STRA-U's faculty members were published in the reporting year	0,923	0,99	1,25

1.5 Financial Model

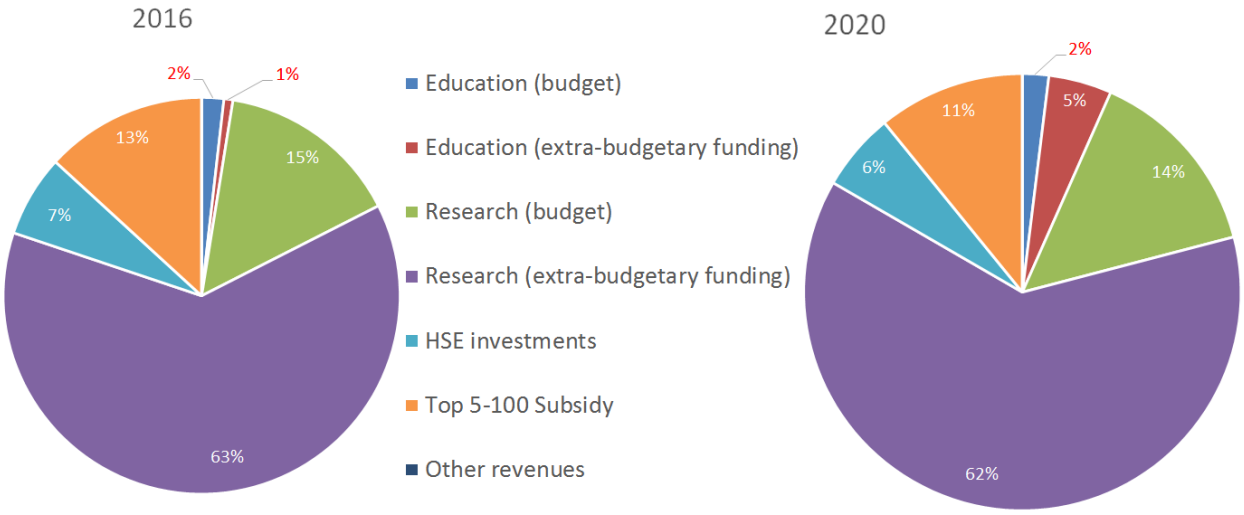
STRA-U budgets are managed by the university and heads of participating units; they are financed from the following three sources:

1. HSE **State assignment**. StraU's contribution into the HSE state assignment in research is about 9%. In the framework of the government project the STRA-U implements the Master's English-taught program Management in The Area of Science, Technologies and Innovations.

2. Funding from **external sources** (extra-budgetary revenues) derived from fee-based educational services, research and expert review projects in the interests of the government and corporate clients, donations and other special purpose contributions. The share of the STRA-U's extra-budgetary revenues is expected to be no less than 64 % in 2020. Funding from external sources is one of the KPIs of the STRA-U's units heads.

3. **HSE special purpose funds** provided to STRA-U units for development (academic development funds, centralized HSE programs such as the Academic Fund, the Fund of Educational Innovations, etc., acquisition of special research and laboratory equipment, inviting international academic staff, etc., including funds of the subsidy under Global Competiveness Program).

Planned STRA-U's sctructure and revenues dynamics:



∑ = 409 mln rubles ∑ = 496 mln rubles

The growth in the STRA-U's revenues in the period of up to 2020 will be achieved thanks to the increase in the number of applied R&D and expert review projects in the interests of governmental and private clients in the following areas: analysis, forecasts and setting priorities of the research and development sectors of the economy, regions and companies; foresight of promising markets and technologies; development of strategies and innovative development programs, systems of indicators and special statistical and sociological surveys, etc.

The scope of fee-based services is expected to grow significantly, mainly, in the new programs of continuing education (including the foresight research), including programs delivered at the request of businesses, leading Russian universities and research centers, cluster development centers, etc.

In the next 3-5 years, the revenues from mass online-cources are expected to grow consistently both on international platforms and in Russia – in line with the development of the National Open Education Platform. The STRA-U is planning to launch online courses in economics and statistics of science, technology and innovations, foresight and innovative policies.

STRA-U will continue to actively participate in research grant programs of Russian funds dedicated to the STRA-U's main fields of research. In case of improvements in the international market situation, the revenues from participation in international research grant programs are also expected to go up.

Total increase in the STRA-U revenues in 2020 versus 2016 will be no less than 20% (87 mln. rubles). As compared with the funds received by the STRA-U under Global Competiveness Program, the anticipated growth of income will exceed 150 %.

STRA-U's expenditures include personnel salaries (68-72%) and other operating expenses (teaching and research process, academic mobility, acquisition of information, etc.).

General and administrative expenses are centrally managed by HSE. All facilities, dormitories, IT infractructure and administrative services are provided by the university.

The STRA-U's financial stability is achieved through the combination of revenues from all types of its operations and HSE investments – through centralized academic development instruments (programs and projects). HSE is ready to provide additional resourses to the STRA-U by reallocating HSE's centralized funds if necessary.

1.6 Schedule (Roadmap) for controlled changes

		Years				
No.	**Task**	**2016**	**2017**	**2018**	**2019**	**2020**
	1. Organizational changes					
1.1.	The STRA-U's organizational structure is formed, including the team, management, collegial and executive bodies	X				
1.2.	Project teams are formed, and the required material and information resources are allocated	X				
1.3.	Changes in the STRA-U organizational structure and personnel	X	X	X	X	X
	2. Changes and outcomes in educational activities					
2.1.	Submission of application for the EPAS international accreditation of the Governance of STI Master's program			X		
2.2.	The EPAS international accreditation of the Governance of STI Master's program					X
2.3.	An agreement with a new international partner for double-degree programs			X		X
2.4.	An agreement with a new international partner for student exchange programs		X			X
2.5.	English-taught online courses		X	X	X	X
2.6.	The share of foreign students in the program reaches 30%					X
2.7.	Lectures by experts from leading field-specific centers (at least 8-12 annually)	X	X	X	X	X
2.8.	Lectures by business practitioners (the number of lectures and master-classes has doubled in 2020 versus 2016)	X	X	X	X	X
2.9.	Lectures on a distant basis by international professors (twofold increase in the number of lectures in 2020 vs 2016)	X	X	X	X	X
2.10.	Outbound mobility of faculty and researchers (up to 30% of the academic personnel annually by 2020)	X	X	X	X	X
2.11.	Short-term educational courses in statistics, STI policy and foresight for the government officers from Russia and abroad			X		X
2.12.	Trainings in the S&T foresight for experts from leading universities (5-100 Program participants), research centers and companies (at least 10 in 2016-2020)	X	X	X	X	X

	3. Changes and results of research and S&T activities					
3.1.	Applied projects in key research areas	X	X	X	X	X
3.2.	Competition-based recruitment of leading international scholars	X		X		X
3.3.	Research projects competition for young scholars from other universities and research organizations	X	X	X	X	X
3.4.	Involvement of students and postgraduate students in research projects (at least 50 annually).	X	X	X	X	X
3.5.	Advanced training and internships for employees	X	X	X	X	X
3.6.	Lectures, master-classes, and workshops held by the leading foreign scholars and practitioners	X	X	X	X	X
3.7.	International conferences (twice annually)	X	X	X	X	X
3.8.	Foresight and STI Governance jouirnal listed in the Web of Science international database		X (application)		X (listing)	
3.9.	Foresight and STI Governance journal listed in Q2 in Scopus					X
3.10.	Publishing and promoting monographs in English edited by the STRA-U's employees at Springer publishing house (at least 10 books and at least 25000 fee-based downloads of separate chapters during 2016-2020)	X		X		X
3.11.	Science, Technology and Innovation working papers in English (HSE Working Papers Series) (at least 90 during 2016-2020)	X	X	X	X	X
3.12.	Regular expert review of the STRA-U's research outsomes by the International Advisory Board	X	X	X	X	X
3.13.	Development of the R&D infrastructure, i.e. related to the accumulation and processing of empirical data	X	X	X	X	X
	4. General changes and results, including at the University-level					
4.1.	Facilitating HSE advancement in education and research at the regional and global level	X	X	X	X	X
4.2.	Reducing HSE dependence on the state budget-based financing	X	X	X	X	X

2. TRANSFORMING THE UNIVERSITY BY ESTABLISHING THE BREAKTHROUGH AREAS ACROSS STRATEGIC ACADEMIC UNITS

2.1 Organizational Transformation of the University

HSE is in the process of systemic transformations, first launched by the university in 2010, and aims to create centers of excellence and to disseminate the experiences of these centers throughout the university.

In the first stage of transformation, the university established 10 international laboratories lead by the prominent foreign researchers. The development of international laboratories in economic, social, computer, and mathematical sciences has contributed to overcoming the long-term isolation of Russian social and economic sciences and enabled HSE to join the global network-based research market and strengthen the university's position as the center of advanced research in select areas of expertise. As a result of the university concentrating its resources on the development of those areas, the number of research publications in the international databases Web of Science and Scopus has grown five times over the last five years. Globally renowned scientists such as Nobel Laureate Eric Maskin, Fields Medal Winner Andrei Okounkov have joined the university. The number of international laboratories grew to 22 in 2015 and these research centers have enabled the university to integrate the new academic culture into more traditional forms through the creation of faculties and moving further to the next transformation stage.

The second stage in the transformation of the university's organizational model is the transition from highly specialized faculties and academic departments, designed with the primary purpose of teaching, to the model of mega-faculties, or large research and education units conducting research (including multidisciplinary research) and faculty training in broad areas of expertise: economic sciences, social sciences, business and management, humanities, computer and engineering sciences, mathematics, law, communications and design and urban studies. The integration process was completed in 2015 when 21 faculties and division networks were replaced with 10 mega-faculties. The former faculties and academic departments became departments and schools, and mega-faculties were merged with previously independent HSE research units to conduct basic and applied research and focus on expert analytical work and consulting. The new organizational model is currently finalizing its operating mechanisms.

The university merger of interrelated fields of expertise encourages the development of promising research areas at the intersection of sciences and ensures the principle of crossdisciplinary interaction in research and teaching. This contributes to the rapid development of the mega-faculties' educational programs built into the framework of new fast-growing areas of expertise that are implemented by research scientists, key employers, international experts; students become involved in real scientific research projects while still in the training. Such integration is provided by research units, departments and schools within the mega-faculties.

The conversion ensures an integrated approach to mega-faculties-based management and the development of all areas of the university's expertise, including higher education and continuing education, basic and applied research, innovation, expert analytical work and consulting. International laboratories still act as the drivers of research, set standards for other research teams and play an important role in graduate and postgraduate education. Regular evaluation of laboratories' performances by internationally recognized experts constitutes the basis for decision-making on the laboratories' existence. Mega-faculty management is based on the principles of academic self-governance, which is implemented at all levels of decision making.

In 2015, the right to managing independently financial resources and the responsibility for achieving planned results (KPIs for the mega-faculties' deans are set) were delegated to the mega-faculties. This significantly simplified the decision-making process, allowed more specific considerations on account of individual disciplines and enhanced their development. Currently, almost 50% of resources from the university-wide academic development fund (scholarships for

academic mobility of faculty members, researchers and students, conferences, etc.) are managed by the mega-faculties. The mega-faculties' academic development funds are competitively distributed in accordance with the decision of mega-faculties' governing bodies, composed of researchers and instructors. The mega-faculties' academic and financial autonomy will be further increased; resources will be managed and decisions made based on KPIs.

The university is currently in the third stage of its transformation: HSE continues to improve the mega-faculties and establish better conditions for their development through the individual research and education units under these new interdisciplinary centers of excellence. The centers use the mega-faculties' infrastructure, human and other resources and have become growth points for promising areas where the university intends to enter the global market. Successes have been achieved in some subject areas as evidenced by high quality publications in the leading journals (See sections below).

2.2 Strategic Academic Units

The mega-faculties and research units (including international laboratories) are used to establish large areas of expertise with interdisciplinary connections: Strategic Academic Units (STRA-Us). There are two types of STRA-Us – international consortia and centers of excellence, which are currently being formed based on the following criteria:

1) Research must be consistent with the global research agenda and international research networks;

2) Research must be relevant to Russia's geopolitical interests and/or sectoral priorities;

3) STRA-Us must serve as expert analytical centers for the development of public policy in the economic and social sectors, education, science and technology forecasting and state-building; each STRA-U should make a significant contribution to the development of Russian economy;

4) Educational programs are implemented at various levels (undergraduate, specialist, graduate and post-graduate programs).

The first type of STRA-Us includes major consortia that address the university's existing core areas. They are recognized internationally (reflected in their international rankings), and have a high capacity for further dynamic development. These consortia are formed from one or more mega-faculties and academic units of the university, which implement educational programs at all levels and their research has been integrated or is capable of being integrated into the global research agenda:

– Economics and Management (QS Economics & Econometrics – 151-200, QS Development Studies – 51-100, QS Social Science & Management – 161[1]);

– Challenges for Social Development (QS Development Studies – 51-100; QS Sociology – 151-200; QS Social Sciences & Management – 161);

– Mathematics, Computer Science and Information Technology: scalable mathematical methods (QS Mathematics и QS Computer Science & Information Systems – 400+, ranks 6th in Russia);

– Humanities Consortium "Humanus" (QS Philosophy – 151-200, QS Arts & Humanities – 289).

The second type of STRA-Us includes centers of excellence: individual structural units that have been created as new growth points in relatively narrow and promising interdisciplinary areas of research and education and are integrated into the global research agenda and implement

[1] HSE position in QS World University Rankings 2015 (by subject and by industry) are given in brackets. This position has been secured thanks to the contribution of the respective STRA-U.

Master's and doctoral educational programs. In the long run, these units are capable of growing into new research and educational areas:

– Foresight and Science, Technology and Innovation Studies (QS Development Studies – 51-100; QS Social Sciences & Management – 161);

– Cognitive Neuroscience: from Computational Models to Neurotechnology (QS Economics & Econometrics – 151-200; QS Social Science & Management – 161);

– Education and Human Development in changing world (QS Sociology – 151-200; QS Social Science & Management – 161);

– Urban and Transportation policy: guiding urban transformation from industrial to digital age (QS Development Studies – 51-100; QS Social Sciences & Management – 161).

Not included in STRA-Us are key HSE faculties such as World Economy and International Affairs, Law, and Communications, Media and Design, as well as the Department of Foreign Languages, because these units are currently focused mainly on the Russian market.

Strategic Academic Unit Management

Each Strategic Academic Unit is managed by:

– the research adviser, a leading scholar in the STRA-U area, well known by the international academic community, whose main functions are to establish the STRA-U research and education agenda and strategies, help enhance STRA-U leadership within the international academic community and engage STRA-U leading experts in relevant fields;

– the leader, a famous academic and experienced research and/or education administrator whose main functions are to ensure achievement of STRA-U goals, coordinate reseach and education communication among the divisions within STRA-U and make personnel and financial decisions.

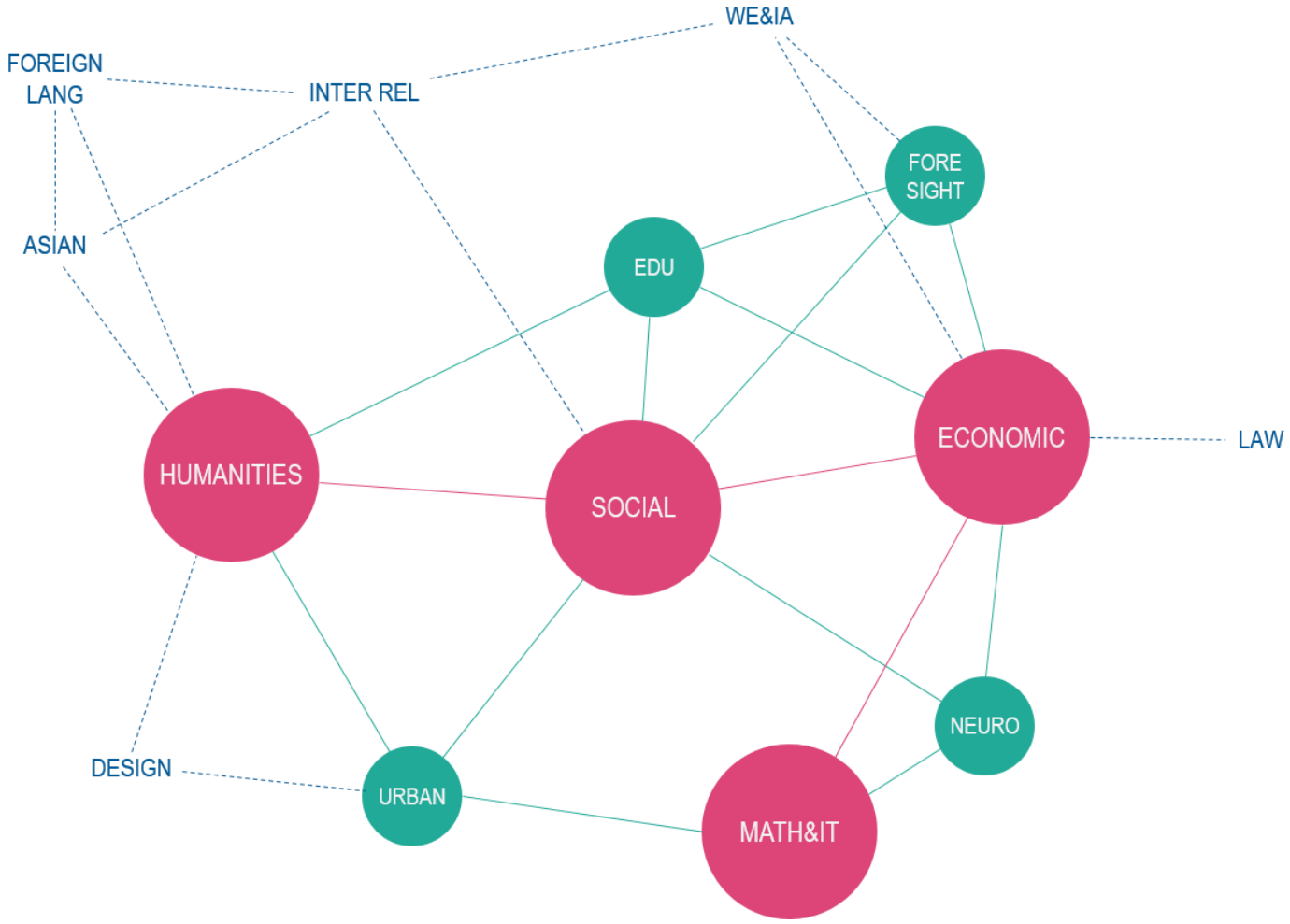
STRA-U is managed by the Management Board, which makes programmatic and resource decisions on each of the STRA-U's tasks delivery and ensures monitoring of STRA-U's tasks delivery.

Some STRA-Us have already established International Expert Committees and others will establish them by the end of 2016. International Expert Committees will conduct external evaluations of STRA-U research and educational activities and provide recommendations regarding STRA-U development strategy. They will also promote international partnerships and the integration of STRA-U researchers in international research networks.

The university's management practices have been tested within the mega-faculties model and have proved to be viable and effective. They will also be used in the next stage of the university development within STRA-U's framework (see more details in respective sections of each STRA-U fact-sheet).

The scheme of interaction between STRA-Us and other units that haven't been integrated as a STRA-U yet is defined in the following figure.

STRATEGIC UNITS INTERACTIONS



StraU's of I type
CONSORTIUMS

>ECONOMIC< ECONOMICS AND MANAGMENT **>**
>SOCIAL< CHALLENGES FOR SOCIAL DEVELOPMENT **>**
>MATH&IT< MATHEMATICS, COMPUTER SCIENCE AND INFORMATION **>**
>HUMANITIES< SCHOOLS AND INSTITUTES CONSORTIUM «HUMANUS» **>**

StraU's of II type
CENTERS OF EXCELLENCE

>FORESIGHT< FORESIGHT AND SCIENCE, TECHNOLOGY AND INNOVATION STUDIES **>**
>NEURO< COGNITIVE NEUROSCIENCE: FROM COMPUTATIONAL MODELS TO NEUROTECHNOLOGY **>**
>EDU< EDUCATIONAND HUMAN DEVELOPMENT **>**
>URBAN< URBAN AND TRANSPORTATION POLICY: GUIDING URBAN **>**

OTHER UNITS

2.3 Research and innovation activities

Research and science project areas are described in detail in each STRA-U Fact-sheet.

HSE strategy for basic research sets rigorous requirements for research quality, and personnel incentives are aimed at facilitating research in the most cutting-edge areas and topical fields. This has caused a significant growth in the number of quality publications. Articles by HSE faculty and researchers are published in top international journals, including Review of Economics and Statistics, Acta Mathematica, Journal of Personality and Social Psychology, The Lancet, IEEE Transactions on Pattern Analysis and Machine Intelligence, Nature Genetics, Journal of Political Economy, Physical Review Letters, American Economic Review, Behavioral and Brain Sciences, Journal of Materials Processing Technology, Annals of Statistics, Communications in Mathematical Physics.

The university has robust research and innovation cooperation with major Russian and foreign companies and organizations which are not only customers of research and consulting projects but also partners in implementation of customized educational programs of mainstream and continuing education. The demand for the university's research is evidenced by steady growth in R&D total revenues, which is currently almost 40%. HSE has partnership relations with such major companies as Gazprom, Rosatom, Rosneft, Novatek, Gazprom Neft, Alrosa, Norilsk Nickel, Aeroflot, Rosgeologiya, Nissan, Sibur, Gazprombank, Lukoil, Transneft, Yandex and others. HSE is constantly expanding the network of joint departments (currently - 40) established in cooperation with leading research and science centers, global consulting companies, ICT companies, analytical centers, and others.

The university's innovative activities are designed to provide diverse forms of communication with project teams which include undergraduate, graduate and post-graduate students, professors and research scientists. Those activities range from annual competitions of business plans for innovative projects to supporting the start-ups at various stages of maturity. A prominent place in the Russian innovation ecosystem is taken by the HSE's Business Incubator which provides coaching and advisory services to student teams; the Innovation Center which provides organizational support to the spin-off companies, and Prototyping Center that provides an experimental platform for technological projects and boasts state-of-the-art equipment.

According to UBi Global rating, in 2015, HSE Buisness Incubator ranked 14 among global university busness incubators (sole university business incubator in Russia to rank in global Top-25).

2.4 New organizational model for the education process

Establishing mega-faculties through the merger of academic units has enabled the implementation of a university-wide organizational and management model for the education process on the basis of "academic adviser - academic council - student office". In spite of a wide variety of programs, the quality of the education process and outcomes is ensured by general principles incorporated in the unique educational standards aimed at a higher level of complexity.

The implementation of undergraduate programs is based on a model that provides for:

– a limited number of courses (no more than five) to be studied by a student in any given semester, at least half of which are electives;

– a fixed part of the program within which a student works on projects and research papers primarily in actual research departments at the university;

– select clusters of courses (minors) available to all students (20 ECTS in two years);

– independent assessment of students' knowledge of the English language at the end of the second year through the process of international exams, and mandatory study of at least two major courses in English;

– mandatory preliminary thesis defense in English.

The implementation of graduate programs is based on the following model:

– no more than 12 courses to be studied by students over two years;

– two professional "core" disciplines (the second disciplines is to be selected by the academic program management and by the students themselves);

– research and independent work must constitute at least 70% of the load;

– opportunity for first-year students to select courses from the general pool of disciplines with broad humanities, social science and economic focus (MagoLego).

HSE's educational programs are focused on the international market: the share of foreign students is currently 7.5%; 18% of disciplines are taught in English; 15 programs in the current academical year and 20 programs in the new academic year will be fully focused on English-speaking students; 43 (29%) educational programs are implemented in partnership with leading foreign (41) and Russian universities (2). HSE is actively involved in the work of universities' consortium representing massive on-line courses on Coursera international platform: in 2015, over half a million students from 195 countries, representing 5% of all Coursera students, signed up for 36 HSE's online courses taught in Russian and English.

2.5 Development of Academic Personnel

Academic personnel development within the new STRA-U framework will be provided by the instruments of academic development and through competitive procedures established in HSE in recent years and described in detail in the Roadmap of the Program for Enhancing HSE Competitiveness of the second stage.

The main instrument for attracting international experts is the international recruitment strategy, which has been in place at HSE since 2010. The ruble devaluation has significantly restricted Russian universities' capacity to compete as employers in the global academic market; therefore, specialist recruitment on the international market in 2016 will change: most cited scientists in high demand by strategic academic units will be selected through the international recruitment procedure. Foreign researchers will be engaged in scientific projects under short-term contracts and remote work contracts. Particular emphasis will be placed on engaging talented young scientists in international research projects through the postdoctoral research fellow program, which will be enhanced starting from 2016.

Mandatory engagement of faculty members in research and involvement of researchers in the educational process is guaranteed by the single contract with academic personnel implemented by HSE in 2015. Faculty members' teaching load is alleviated by teaching assistants, who are selected from among the best students and thus get a chance to start their academic career. Personnel rotation and academic faculty selection is performed through creating competitive academic environment - an open competition for academic faculty positions is held annually and attracts many external candidates. The competition procedure involves the multi-stage selection of candidates: evaluation of research, professional level, interviews, and open lectures. The selection is carried out by expert subject committees, mega-faculties' personnel, and the personnel committee of the HSE Academic Council. The open procedure and similar evaluation criteria for HSE professors and external candidates provide conditions for the selection of the best specialists to be employed by the university on a full-time basis. They meet the university's requirements focused on the global market: HSE academic faculty was renewed approximately by one third in 2013.

The merit-based personnel selection system is supported by a wide range of incentives that provide for professional development and the opportunity to select the optimum academic path for each faculty member. The instruments include stipends for publications at the international level, contributions to the university's reputation, teaching courses in English, development of new teaching methods and training courses, individual and collective research and academic mobility scholarships, international partnership development scholarships, comprehensive professional development program which includes internships and PhD

education at foreign universities and academic English courses at Academic Writing Center. All of these procedures are carried out on a competitive basis.

HSE strives to create an English language-driven professional environment and to ensure the smooth integration of international students, faculty members and researchers into the university academic life. HSE has established special administrative units that provide guidance to international students and academic personnel in all aspects of the HSE experience (including medical insurance, social support, etc.). The university has created English language information resources and hires program coordinators with fluent English. In the coming years, the number of administrative personnel with English proficiency will be increased, and international faculty members will receive comprehensive information about what is occurring during their employment at HSE.

HSE's target personnel development model suggests that by 2020 at least 60% of academic personnel will be scientists (included in the global academic networks), about 20% will be the leaders of the Russian professional market, and the remaining 20% will be engaged only in teaching (mostly teaching foreign languages). It is also planned that 90% of full-time HSE faculty members will be able to teach and conduct research in foreign languages.

2.6 Financial sustainability and resource allocation for the establishment and development of Strategic Academic Units

Resources for the Program of Enhancing Competitiveness and the university's financial sustainability in general are secured primarily through revenue from core activities (all types of educational services, research and expert and consulting activities). In aggregate, HSE revenues in 2016[2] will exceed 14 billion rubles ($190M), which is higher than the revenue in 2012 by 44%. The university earns about 40% of the funds or 6 billion rubles per year ($80M) in the open market: in terms of extra-budgetary revenue, HSE is among top three Russian universities. Global Competiveness Program program funding constitutes only 6.5% to the university's revenue.

In the years leading up to 2020, HSE will increase its overall revenue by 31% compared to 2015, mainly through extra-budgetary income, of which 70% will come from for-profit educational services, and 20% from applied R&D and consulting services. Overall, by the end of the period the share of extra-budgetary income will increase to up to 44%.

Resources for the implementation of the HSE Roadmap will be gathered by combining centralized incentive mechanisms and increasing the financial autonomy of the units. HSE makes target investments of more than a quarter of its income into the university's development projects. The share of funds managed at the level of research and educational units and their consortia is, on average, more than 50%.

The university's financial model is actually replicated within STRA-Us: the units' financial sustainability is achieved through a combination of revenues from all types of activities and diversification of sources of their financing. The tasks of resource allocation to the units within STRA-Us are reflected both in their budget structure, and in the KPI system of their leaders (see Section 2.1).

Key risks for the financial sustainability of the university and its units in the period of up to 2020 are mostly related to negative economic conditions:

1) the devaluation of the ruble caused a significant reduction in the competitiveness of Russian universities as employers in the international academic labor market; paying competitive salaries becomes increasingly difficult, especially when trying to maintain fair balance between Russian and foreign academics;

2) the devaluation has also resulted in the significant increase of other university costs that depend on currency exchange rates, such as international academic mobility, access to foreign sources of information, purchase of equipment, etc.

[2] Excluding state capital investments

3) reduction of Federal Budget expenditures for 2015-2017 significantly restricts the university's income growth potential, both in education and in research.

The key measures taken by HSE to address those risks are:

- cutting operational and administrative costs (in 2016, operational costs were cut by 15%, administrative personnel costs were cut by 10%, etc.);

- reducing full-time employment of foreign personnel in favor of short-term and remote contracts, without compromising the requirements related to cooperation with Russian personnel and publication activity levels;

- stricter internal requirements related to the efficient utilization of resources: allocation of funds for research projects that foster academic personnel allowances; implementation of economic standards for educational programs and personnel schedule and workload; and introducing indicators for attracting external resources into managers' KPI systems;

- reducing (and closing) administrative and research units and educational programs that do not meet academic criteria of productive efficiency (in particular, in 2014-2015, the Master's programs portfolio was optimised, and a number of academic departments were reorganized).

Information on HSE-Moscow total revenues and expenses in 2015-2020 are given in the table below (mln rubles):

mln rubles

(excluding state capital investments)	2015	2016	2020
REVENUES	13150	13880	16197
Educational services	**7 127**	**8 228**	**10 375**
State assignment for educational services	4 703	5 352	6 176
Fee-based educational services – Higher education	1 331	1 652	2 311
Fee-based educational services – Continuing education	632	695	1 240
Pre-university education	168	301	386
Subsidy for the scholarship fund	293	228	262
Research and Development	**2 577**	**2 568**	**3 000**
State assignment for research	888	862	1 000
Applied research and development	1 690	1 705	2 000
Other revenues (special purpose subsidies, donations, other revenues)	**817**	**1 102**	**1 016**
Funding under 5-100 Program (special purpose subsidy)	**930**	**930**	**930**
EXPENSES	12 099	12 903	15 304
Program and project expenses	**3 109**	**3 364**	**3 969**
Current operating expenses	**7 961**	**7 920**	**9 960**
Special purpose expenses (scholarships, major repairs, taxes)	**1 029**	**1 293**	**961**
Reserves	**283**	**325**	**414**
BALANCE (end of period)	**1 052**	**977**	**893**