Section "Knowledge transfer: Influence of universities (MEPhI Case)"

Mikhail Strikhanov
Rector
### KNOWLEDGE TRANSFER

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Main target of university rankings today</td>
</tr>
<tr>
<td></td>
<td>• Ranking indicators allows to conduct comprehensive comparison with other world leading universities to understand strengths and weaknesses of the university</td>
</tr>
<tr>
<td>II</td>
<td>Rankings impact on the society development</td>
</tr>
<tr>
<td></td>
<td>• To shape the futures vision on how to account for knowledge transfer with high social impact</td>
</tr>
<tr>
<td>III</td>
<td>What parties are involved in knowledge transfer?</td>
</tr>
<tr>
<td></td>
<td>• Society in general - universities, graduates, industry, business, government etc.</td>
</tr>
<tr>
<td>IV</td>
<td>How society and universities can use rankings as a strategic tool?</td>
</tr>
<tr>
<td></td>
<td>• Analysis, development and implementations of an action plan to move from point A (current status) to point B (future vision)</td>
</tr>
<tr>
<td>V</td>
<td>Action plan implementation</td>
</tr>
<tr>
<td></td>
<td>• Implement developed action plan by all interested parties</td>
</tr>
<tr>
<td>NEW INDUSTRY SEGMENTS</td>
<td>SAMPLE PROJECTS</td>
</tr>
<tr>
<td>-----------------------</td>
<td>----------------</td>
</tr>
</tbody>
</table>
| SMART LOGISTICS       | ARCTIC ROUTES AND ECOSYSTEM | • Modelling and optimising sea cargo traffic  
• Eco-monitoring and bio-monitoring in extreme climates  
• IT-solutions for online experimental data transfer | ENTER MARKET WITH HIGH GROWTH POTENTIAL |
| NUCLEAR MEDICINE      | NANO-THERANOSTICS AGAINST CANCER | • Nanoparticles for early diagnostics and cancer imaging  
• Nanosensitisers for RF, ultrasonic and laser-induced hyperthermia of tumors  
• Nuclear and radiation nanomedicine | REDUCED CANCER MORTALITY RATES |
| QUANTUM ENGINEERING   | ADVANCED CYBERSECURITY FOR CRITICAL INFRASTRUCTURE | • Big data analysis for predicting cyber threats  
• Detection of abnormal activity in user behavior for countering cyber threats  
• User identification via behavioural biometrics | BETTER RESISTANCE TO CYBERATTACKS |
| CYBERSECURITY         | LASER-BASED INFORMATION TRANSFER | • Radiophotonic systems for broadband signal processing  
• Distant quantum gravimetry  
• Qubits creation via laser assisted nano/microstructuring of materials for quantum computing | SATELLITELESS NAVIGATION |
|                       |               |             |                            |
MARKET OPPORTUNITY DRIVEN APPROACH TO RESEARCH AND EDUCATION DEVELOPMENT

MARKET DEMAND
- Global and national challenges
- International research collaborations
- Industrial partners

PROBLEM STATEMENT (UNIVERSITY+PARTNER)

EDUCATION AND RESEARCH INITIATIVES

NEW PARTNERSHIP MODELS

INITIATIVES FOR TRANSITION TO MARKET OPPORTUNITY DRIVEN APPROACH:

1. STRAU-BASED MODEL

   MEPhI Senior Leadership

   Nuclear
   Lasers
   Electronics
   Bio
   IT

   STRAU CORE PRINCIPLES

   NEW GOVERNANCE TEAM

   GENERAL MANAGER
   PRINCIPAL INVESTIGATOR
   RECOGNISED INTERNAL EXPERTS
   EXTERNAL ADVISORY BOARD

   STRAU – STRATEGIC ACADEMIC UNIT

   ALIGNMENT
   AUTONOMY
   RESPONSIBILITY

2. FLEXIBLE RESOURCE ALLOCATION

   Investment in university-wide initiatives to enhance international competitiveness
   - Academic excellence
   - Admin staff development
   - Public relations

   Investment in StrAUs on a competitive basis, in accordance with KPIs aligned with MEPhI’s strategy, for example:
   - Performance in key subject rankings
   - Number of articles in Q1
   - Number of citations per faculty
   - Youth involvement into research projects

   Investment in new multidisciplinary R&E initiatives on a competitive basis

   Non-budget
   Budget-financing

   45.5%
   54.5%
   15-20%
   65-70%
COLLABORATIVE KNOWLEDGE TRANSFER: INDUSTRIAL PARTNERS

EXPANSION OF MEPhI’S INDUSTRIAL PARTNERS

- LASER & PLASMA TECHNOLOGY
- NANO-ENGINEERING AND ELECTRONICS
- NUCLEAR PHYSICS AND ENGINEERING
- BIO-MEDICINE
- INFORMATION TECHNOLOGY

NEW MODELS OF INDUSTRY/UNIVERSITY COOPERATION

- LASER & HI-TECH LEARNING FACTORY
- DIGITAL TEST GROUNDS
- PHARMA LEARNING FACTORY
- ENGINEERING CENTRE

CONSORTIUMS AND ALLIANCES

ELECTRONICS DESIGN AND TESTING LAB

DIGITAL LIFE SCIENCE & NUCLEAR PARK

WORLD UNIVERSITY INDUSTRY INCOME

Top 11

2014 2016 2018
MEPhI KNOWLEDGE TRANSFER IN EDUCATION

GLOBAL TRENDS AFFECTING THE DEVELOPMENT OF EDUCATION:

WORKING LIFE EXPECTANCY INCREASE

DIGITALISATION of the economy

GROWTH OF GLOBAL COMPETITION for investment and talent

TRADITIONAL EDUCATION

EDUCATION 4.0

INCREASE THE ROLE OF DIGITAL & SOCIAL OPPORTUNITIES

DIGITAL IMPACT

SOCIAL IMPACT

PROFESSIONALS

MEPhI GRADUATES AS LECTURERS

RETRAINING

TRAIN THE TRAINERS

AUTODESK, SIEMENS, SAS ORGANISE ADDITIONAL EDUCATION FOR TRAINERS

VR SOLUTIONS

VR LECTORIUM
VIRTUAL LAB
VIRTUAL EXPERIMENT
VIRTUAL MEGASCIENCE FACILITY
VIRTUAL REVERSE ENGINEERING

SMART CITY PROGRAMMES FOR CITY MANAGERS OF MONO-CITIES

INTERNATIONAL CENTER FOR PUBLIC DIPLOMACY

INTERNATIONAL NON-PROLIFERATION INITIATIVES

STUDENTS

OLYMPIADS

2,000 STUDENTS PARTicipated in 2018

WORLD SKILLS

TEAM WINNER – YOUNG PROFESSIONAL NATIONAL INTERUNIVERSITY CHAMPIONSHIP (WORLD SKILLS RUSSIA)

INDUSTRY CHAMPIONSHIPS: WINNER – DIGITAL SKILLS AWARDEE – ATOMSKILLS

INTERINDUSTRY CHAMPIONSHIP: WINNER – WORLD SKILLS HI-TECH

DIGITAL COMPETENCIES

DATA ANALYTICS, DATA SCIENCE, DATA ENGINEERING

MICRO MODULE APPROACH

TARGET: MORE THAN 50% OF SUBJECTS ARE ELECTIVE

BLENDED LEARNING

ONLINE LEARNING

EDX, COURSEERA, OPENEDU.RU

AI-BASED ADAPTIVE COURSES

HIGH SCHOOL SCHOLARS

PRE-UNIVERSITY #3 IN RUSSIA-WIDE RANKING OF NATURAL SCIENCE HIGH SCHOOLS

OLYMPIADS 40,000 HIGH SCHOOL STUDENTS PARTICIPATED IN 2018

SUMMER SCHOOLS

PRE-UNIVERSITY #3 IN RUSSIA-WIDE RANKING OF NATURAL SCIENCE HIGH SCHOOLS

UNIFIED STATE EXAM (average score)

2018 92.3
2017 90.5
2016 89.0
2015 87.9
2014 85.3
2013 86.0
MEPhI GLOBAL KNOWLEDGE TRANSFER THROUGH EXPORT OF EDUCATION

DIRECT EXPORTS TO FOREIGN MARKETS

INTERNATIONAL STUDENTS AT MEPhI

- 1430 Foreign students
- 63% Non-CIS foreign students
- 64 Countries represented
- 38 Programmes in English

INTERNATIONAL NUCLEAR EDUCATION

INTERNATIONAL ACADEMIC STAFF, SHARE

- 2020 [plan]
- 2013
- 2014
- 2015
- 2016
- 2017
- 2018

MEPhI Uzbekistan Branch
6 MEPhI Educational Programs, 500+ Students by 2025

JOINT INTERNATIONAL PROGRAMS (30)

- University of Turin: Advanced Theoretical and Astrophysics
- Hangzhou Dianzi University: Nano- and Functional Electronics
- University at Buffalo (SUNY): Biomedical Nanotechnologies
- Polytechnic University of Valencia: Advanced Semiconductor Lasers and Technology
- Tokyo University of Technology: Innovative Nuclear Reactors

Programs at MEPhI: IAEA Approval
- Nuclear Knowledge Management
- Physics in Nuclear Medicine

SHARE OF INTERNATIONAL STUDENTS

- 2020: 23.6%
- 2018: 21.6%
- 2013: 5.1%
MEPhI proposals for Moscow International University Ranking
"The Three University Missions"

Adjustment of indicators in criteria group «University & Society»

<table>
<thead>
<tr>
<th></th>
<th>MosIUR</th>
<th>MEPhI suggestions</th>
</tr>
</thead>
</table>
| 1 | “University’s share in its country’s total university publications” weight 4% | New indicator: “University’s share in its country’s total university citations”
Source: Scopus (SciVal) |
| 2 | -                                           | New indicator: “Share of publications with academic and corporate affiliations”
Source: Scopus (SciVal) |
| 3 | “University’s alumni with an individual article on Wikipedia” weight 9%       | To reduce the weight of indicator “University’s alumni with an individual article on Wikipedia” |

Should university ranking be split into subject rankings?

- 11 Subject Rankings
- 48 Subject Rankings
- 54 Subject Rankings
- 22 Subject Rankings
- 6 Subject Rankings
THANK YOU FOR YOUR ATTENTION!