Research and Innovation strategy for the future: Kaunas University of Technology

Dr. Leonas Balaševičius, Vice-Rector for Research and Innovation

ktu
1922

HUMAN SIDE OF TECHNOLOGY

REGIONAL CONTEXT

* NUMBERS (KAUNAS REGION)

TERRITORY, km²:

157

GDP per capita, Eur

23 200

POPULATION:

613 337

22 % OF ALL LITHUANIAN RESIDENTS

- **A short flight (2 to 3 hours) from any European city**
- **Cultural Capital of Europe in 2022**
- **Art deco city: UNESCO's World Heritage Tentative List**
- **City balancing contemporary European point of view and authentic Baltic values, is strategically the most convenient living point in Lithuania. It's also an important crossroads between the Baltic countries, Scandinavia, and Central and Eastern Europe for both travelling by land and air.**

* Statistics Lithuania, 2022

KAUNAS

ktu
1922

KAUNAS UNIVERSITY OF TECHNOLOGY (KTU) COMMUNITY

Number of students:

~8,000

4,948 bachelor's students
2,011 master's students
1141 international students
339 PhD students

Alumni:

~160,000

Academic Staff:

~1,000

KTU COMMUNITY

8 research institutes **2** valleys **4** campuses in 3 cities **9** faculties

Research institutes

- Biomedical Engineering Institute
- Food Institute
- Institute of Architecture and Construction
- Institute of Environmental Engineering
- **Institute of Materials Science**
- Institute of Mechatronics
- Prof. Kazimieras Baršauskas Ultrasound Research Institute
- Health Telematics Science Institute

Faculties

- Faculty of Chemical Technology
- School of Economics and Business
- Faculty of Electrical and Electronics Engineering
- Faculty of Informatics
- **Faculty of Mathematics and Natural Sciences**
- Faculty of Mechanical Engineering and Design
- Faculty of Social Sciences, Arts and Humanities
- Faculty of Civil Engineering and Architecture
- Panevezys Faculty of Technologies and Business

- ISM University of Management and Business, Vilnius

STUDY PROGRAMMES

128

STUDY PROGRAMMES

- **Physics**
- **Engineering**
- **Technological sciences**
- **Mathematics:** Data Science and Engineering
- **IT:** Artificial Intelligence, Informatics,; MSc: Artificial Intelligence in Computer Science
- **Social sciences, art and humanities**
- **Economic and Business management**

52% of study programmes are taught **in English**

investors' **spotlight**

11 KTU bachelor's study programmes have been awarded the Investors' Spotlight quality labels.

PhD PROGRAMMES

#Mokslo infrastruktūra

20 doctoral (PhD) programmes.
Duration – 4 years.

Technological Sciences

- Electrical and Electronic Engineering
- Civil Engineering
- Transport Engineering
- Environmental Engineering
- Chemical Engineering
- Energetics and Power Engineering
- Informatics Engineering
- **Materials Engineering**
- Mechanical Engineering
- Measurement Engineering

Social Sciences

- Political Sciences
- Management
- Economics
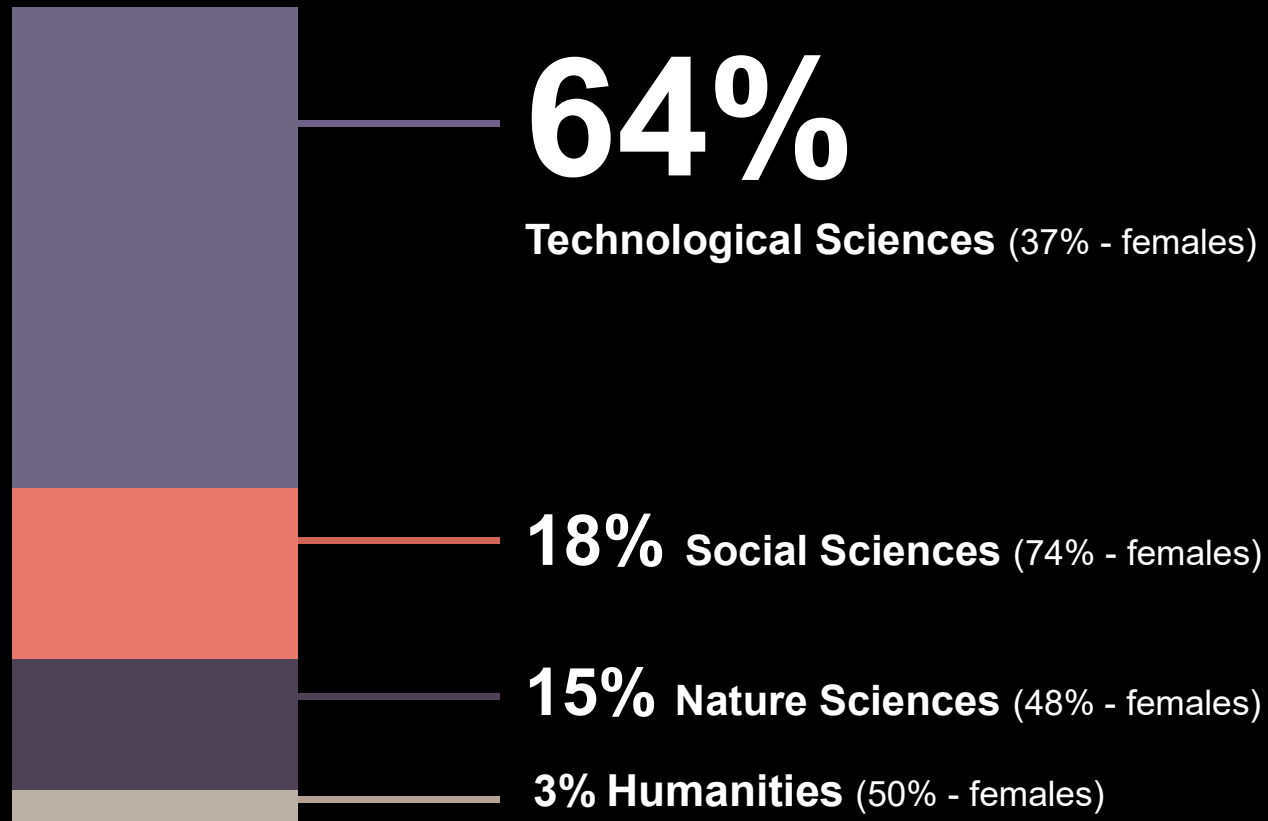- Sociology
- Education

Visual Arts

- Architecture

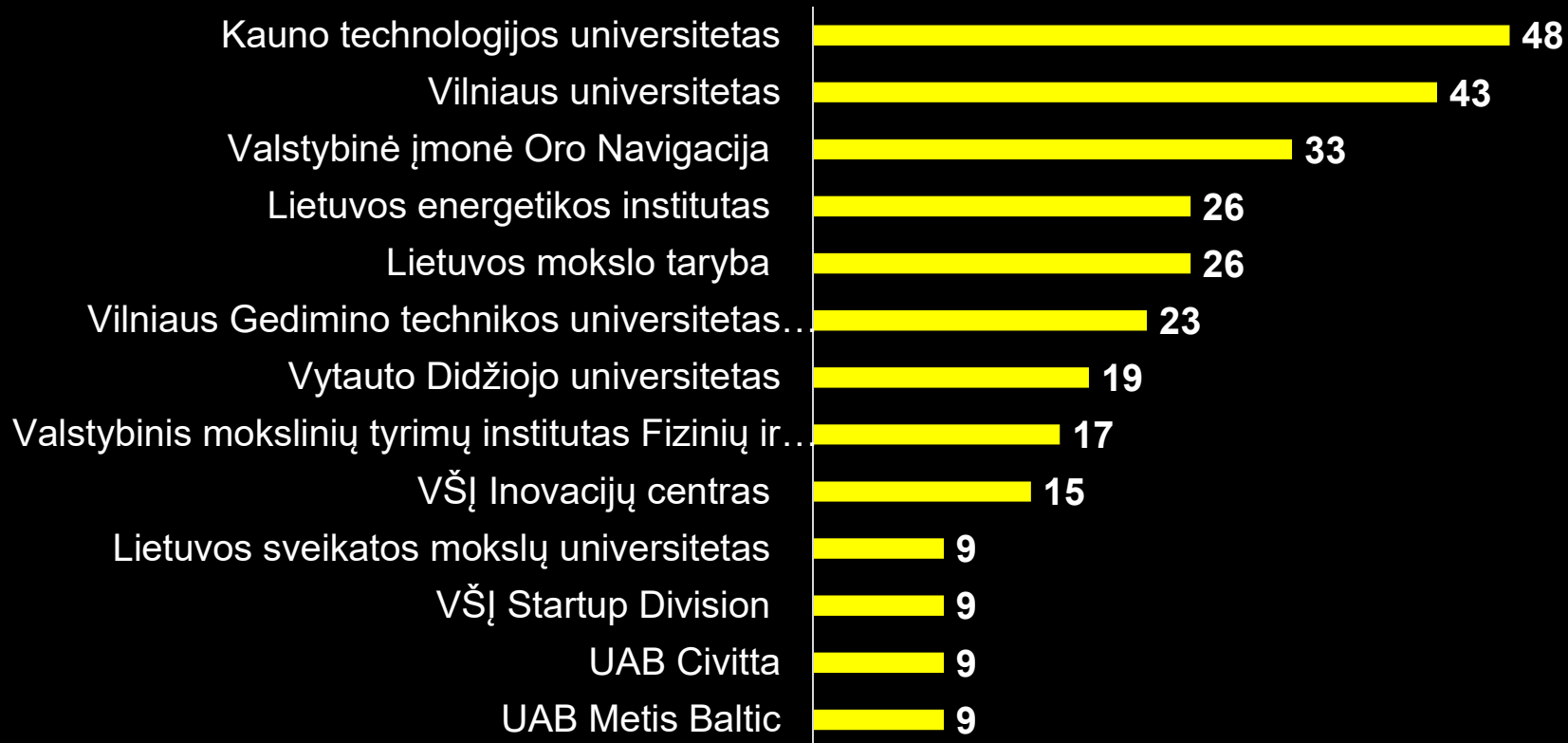## Nature sciences

- **Physics**
- Chemistry
- Informatics

Humanities

- History and Theory of Arts

PhD STUDENTS

HUMAN SIDE OF TECHNOLOGY

64%

Technological Sciences (37% - females)

18% **Social Sciences** (74% - females)

15% **Nature Sciences** (48% - females)

3% Humanities (50% - females)

TOP10 of H2020 program executors in Lithuania, 2014 – 2021; by number of projects

Executor	Projects
Kauno technologijos universitetas	48
Vilniaus universitetas	43
Valstybinė įmonė Oro Navigacija	33
Lietuvos energetikos institutas	26
Lietuvos mokslo taryba	26
Vilniaus Gedimino technikos universitetas…	23
Vytauto Didžiojo universitetas	19
Valstybinis mokslinių tyrimų institutas Fizinių ir…	17
VŠĮ Inovacijų centras	15
Lietuvos sveikatos mokslų universitetas	9
VŠĮ Startup Division	9
UAB Civitta	9
UAB Metis Baltic	9

Source: https://webgate.ec.europa.eu/dashboard, 2021-02-21

HUMAN SIDE OF TECHNOLOGY

R&D FOR INDUSTRY & BUSINESS

1. The University has helped Lithuanian businesses to access more than €32 million from national programmes. The University performs 43% of all R&D work and services for business in the fields of nature sciences and technology carried out by Lithuanian universities.

2. Orders from foreign entities account for 16-30% of total R&D revenues. Intellectual property licensing revenues have increased 2-times compared to 2021.

3. Around 40 cooperation agreements with businesses are signed each year.

HUMAN SIDE OF TECHNOLOGY

ktu
1922

UNIVERSITY ROLE

A university is expected to produce knowledge (scientific results - >900 publications per year), but it also is expected to produce new technologies, and if so, to what extent?

Knowledge production can be considered as a necessary, but not a sufficient step to innovation. It creates a potential which can be actualized by bringing together users, producers, entrepreneurs, and policy-makers in a "transaction space".

The comparative advantage of the university is that the knowledge-base is continuously developed because there is a flow through of students. Each year KTU has ~2,300 potential new inventors.

10

UNIVERSITY ROLE

The university assumes this role not only as a supplier of knowledge and human capital, but as another "industrial actor" creating intellectual property and co-shaping new firms.

©Jonas Klemanas, KTU, 2013

The innovation systems can be expected to involve both technological and organizational levels, and the possible change of relations between these two levels.

In 2022, 21 international patent applications and 10 patent applications were filed with the Lithuanian State Patent Office; 8 Lithuanian, 1 US , 3 European and 1 Chinese patent were received.

KTU STRATEGY

DEVELOPMENT OF INTERNATIONAL RELATIONS

ECIU

Attracting international staff and students

Development of international brand

Cooperation with international academic and research institutions

---

QUALITY OF STUDIES

M SCIENCE BASED STUDIES

- Improvement of study programmes and teaching process
- Professional development of academic staff
- Modernisation of study environment

QUALITY FOR STUDENS AND CLIENTS **K**

RESEARCH AND INNOVATION BREAKTHROUGH

E EFFECTIVE SOLUTIONS FOR SCIENCE AND INNOVATION

- Improvement of research quality
- Development of R&D ecosystem
- Strengthening of international project portfolio

SUSTAINABLE DECISIONS FOR THE BENEFIT OF THE COUNTRY **T**
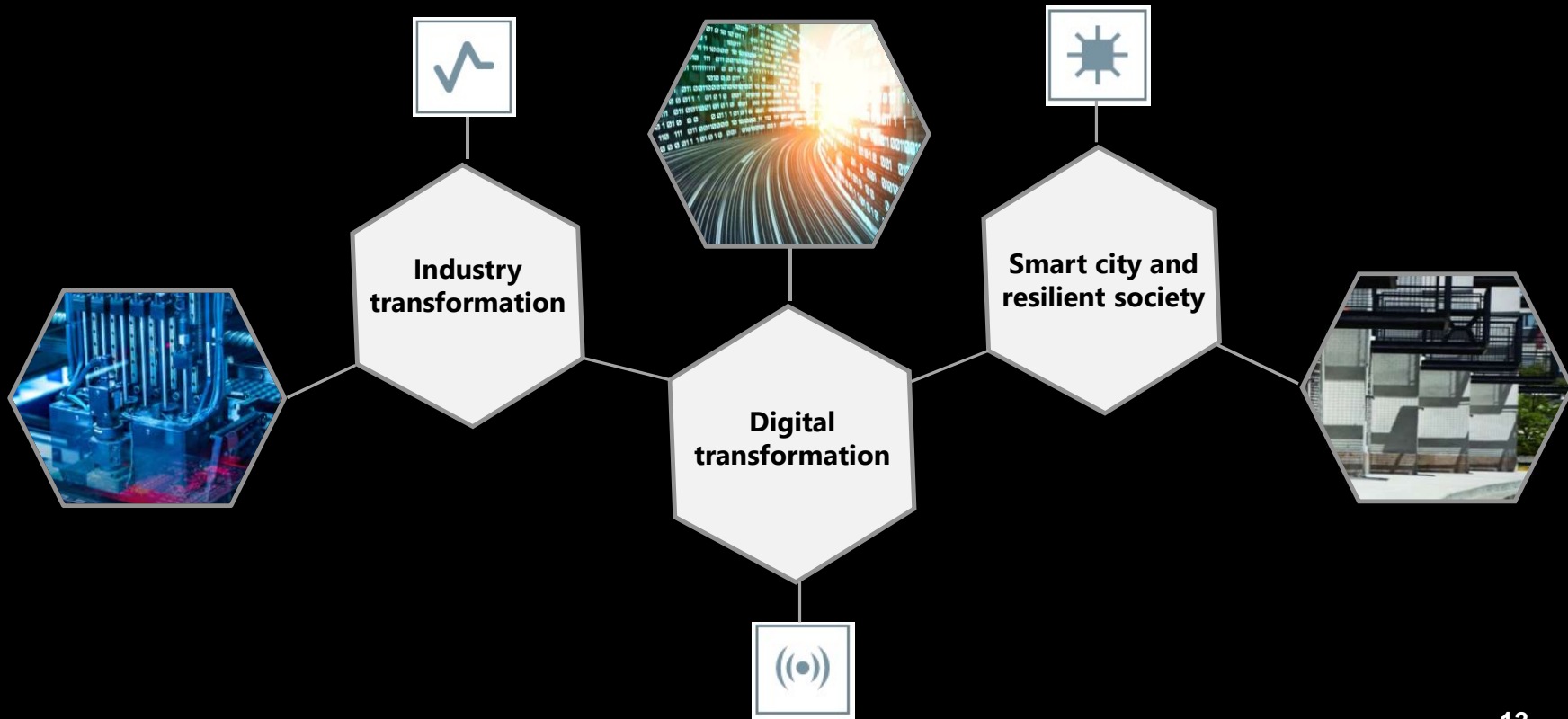

ORGANISATIONAL SUSTAINABILITY

S SYSTEMIC ORGANIZATION MANAGMENT

- Development of human resources
- Ensuring effective communication
- Modernisation of infrastructure

UNIVERSITY FOR EACH OTHER **U**

12

KTU PRIORITIES

Industry transformation

Digital transformation

Smart city and resilient society

HUMAN SIDE OF TECHNOLOGY
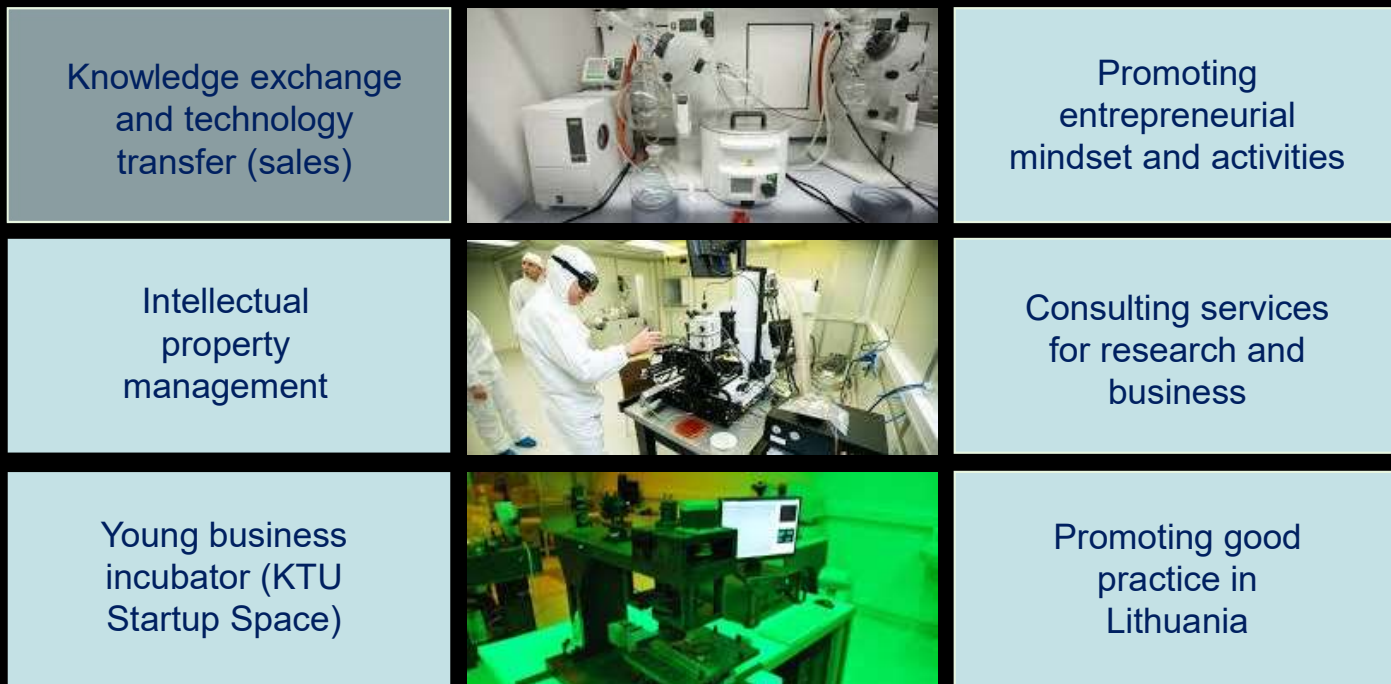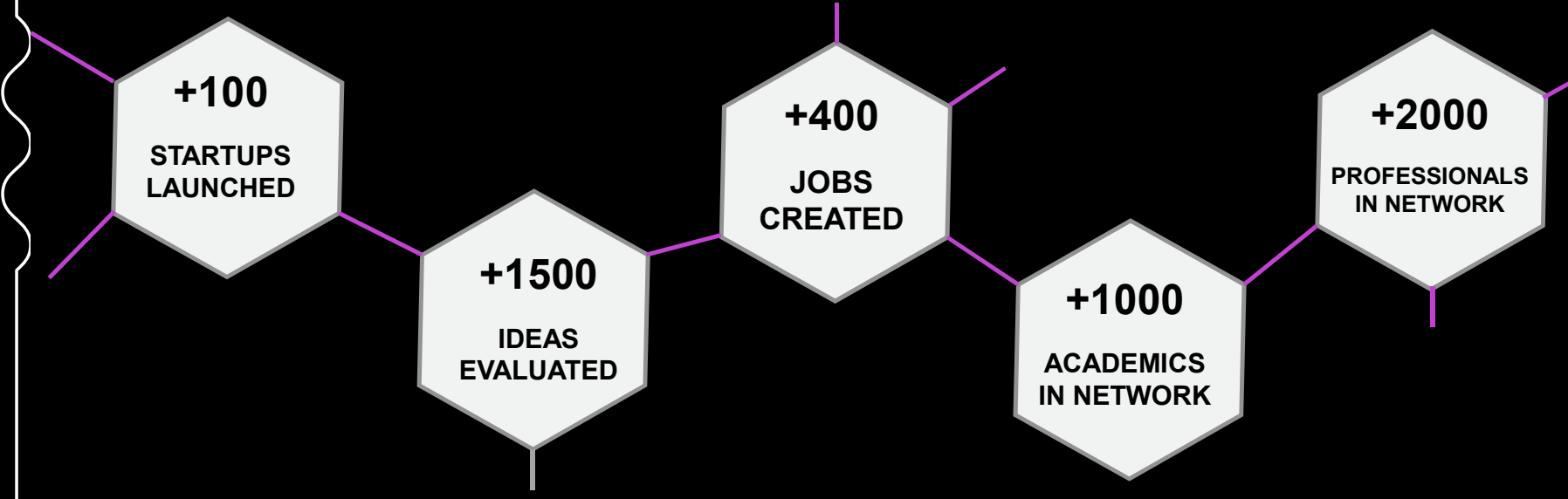
ECIU: THE CHALLENGE-BASED APPROACH

- **Work on providing solutions for real-world challenges**.

- Challenge-based learning is well-established: learners, teachers, and adopters collaborate in finding a solution.

- **Challenge-based research & innovation** are relatively new:
  - Unique to research: new knowledge needs to be gained before a solution can be realized;
  - Unique to innovation: exclusive focus on creating value.

- **Collaboration by all stakeholders is key**: solution providers, solution adopters, challenge owners, etc. All stakeholders contribute to the solution.

KTU NATIONAL INNOVATION AND ENTREPRENEURSHIP CENTRE (NIEC)

HUMAN SIDE OF TECHNOLOGY

Knowledge exchange and technology transfer (sales)		Promoting entrepreneurial mindset and activities
Intellectual property management		Consulting services for research and business
Young business incubator (KTU Startup Space)		Promoting good practice in Lithuania

BUSINESS → NIEC ← ACADEMIA

15

EVENTS

Opened in 2014, KTU Santaka Valley became an important venue for national and international events – around 30 of them take place annually.

Technorama

- 60–80 inventions
- 200 young innovators
- 2 000 visitors
- 3–9 universities

KTU Career Days

- > 13,000 visitors
- 140 participants
- More than 1,000 internships and job vacancies
- >3,000 CVs
- 17 different speakers in WANTed Talks and Small Talks areas
- 3 different areas for career, development and inspiration

Lithuanian Research and Industry conference

- Brings together researchers, entrepreneurs and government representatives
- Platform to share insights, experience, ideas and contacts for further cooperation between research and business

SUCCESS STORY

First in Lithuania Fab Lab engineering workshop lab

- Fab Lab Kaunas serves as a miniature factory of electronics and provide students with the opportunity to apply the theoretical knowledge gained during their studies in practice.

- Fab Lab Kaunas is a result of close cooperation between the KTU Faculty of Electrical and Electronics Engineering and local business enterprises operating in the Electronics Industry.

HUMAN SIDE OF TECHNOLOGY

SUCCESS STORY

Center of Smart Cities and Infrastructure

- Established in January 2019 by Kaunas University of Technology together with 5 business partners:

- *Bentley Systems, YIT Lietuva, INHUS Group, Staticus, Kauno tiltai,* and public institution *Skaitmeninė statyba*.

KTU ARTIFICIAL INTELLIGENCE CENTRE

- The AI Centre aims to meet the needs of business and society, to develop and integrate AI solutions that allow to solving different problems in industry, medicine, and the public sector.

- Horizon Europe project „CoE OF AI FOR SUSTAINABLE LIVING AND WORKING"

STRATEGIC ACTIVITIES OF THE AI CENTRE OF EXCELLENCE

CIRCULAR ECONOMY

HEALTHY LIFESTYLE

SMART MOBILITY

INDUSTRIAL DIGITALIZATION

GREEN ENERGY

AI ETHICS

MAIN ACTIVITIES OF THE AI CENTRE OF EXCELLENCE

AI LABORATORIES, SYSTEMS, ETC.

Intelligent systems modeling environments, business analytics tools, physical and virtual AI labs for external organizations, providing opportunities to test and try a variety of business scenarios.

NEW GENERATION OF INTELLIGENT SOLUTIONS

Personalized explainable artificial intelligence (XAI) based systems thus increasing transparency, trust, ethics, and trust in AI-based solutions.

DEVELOPMENT AND EVALUATION OF SYSTEMS

Implementation, evaluation, and testing of AI solutions under both laboratory and real conditions.

DATA ANALYSIS

Development, maintenance, support, and application of data storage infrastructure to meet the specific needs of AI solutions.

PRACTICAL TRAINING AND EDUCATION

Value-added training and courses incorporating good practices on how to integrate AI solutions while ensuring sustainability in the private/public sector by promoting a sustainable living, working concept, and creating an AI ecosystem.

PATENTS

New AI-based patents that ensure the high-quality operation, transparency, sustainability, and ethics of intelligent solutions.

M-LAB

- Experimental and Prototyping Laboratory for Physical and Technological Sciences

- End of the project – 2023

Thank you !