



PROSPECTS FOR THE CREATION AND DEVELOPMENT OF A SUSTAINABLE INNOVATION ECOSYSTEM OF NTU "KHPI"

National Technical University "Kharkiv Polytechnic
Institute"



MicroCAD 2024



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The team of the sustainable innovation ecosystem of NTU "KhPI"



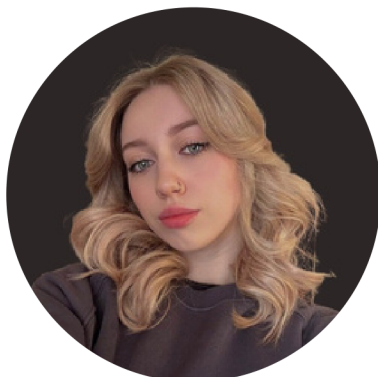
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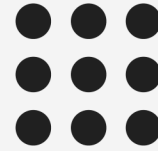
WHERE IT ALL STARTED

In 1993, the first MicroCad Conference was held, which was the beginning of our university ecosystem creation, which has been developing, for more than 30 years. Prominent scientists from around the world, honorary doctors and professors of our university spoke at this conference, and it should be noted that in recent years, for the first time, the speakers were Nobel laureates.

XXXII International Scientific and Practical Conference "INFORMATION TECHNOLOGIES: SCIENCE, TECHNOLOGY, TECHNOLOGY, EDUCATION, HEALTH. MicroCAD-2024"

MicroCAD for more than 30 years





Obstacles to the creation of startup ecosystems of universities

The difficulty of creating commercial companies (“spin-offs”) and transferring to them the rights to intellectual property objects created with budget funds

ACTUAL TASKS

to solve the needs of commercialization of startup projects, innovative developments and scientific topics



International experience

Analysis of the international experience of creating innovative ecosystems of the world's leading universities: Finland, Germany, China, the Netherlands, etc.

Taking part in the international grant of the Ministry of Digital Transformation of Ukraine, they visited Aalto University (Helsinki, Finland), where they got acquainted with the innovative startup ecosystem, which includes a startup center.



AoF, EU-projects

Corporate and BF projects

R2B, ERC PoC, EIT projects

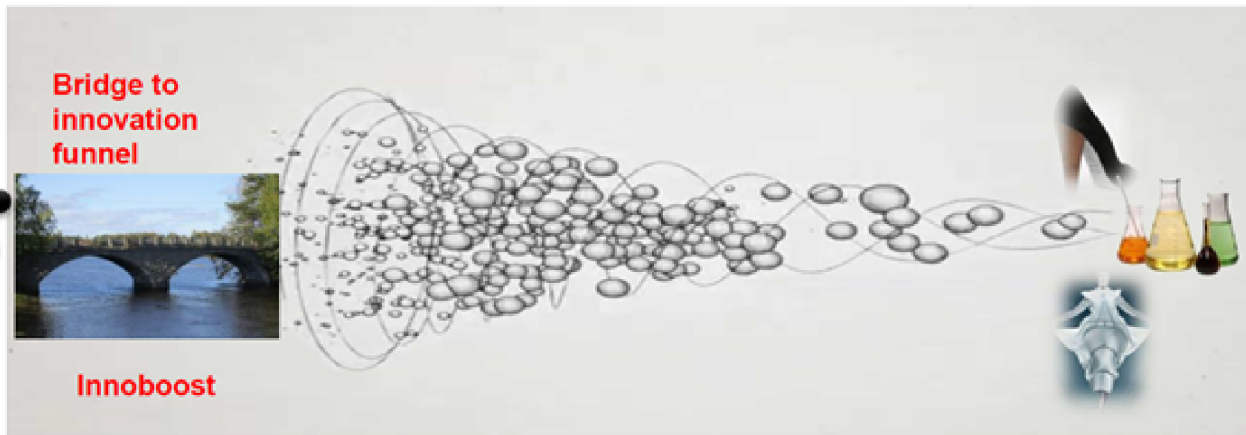
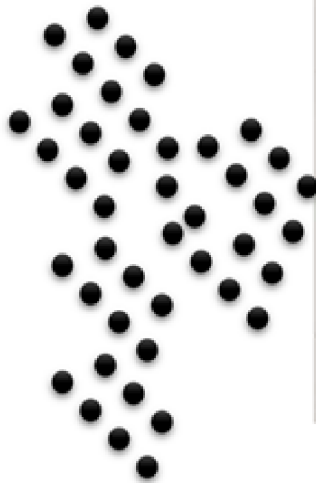
Fundamental research

PoC

TRL-development

Pre-commercialization

Commercialization



Invention disclosures

Patents

Technology transfer

Research services

Innovation services
EIT services
Corporate relations

Aalto Startup Center
Corporations

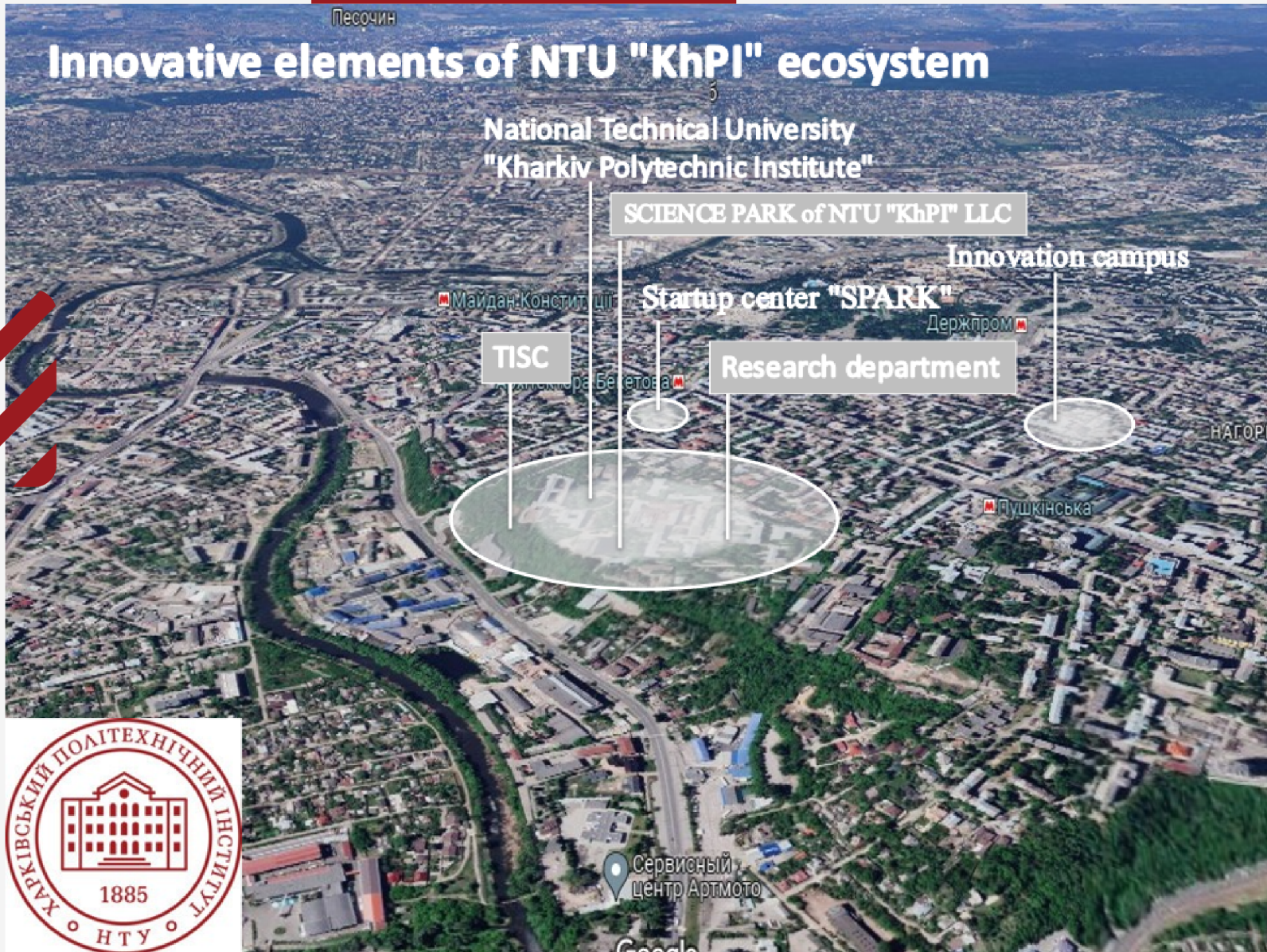
A? Aalto-yliopisto
Aalto-universitetet
Aalto University

<https://innovation.aalto.fi/>

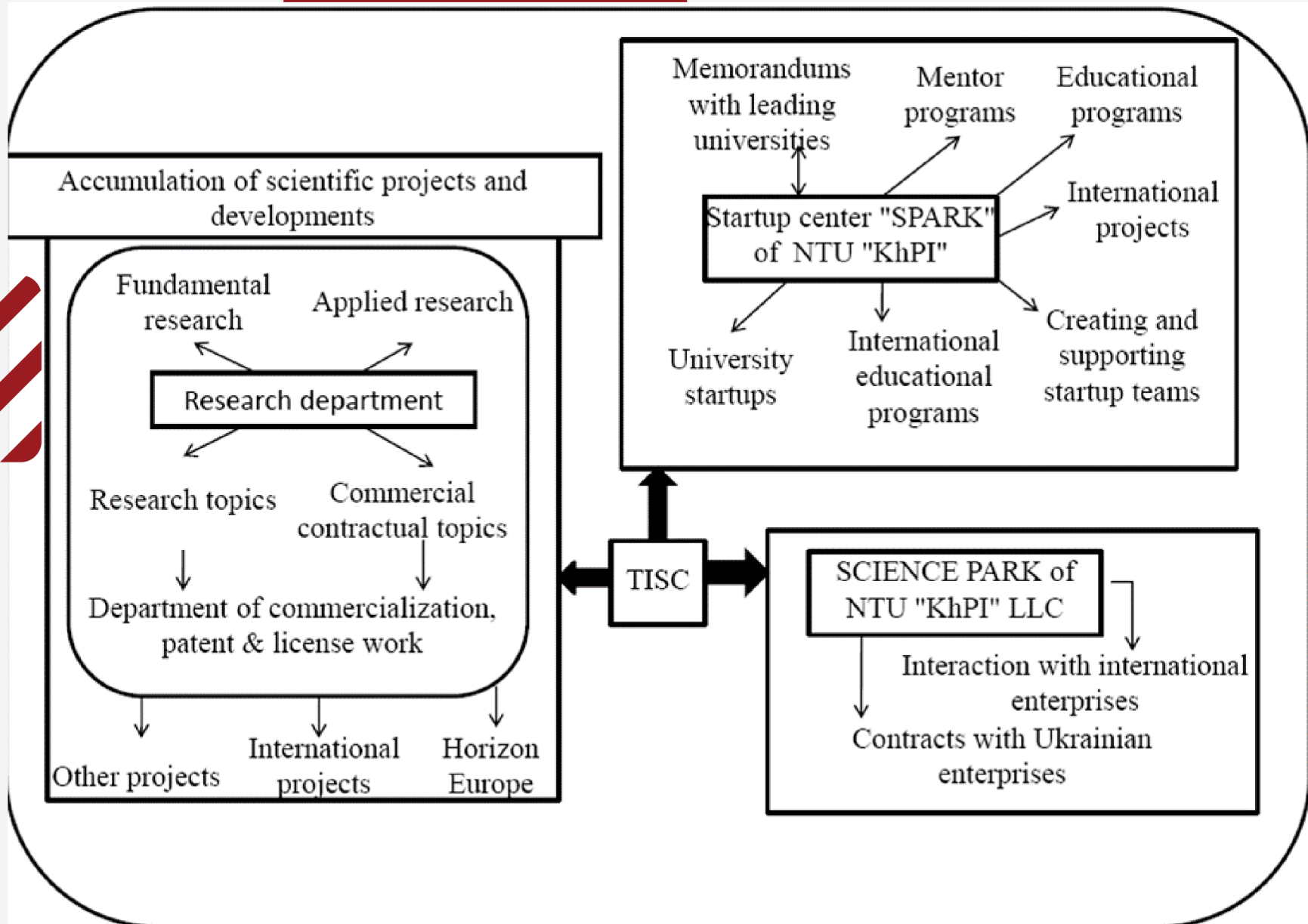
<https://startupcenter.aalto.fi/>

The experience of building an ecosystem of Aalto University

Innovative elements of NTU "KhPI"



Current scheme of work of innovative units of NTU "KhPI"



Innovative units



- Scientific and research part (S&R)
- Startup center "SPARK" NTU "KhPI"
- LLC "Science Park of NTU "KhPI"
- TISK

DYNAMICS OF NTU “KHPI” SCIENTIFIC DEVELOPMENT

Years					
Indicator	2019	2020	2021	2022	2023
Financing, million UAH	52	60,5	71,6	54,9	67,7
Number of scientific papers (fundamental+applied)	223	180	138	79	105
Contractual scientific topics,	184	136	109	43	46
Startups	28	31	33	45	59
Spin-off	2	2	2	3	2

Scientific and research part (S&R)



- Educational and research cluster "Polytechnic - 125",
- Technology Transfer Center,
- Center for Commercialization of Intellectual Property and Technology Transfer,
- Academic Center of Competence of IBM "Smart Commerce"
- departments of scientific and technical information and patent and licensing work, standardization and metrology
- Scientific, technological and educational center
- 5 educational research and production centers
- 116 research laboratories



Startup center "SPARK" NTU "KhPI"

Startup center "SPARK" of NTU KhPI is the first and unique business incubator not only of Kharkiv, but of all of Ukraine with a co-working area, a training center and various mentoring and project support programs



LLC "Science Park of NTU "KhPI"



- The mission of the KhPI Science Park: integration of intellectual resources into the process of developing knowledge-intensive, innovative products competitive on domestic and foreign markets with the aim of increasing Ukraine's competitiveness in the world and ensuring the sustainable development of society.

The Science Park was created with a purpose

- Creation of new types of innovative products, implementation of measures for their commercialization, organization and provision of production of innovative products that are highly competitive in domestic and foreign markets;
- Promotion of development and support of small innovative entrepreneurship;



- Involvement of students, graduates, post-graduate students, scientists and university employees in the development and implementation of science park projects;
- Attracting and using risk (venture) capital in one's activities, supporting science-intensive production;



Startup-movement

this is a new effective way that our state and, in particular, NTU "KhPI" is moving forward. It has been tested in many European countries.

Therefore, today, integrating into the global scientific and educational space, we use those approaches to the commercialization of intellectual property that exist in the world.





CIG R&D Lab

Within the framework of the educational and scholarship program, students, postgraduates and young scientists receive expert and financial support for the development of their startups



THE BEST STARTUPS OF THE FIFTH SEASON OF CIG R&D LAB

- **a service that allows you to track the expiration date of products and ready meals in the refrigerator;**
- **hydrogel patches for the introduction of drugs into the human body - the winner of the season;**
- **smart home system with a new encryption system.**



SCHOLARSHIP FOR THE 6TH SEASON OF THE CIG R&D LAB PROGRAM

- **BrownC-Rec is a method of reclamation of soils contaminated by heavy metals and radionuclides as a result of military operations.**
- **MineGuard is an advanced mine detection system that solves the critical problem of detecting explosive devices in de-occupied territories**
- **Prominchik is a highly mobile photovoltaic power supply system in emergency situations.**



In the near future, our university will celebrate the 140th anniversary of its foundation. Over the years, there were many significant events related to the activities of the university and its alumni, as well as world-class innovations.

New challenges have arisen in connection with the Russian war against Ukraine. And in these incredible conditions, our university continues to implement its mission in educational and scientific activities.

Currently, National Technical University «Kharkiv Polytechnic Institute» is one of the best universities in Ukraine according to international rankings.

Students, teachers and scientists, through our research, teaching, public activities are working to solve the most important challenges facing Ukraine and our civilization. These challenges are summarized by the United Nations as the 17 Sustainable Development Goals.

For the consideration of the world university community and all interested parties, we present the report of the National Technical University «Kharkiv Polytechnic Institute», which is intended for a wide range of local, national and international audiences in the public, private, non-governmental, political and educational sectors.

We hope that it will stimulate further ideas, actions and opportunities for cooperation and partnership so that together we can play a full role in achieving the global Sustainable Development Goals by 2030.

Yevgen SOKOL

Rector of NTU «KhPI», corresponding member of the National Academy of Sciences of Ukraine, Laureate of the State Prize of Ukraine in the field of science and technology, Laureate of the S.O. Lebedev Prize of the National Academy of Sciences of Ukraine, doctor of technical sciences, professor.

Goals of sustainable development



A SUSTAINABLE INNOVATION ECOSYSTEM NTU"KHPI"

To solve this issue, it is proposed to create an ecosystem and establish practical interaction with LLC "Science Park NTU "Khpi"", which will be implemented through the following Global Sustainable Development Goals (SDGs): SDG 4 "Quality education", SDG 9 "Industry, innovation and infrastructure ", and TSR 17 "Partnership for sustainable development"



Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

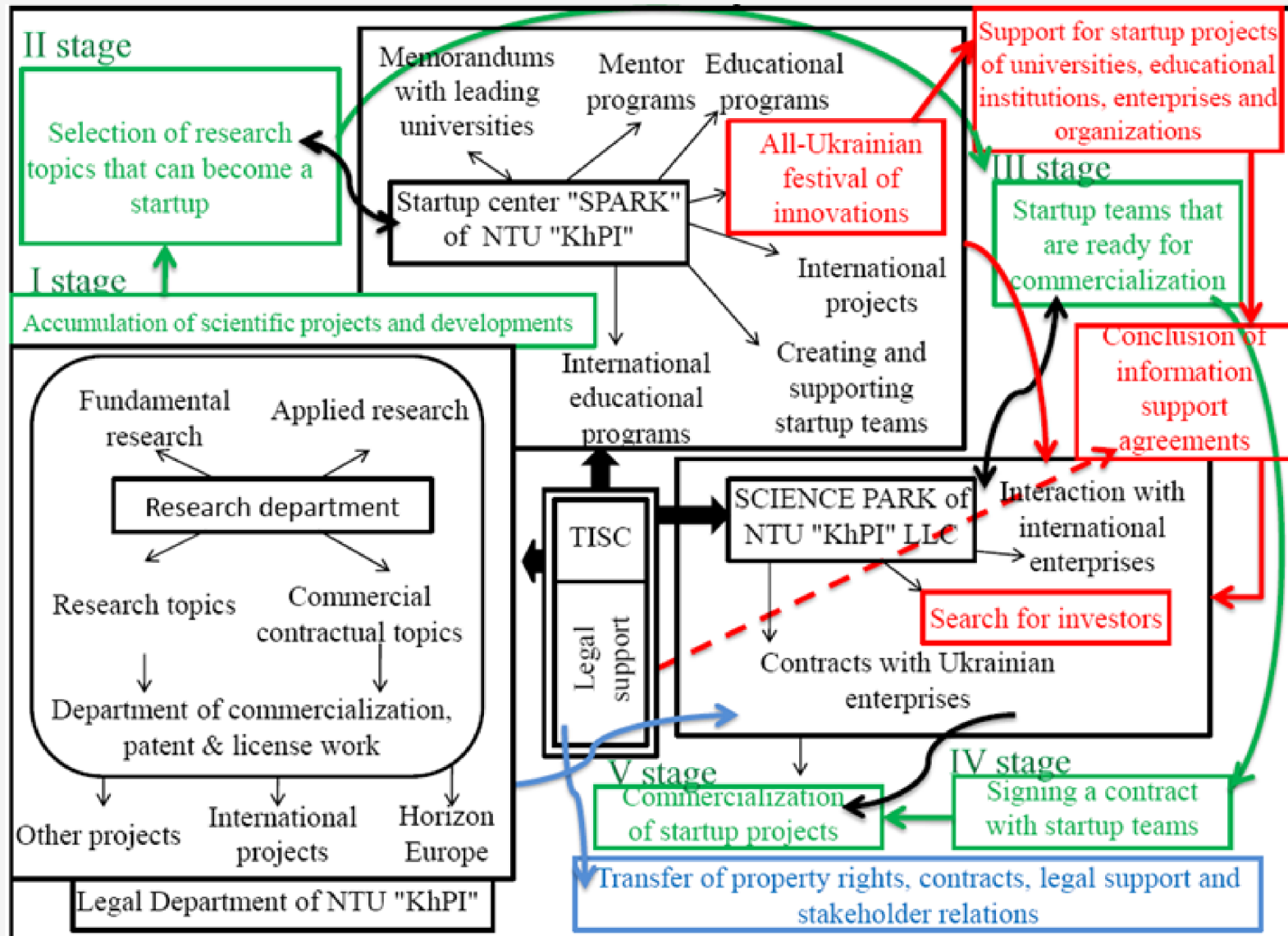


Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

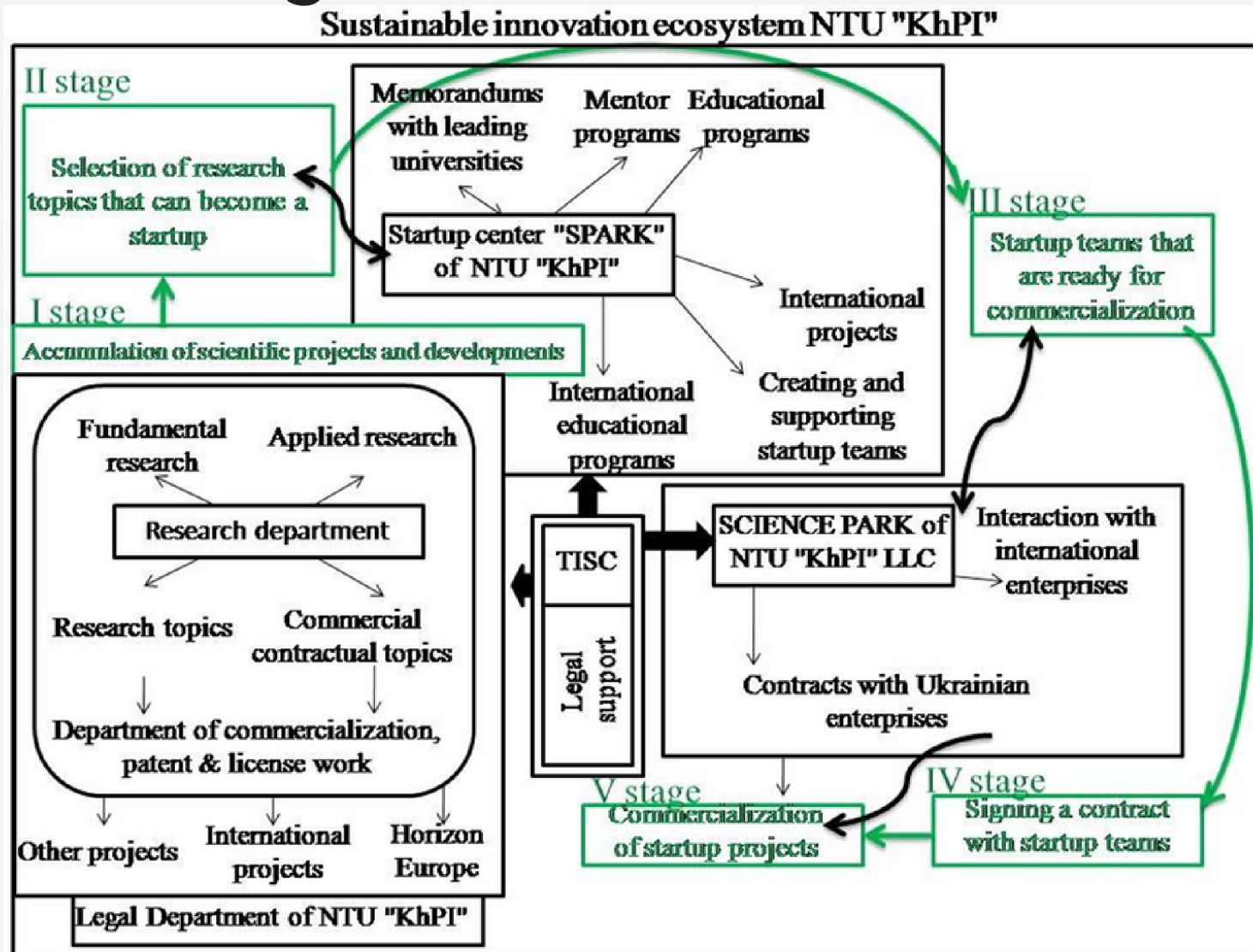


Strengthen the means of implementation and revitalize the global partnership for sustainable development

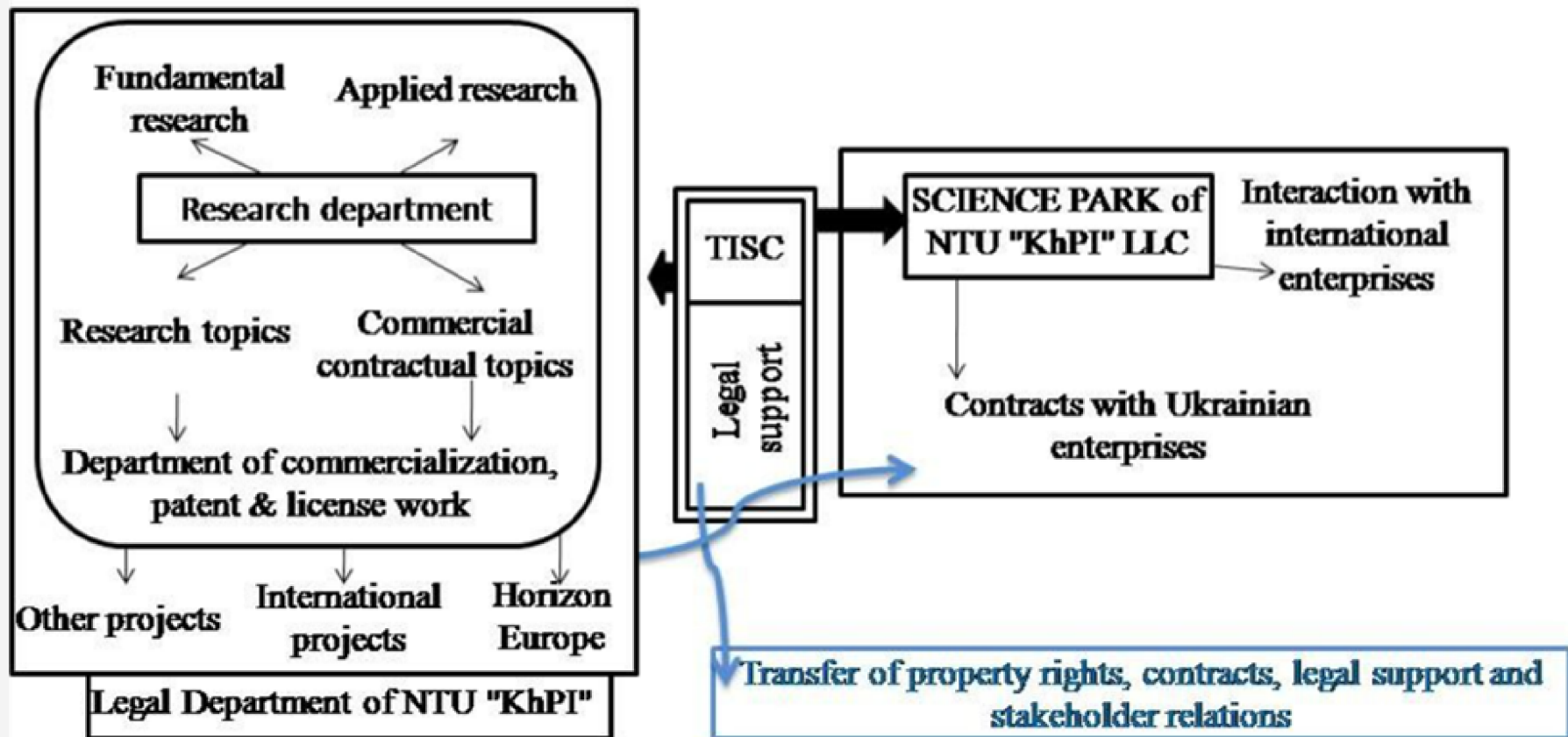
Strategic model of sustainable innovation ecosystem of NTU "KhPI"



The first cycle, the commercialization of startup projects is implemented through five stages



The third cycle of commercialization of startups in the innovation ecosystem model





Activities within the model of the innovative ecosystem of the university

A large number of activities have already been carried out within the framework of the sustainable innovation ecosystem of our university





Kharkiv Energy Efficient

The project of the National Technical University «KhPI» «Kharkiv Energy Efficient» united the efforts of thousands of academic staff, scientists, students and postgraduates to provide scientific, scientific and technical support for the strategy of energy efficient Kharkiv. The leaders and ideologues of NTU "KhPI" are Professor Yevhen Sokol and Andriy Marchenko.



Investment projects proposed by NTU "KhPI" (examples)

Solar energy

Equipping a medical facility with a rooftop solar power plant as an additional source of electricity to support its own consumption (on the example of the Kharkiv City Clinical Hospital for Urgent and Emergency Medical Care named after Prof. O.I. Meshchaninov)



Individual heat stations

Widespread use of heat stations with plate heat exchangers, which saves about 20% of heat energy. The university's specialists, together with partners in Ukraine, have designed and installed more than 2.500 plate heat exchangers that have proven their effectiveness.



Electric transport

Decarbonization of municipal transport in accordance with the outcome document of the UN Summit "Transforming our world: the 2030 Agenda for Sustainable Development"



Turboexpanded technologies

The use of secondary energy resources, such as compressed gas energy that is reduced at gas distribution stations of industrial and household consumers, is an important area of electricity production. The beneficial use of excess gas pressure by replacing throttling devices with turboexpander units to drive electric generators makes it possible to generate a significant amount of unconventional electricity in Ukraine, ranging from 50 to 1200 kW.



Glow-in-the-dark paving slabs paving stones

The idea of the project is to introduce the glow-in-the-dark paving slabs in the city, primarily in the city Centre and Northern Saltivka. The glow-in-the-dark paving slabs are the result of a university start-up by NTU "KhPI".



Proposals for investments in the city of Kharkiv from (NTU "KhPI")

The goal of the project: ensuring the sustainable development of the city of Kharkiv in post-war reconstruction



SUSTAINABLE INNOVATION ECOSYSTEM NTU «KHPI»



The proposed model of a sustainable innovation ecosystem NTU «KhPI» effectively solves the important scientific and practical task of commercializing startup projects and innovative developments.

Thank you very much for your attention.

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