STCU – Science and Technology Center in Ukraine

Institute Self-Sustainability – *A Study of Obstacles Faced by Institutes in Ukraine*

Barriers which exist on the way to commercialization of scientific research results in Ukraine – A Study

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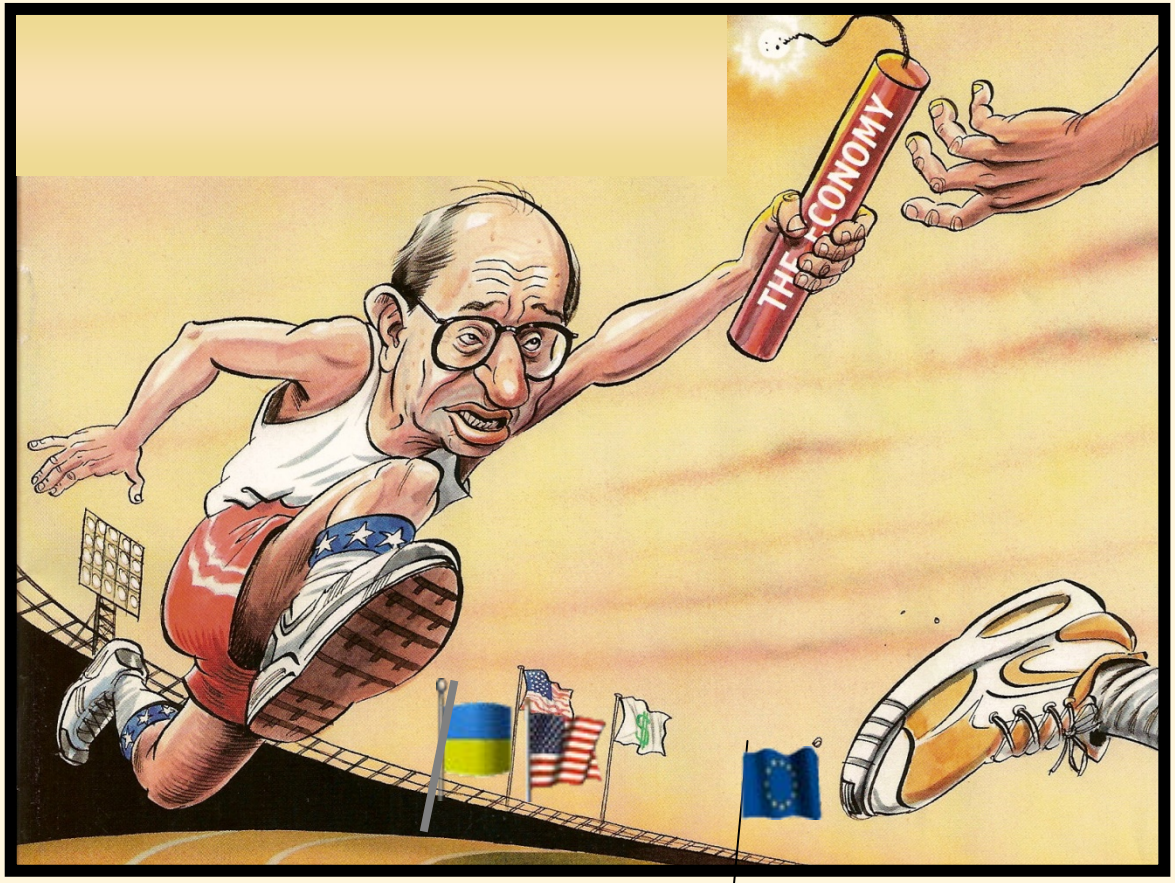
STCU – Making Progress, Seeing Results –

Our Mission: Non-Proliferation through Science Collaboration

- Working with 9000 scientists since 1995
  - in Ukraine, Georgia, Azerbaijan, Moldova & Uzbekistan
- 1900 Projects
- 190 Partner Organizations – Government & Commercial
- 240 Patent Applications – National & International

Can Your Country be Competitive in the Global Knowledge Economy Race?



За: М. Гінуль, Бельгія

How You Can Make a Difference Through…

Technology Transfer, Innovation and Entrepreneurship

Why Technology Transfer Is Important for Your Country

- Through Patenting & Licensing

you get

- New Start-Up companies creating high-tech jobs.

Technology is the major driving force of a successful economy in today's world.

What is Institute Self-Sustainability

- Achieving long-term self-sustainability, modernization, and growth;
- Evolving away from heavy reliance on government budget funding;
- Achieving financial independence.

What does it mean for an Institute to be Self-Sustainable?

- Large mix of active R&D projects
- Commercialization of R&D results
- Technology transfer capability
- International collaborative relationships
- Commercial strategic partnerships
- International standards
- Competitive R&D capacity and modern infrastructure
- Strategic planning and business planning

Self-Sustainability Means:

- You are not dependent on any one organization for your institute's growth and survival;
- Your finances are diverse – if one source decreases, others take its place;
- You take the reins and create your own future;
- Your scientists can move in directions that are not controlled or limited;
- You can grow in directions that your scientific curiosity takes you.

Let’s talk about the study we did in Ukraine on the <u>obstacles institutes face in trying to commercialize</u> their technologies and create start-up companies in their countries.

Each country’s obstacles may be different, but there are many similarities.

Barriers which exist on the way to commercialization of scientific research results – A Study

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Introduction to Study Conducted in Ukraine by Prof. Tsybulov

- Study was done using the Delphi method.
- Prof. Tsybulyov interviewed 14 Ukrainian government officials of various ministries, institute and university officials and staff, and others who deal with scientific activity, industrial policy, patenting, technology transfer, and commercialization areas.
- These experts expressed their views as to what barriers exist, and then through the Delphi method these results were tabulated and the answers ranked.
- We will see the summary results of this study.

Historical Background

- In considering the obstacles to commercialization, it is necessary to understand that for the most part the obstacles in Ukraine and in other countries of the former Soviet Union are remnants of the Soviet system of operation in which scientific research and innovation were basically state property and as such had to be strictly guarded and controlled
- Since independence, Ukraine and other CIS countries have tried to develop legal systems to help manage their scientific activities. However, at stake is a carefully ingrained view of what constitutes national security, a whole mind-set of how to be protective of state property and how to act responsibly, both collectively and as individuals.
- The newly created republics needed to control and guard all revenue generated inside their countries. The Western models for business creation and operations are regarded with suspicion by the remaining old system of State control.
- The obstacles to commercialization that the study revealed and ranked must be viewed in the context of each country's historical development. Changing their old habits and beliefs takes education, re-training, re-interpretation and time.

Risks and Opportunities

- Some investors look at this process of national development as too risky to participate in.
- However, other investors recognize that this may be a time of great opportunity.
- Even though the world of commerce is still relatively new in these countries and the world of consumer product commercialization still holds many mysteries to them.
- At such a time, collaboration between investors and scientist-innovators can be enormously and mutually rewarding.
- The commercial potential from scientific discoveries and technology developments can be great if one takes the time to uncover them and to work collaboratively with them.
- These scientists are eager to see their developments and inventions in use by consumers in the global arena. The scientists are seeking collaborative opportunities with western investors and the formation of joint ventures.

View the Obstacles as a Challenge to Overcome

- View the obstacles and barriers that I present here as a challenge, rather than an impediment to doing business in Ukraine and other countries of the former Soviet Union.
- The fact that 14 experts in Ukraine were able to express these barriers is a step in the right direction toward a more open and market-driven economy in these countries.
- Collaboration with these scientists can be mutually rewarding financially and also as an eye-opening experience, entry into other worlds of perception and endeavor.
- Now let’s look at these obstacles that we have ranked as a challenge to be overcome for the mutual benefit of both the investors, the scientists, and the countries where the technologies have been developed.

Significant Scientific Potential in Ukraine

- In 2007 – 1,404 organizations performed research in Ukraine, among them 365 from Academy sector and 178 from higher education;
- 56,869 specialists are involved in Academy and university sectors of science, among them 3,885 Dr. of Sc. and 13,851 Ph.D.,
- This shows the high scientific potential of Ukraine.

Low Innovation activity *in the industrial sector (2007):*

- 14.2% of enterprises are involved in innovative activity;
- 6.7% by sales volume of realized innovative production;
- According to data of World Economic Forum about global competitiveness, Ukraine occupies 73rd place out of 131 countries ranked.

Life cycle of innovative production

Idea → **Research and Proof of Principle** → **Development** → **Manufacturing** → **Realization & Sales** → **Income**

Research and Proof of Principle

- Technical hypothesis
- Research
- Pilot project

Development

- Development of research & engineering
- Preliminary developments
- Technical project
- Prepare documentation for production
- Prototype development & testing
- Acceptance testing
- Finalizing prototype for production

Manufacturing

- Scaling for Production
- Production
- Delivery & distribution

Realization & Sales

- Product policy
- Price policy
- Marketing policy
- Distribution policy

Five major barriers have been identified that impede commercialization of scientific research in Ukraine

Rank	Barrier
1	**Scientists lack of commercialization experience, knowledge and preparation**
2	**Insufficient financing for innovation**
3	**Shortcomings of the legal structure for research activity.**
4	**Absence of an effective infrastructure for innovation**
5	**Ineffective management of research activities.**

1. Barriers which characterize the knowledge of commercialization by the scientific community

Rank	Barrier
1	**Key persons (governmental officials, leaders of scientific organizations and industrial enterprises) are not aware of the important role of intellectual property in economic development**
2	**Overwhelming amount of researchers did not realize the importance of commercialization and do not know how to commercialize the results of their research**
3	**Older age of the main part of the researchers with higher qualification (60-85 years)**
4	**Main focus of talented researchers has been oriented on performing contracts of foreign scientific centers and companies**
5	**The high-quality of research staff who work in Academies and Universities has decreased**

1. Barriers which characterize the knowledge of commercialization by the scientific community *(cont'd)*

Rank	Barrier
6	**Low efficiency of the training system for scientific personnel**
7	**Scientists, as a rule, get the results of research at first, then look for ways to use them, but not vice versa**
8	**Research workers do not have sufficient knowledge and abilities for realization of innovative projects**
9	**For the last decade the proportion between the specialists in engineering field and humanitarian ones have changed from 80:20 to 20:80**
10	**Scientists do not understand for whom and why the results of their research is needed**

2. Barriers which characterize financing of research

Rank	Barrier
1	Insufficient financial stimulation of subjects of innovative activity
2	Insufficient amount and inefficient priorities of distribution of the state financing of innovative projects
3	Absence of State support for innovative activities
4	Low level of scientific-technical base of scientific organizations.
5	An insignificant volume of venture capital in Ukraine.
6	Insignificant foreign capital investment in the innovative sphere of Ukraine
7	Academy does not have enough money for the legal safeguard of the scientific researches results

3. Barriers in the legal structure of research activity

Rank	Barrier
1	**Absence of state innovative policy and strategic development programs of key industries**
2	**The state insufficiently stimulates the innovative activity both in financial and in organizational plan**
3	**Contradictions in the\ normative-law base regulations for the legal relationships in the field of innovative activity**
4	**Laws in the field of innovative activity that develop techno parks, actually are not executed, and practically do not give preferences to small innovative enterprises**
5	**Prohibition of the Antimonopoly committee of Ukraine on the creation of large alliances**

Scientific research in Ukraine is regulated by over 80 laws and government regulations

1	**«On innovative activity»**
2	**«On priority directions of innovative activity in Ukraine»**
3	**«On government activity control in the field of technologies transfer»**
4	**«On special regulations of innovative activity of technological parks»**
5	**«On scientific and scientific-technical examination»**
6	**«On investment activity»**
7	**«On innovative activity»**
8	**«On priority directions of innovative activity in Ukraine»**

The Law of Ukraine «On innovative activity»

- Very complicated procedures for approving and financing of research projects;
- The Law authorizes a central agency for R&D activities, but it does not designate such an agency; this duplicates responsibilities and wastes funding.

The law of Ukraine «About priority directions of innovative activity in Ukraine »

- The Law foresees support and development of the 3rd and the 4th technological structure instead of the 5th and 6th; that is, it does not focus on the future but orients itself on the past.

The law of Ukraine «About the government regulatory control in the field of Technology Transfer»

- Doesn’t set any clear interpretation or definition of the term «property rights of technologies»
- Technology is not examined as a separate object of civic relations.
- Does not authorize the financing of Technology Transfer Offices and their innovative activity and patenting .

The law of Ukraine «About the special regime of innovative activity of Technological Parks»

- The mechanism of creation of such parks is extremely difficult (because of changes in the Law);
- Existing Technological Parks in Ukraine are not suited for commercialization of results of small and medium scientific enterprises.

The Law of Ukraine «On investment activity»

- An investor needs to get numerous Government permissions and Approvals (Receiving such permissions is a path to corruption);
- The Law has guarantees for protecting investments, but does not describe the mechanisms for such guarantees, and thus, frightens off potential investors.

4. Barriers which characterize the absence of effective infrastructure

Rank	Barrier
1	Degradation of scientific-research institutes
2	Unfavorable attitude of production sphere to innovations
3	Liquidation of the structural subdivisions, responsible for innovative activity, for industrial enterprises.
4	No desire for innovations by state enterprise monopolies
5	Absence of economic-legal mechanisms of implementation of scientific-technical developments in production
6	Absence of mechanism which would allow small innovative business to use the areas and scientific equipment of universities and institutes
7	Excessively difficult mechanism of techno-park creation
8	Universities do not have innovative enterprises which are engaged in production

4. Barriers which characterize the absence of effective infrastructure (cont'd)

Rank	Barrier
9	**The rectors of the universities are usually not interested in creation of innovative enterprises**
10	**Absence of demand for innovative products in internal market**
11	**Small and Middle Enterprises are not prepared to promote their innovations**
12	**Most academic Institutes and universities have status of non-profit organizations, which substantially diminishes the possibility of creation of innovative enterprises**
13	**Scientists of the Academies and universities are oriented toward fundamental research**
14	**There is a contradiction between relatively long period of realization of innovative project (a few years) and short term of governmental officials who stay in power (one year)**
15	**Significant part of the innovations market, that Ukrainian scientists worked on, passed to Russia in connection with disintegration of the USSR**

5. Barriers in research management

#	Barrier
1	Scientists do not understand why their research results are wanted and for whom they are needed
2	Low motivation of the university and institute scientists
3	Scientists are not oriented to the market
4	The overwhelming amount of work which is done in Academies and universities is finished with written reports that are not ueful for further development
5	Scientists lack business and investor contacts in business-environment
6	There is no clear path of commercialization of scientific research results for the scientists
7	Access to western technologies by Ukrainian Industry is easy; therefore, it is more advantageous for industry to purchase a new technology abroad, than to develop a new technology by themselves

5. Barriers in research management (cont'd)

Rank	Barrier
8	Sometimes a perspective new development is blocked by an organization for which this development may be a threat
9	Among the scientists there is inertia of thought: «The State allots money and we create new knowledge»
10	Unwillingness of civil servants to risk accepting administrative decisions in the sphere of innovative activity
11	Low competition for the receipt of financing of science-research works
12	The Academies plan the directions of scientific researches not oriented to the market
13	The Academies can monopolize artificially the research results

Let’s talk about
what can be done.

Who started Silicon Valley?

- Bill Hewlett and David Packard started

HP Hewlett-Packard Company in their garage in 1939.

  - Pursued a dream to own their own company,
  - Ended up blazing the electronic revolution,
  - Unwavering desire to develop innovative and great products!

- Stanford University students and professors expanded it.

Today Silicon Valley is the greatest model for entrepreneurship.

Silicon Valley was developed by innovators,

Innovators like your country has and is not using properly!

- Did Bill Hewlett and David Packard have problems? Of course!
- Was it easy? Absolutely not!

No effort – No rewards!

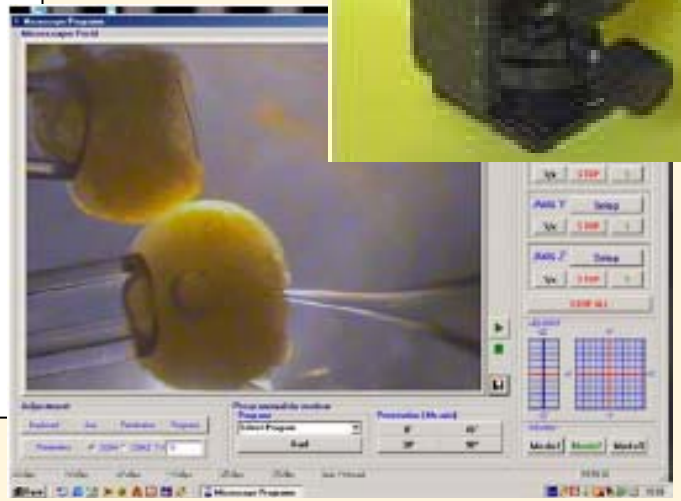
- They all learned from their mistakes. They got up and did it again, with more passion because they believed in what they were doing and in themselves.
- I want you to believe in yourselves.

You're terrific! You can be great!

3 Selected Examples of Partnering Opportunities at STCU in Ukraine

Ukrainian Robotic Micro-manipulators take the smallest step in the world!

- **Accurate & reproducible half-nano-meter steps (world-record!)**
- **Used for demanding bio-tech applications such as:**
  - *Patch Clamp (holding & positioning cells),*
  - *IVF (in-vitro fertilization), and*
  - *Cell cloning,*
- As well as in semiconductor integrated circuits industry – all growing markets.



PLANT GROWTH REGULATORS

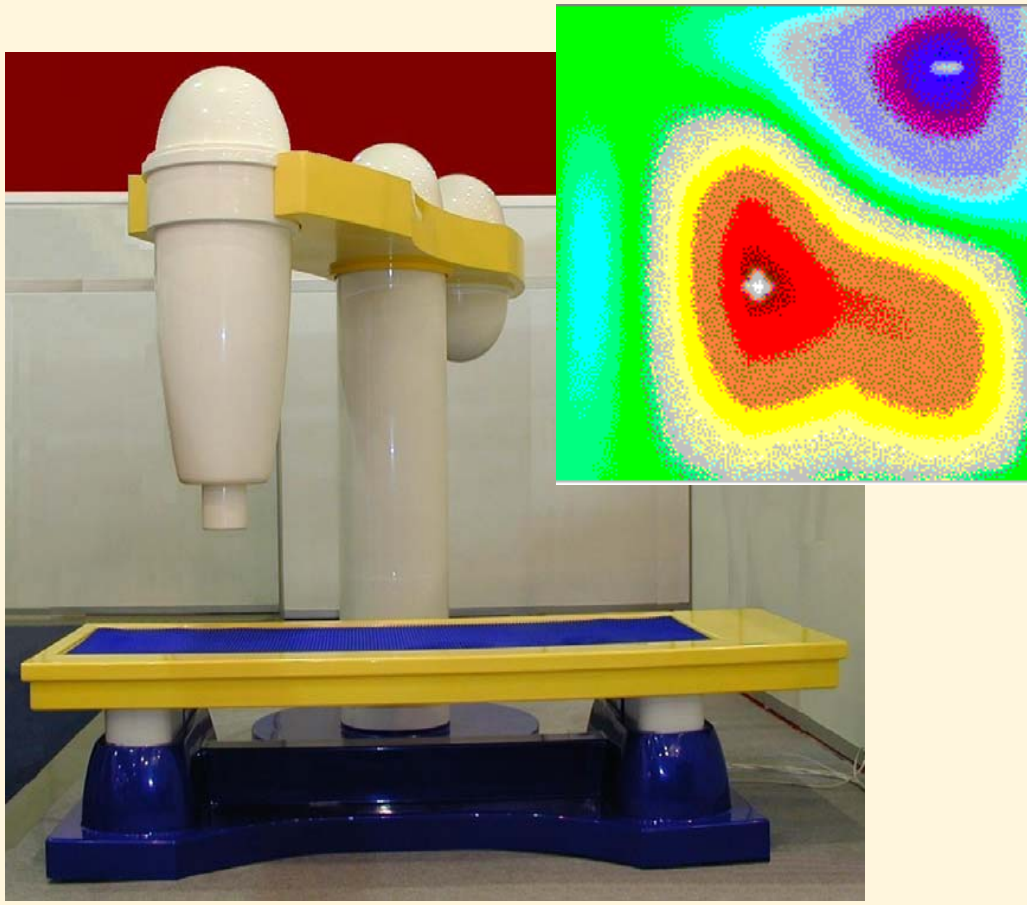
25% GROWTH IMPROVEMENT FOR MANY AGRICULTURAL CROPS

Based on Biotechnology of micromycetes cultivation from root system of herbs

Agrostimulin Biosil	for cereals, leguminous and perennial herbs
Biomax Betastimulin	for sugar beet
Zeastimulin	for corn
Radostim	for seed treatment
Treptolem	for sunflower, rape
Charcor	for root system development

Non-Invasive, Risk-Free Magneto-Cardio System for Early-Diagnosis of Heart Diseases

- Measures the tiny magnetic fields emitted by the human heart
- Risk-free diagnosis of ischemia, ventricular arrhythmias, & other heart ailments through imaging & quantitative analysis
- Non-invasive clinical evaluation of new drugs & therapies.



Stop selling what you have!

Start selling what they need!

Let me repeat this:

Start selling what they need!

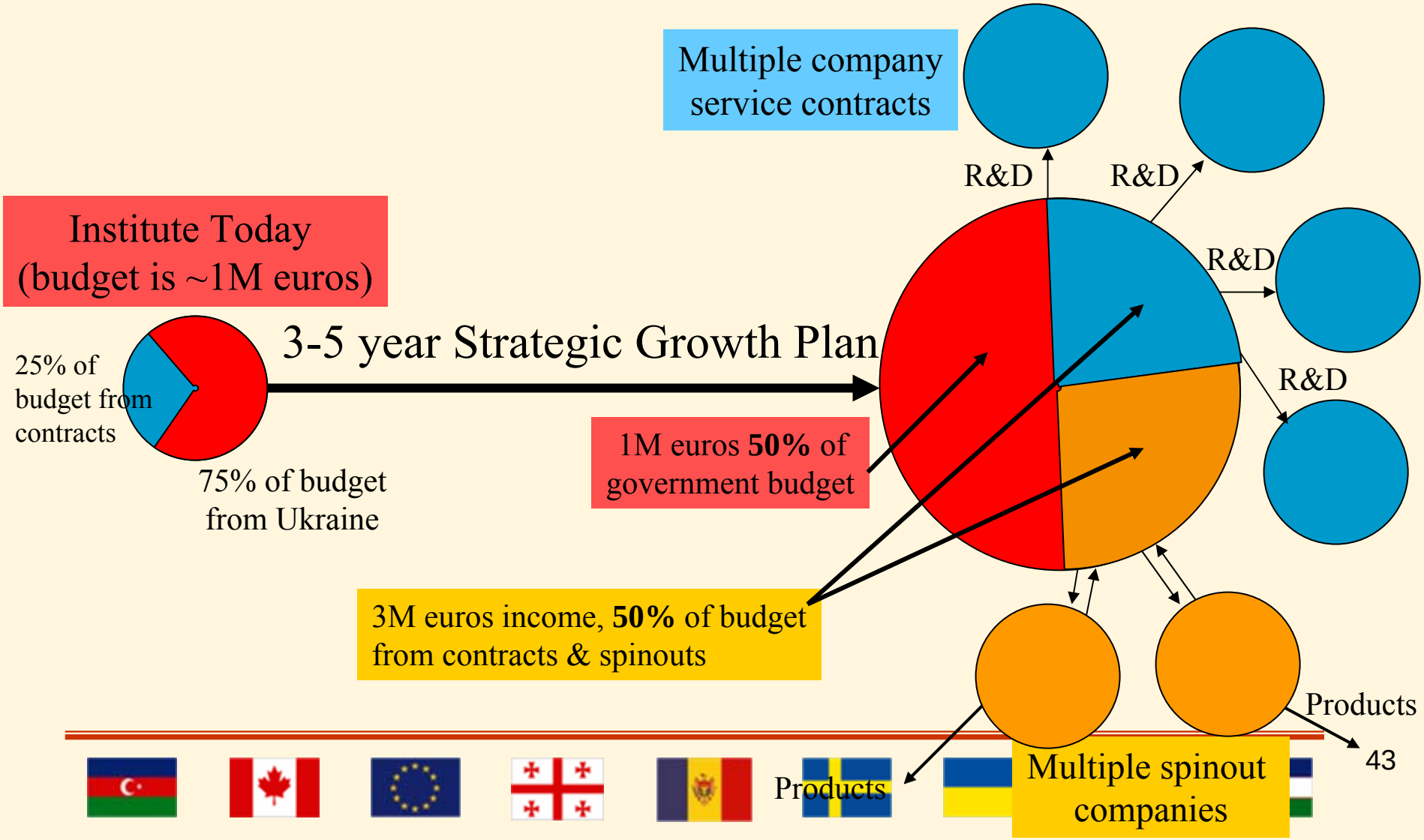
Stop talking.

Start doing!

One Possible Example of How an Institute Can Go from 1M euros to 2-4M euros in 3-5 years –

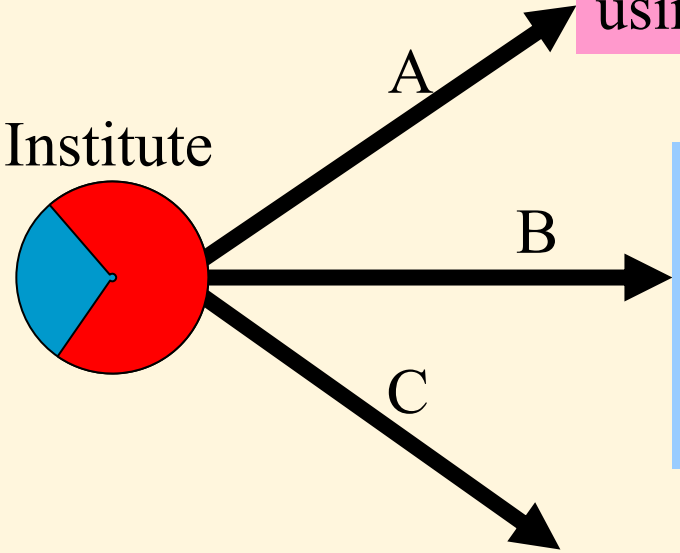
By Diversifying the Institute's Funding Revenues

Institute Strategic Growth Plan over 3-5 Years



A Possible Growth Model for Institutes

A-B-C Growth Strategy



Maintain, improve and expand institute scientific skills & capabilities using budget from government

Develop multiple external R&D and Service contracts based on institute capabilities with CIS, EU and other western companies & organizations (private & public)

Find western investors to license or spin out several (1-3) start-up companies based on technologies and products developed at institute

Full Spectrum of Product Development

Market Research & Analysis

Market-Ready Prototype Development

Creating Start-up Companies & Hi-Tech Jobs in Your Country

Product Sales

Full Tech-Transfer Vector

Developing the Four Pillars for Your Country's Science

Science excellence at institutes, universities, and research laboratories	Transfer of scientific results into marketable products	Commercial-ization of scientific innovations	Creation of High Tech jobs for your scientists and your people

Let's all work together to increase high tech jobs

through International Partnering

Focus on the future

- It has been said that the reason the windshield of an automobile is larger than the rear-view mirror is because you are supposed to spend most of your time looking where you are going, rather than where you have been.

As in life look toward the future.

A quote from Mario Andretti, the famous auto racer in the US:

If everything seems under control, ***you're just not going fast enough.***

Promote Yourself!

No one will do it for you!

…Споконвіку Прометея
Там орел карає,
Що день божий довбе ребра
Й серце розбиває.
Розбиває, та не вип'є
Живущої крові, —
Воно знову оживає
І сміється знову…

From Kavkaz
By Taras Shevchenko

Prometheus Bound
By Pietr Paul Rubens

Institute Self-Sustainability and Strategic Growth is in your hands!

Good Luck!

Vic Korsun, Deputy Director (USA)

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