Challenges of Commercialization

"Turning Investment in Science into Payback from Business"

Finnish-Russian Innovation Alliance on Nanotechnology

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Technological Innovation Spans From Science To Global Commercial Success

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Objective:
From Top Science to Top Competitiveness

Better Return On Investments in science

- Investments in material assets
- Investments in research
- Investments in higher education

Industry modernization and International competitiveness

- Reduce dependence on energy
- Reduce need of regulatory barriers
- Reduce reliance on high technology import

Results Of Russian Research Have Been Successfully Commercialized - Abroad

Some recent examples

- A^3B^5 Heterostructures (USA, Taiwan, China, Japan…)
- Silicon Carbide semiconductors (Cree Research, USA)
- Atomic Layer Deposition (Picosun, Beneq, ASM)
- Optogan – Start-up in Finland, acquired "back" to Russia

Lessons from the past

- Commercialization requires specific expertise on par with the qualifications of the best scientists, but they can't commercialize alone

  ➔ Invest in high-quality business development support
- Market need must direct applied research

  ➔ Invest professional Market Validation
- Patent is not "a scientific publication" and cost, but a tool to keep and control results of research. Transfer of patent rights can work as an in-kind investment and anti-dilution tool in fundraising

  ➔ Invest in IPR expertise and funding

Case: Silicon Carbide – Pioneering Research in Russia, Business Abroad

Company Profile	Companies		
	USA	Europe	Japan
Military/Aerospace	Northrop Grumman, HRL, NASA (Glen Research Center)	Thales, AMS, EADS, Ericsson MW	-
HF/Power semiconductors	Triquint	Infineon, STMicroelectronics, Philips, Dynex,	Hitachi, Toshiba, Toyota/Denso Fujitsu/Eudyna, Oki, NEC, New Japan Radio
Vertically integrated manufacturing (substrate, chip, packaging)	Cree, Semisouth, Astralux, Intrinsic, TDI, LCermet, Nitronex	Siced/Sicrystal, Linköping University/TRANSiC	Major companies, partly vertically integrated
Substrate	Dow Corning,CREE	-	-
Automation, power electronics	General Electric, Rockwell	Siemens, ABB, Alstom	Matsushita, Mitsubishi Electric
Car electronics	-	-	Toyota/Denso
Optoelectronics	Lumileds, Cree, Gelcore, Kopin	Osram Opto Semiconductor	Nichia, Toyoda Gosei, Sony, Rohm
Equipment	Veeco	Aixtron, Epigress, Thomas Swan, Riber, Jipelec, EMF	Takeuchi, Nippon Sanso

"In the 90's only Western firms and universities had interest for Russian SiC researchers and results."
"At Cree (USA), world leader in SiC based devices, in early 90's almost half of the scientists were emigrants from USSR"
Market value of Cree Research alon in US$ 3.19 billion (11.10.2011)

Source: ЭЛЕКТРОНИКА: Наука, Технология, Бизнес 5/2006; Yahoo Finance

In Russia Internationally Competitive Patenting and IPR Management is Rare

- Patenting is seen by scientists as avoidable extra cost rather than a business investment
- Mostly domestic patenting only
  - Patent seen by scientists as "a publication"
  - Domestic licensing business underdeveloped
  - In many cases patents are not renewed
- International patenting is a rare exception
  - No systematic review of commercial potential
  - No attention to PCT application deadline
  - No systematic evaluation of commercialization potential
- As a result, Russia lags behind in IPR Business despite its huge investment in science and intellectual potential

Three Finnish Nanotech SME companies alone have **over 200** international nanotech-related patents

Good IPR Management Is Good Investment, But It Requires Skills, Time And Money

1. The Basics
   - Awareness, understanding and incentives
   - Patenting process
   - Financing
2. Build patent portfolio
   - Understand opportunities for - and problems with - patenting
   - File domestic AND international patent applications
   - Keep the patents valid and enforce the IPR in courts
3. Use the IPR for business
   - Commercialization as start-ups
   - Technology transfer by licensing
   - Obtain useful IPR by cross-licensing

All this takes time and money, but what's the alternative?

There Is a High Risk of Failure in Technology Commercialization

1. Lack of International Commercialization Experience
2. Limited pool of internationally experienced business talent
3. Alarming situation in IPR management limits opportunities for international licensing and Start-Up fundraising

As a result, enormous investments in science may **fail** to bring the expected **commercial** results and improvement of Russia's **international competitiveness**

Payback From Big Nanocenter Investments Depends On Successful Commercialization

Nanotechnology centers at a glance

Average financing of Nanotechnology Center project:

- Investments in equipment — € 29 millions
- Investments in operational budget (3-5 years) — € 6 millions
- Number of start-up created (5 years) — 50

By 2015, RUSNANO launch the start-up of 12-15 Nanotechnology Centers, creating 400 new technology start-ups.

Experienced support accelerates commercialization and reduces risk

Source: Rusnano, Evgeny Evdokimov Moscow, April 2011

Combine Best Resources of Finland and Russia for Commercialization

- Build a Nanotechnology Commercialization Center as a pilot project for Russia and Finland
  - Smooth and un-bureaucratic operating environment with unrivalled expert support and financial resources
  - Professional support to save time and reduce risk in international technology commercialization
- Support growth entrepreneurship at early phase
  - Shared material resources
  - International contacts and management expertise
  - Funding of services that help to reduce risk
- Lobby for changes in operating environment of growth-oriented technology companies
  - Administration, e.g. company set-up, funding, governance, customs, taxation etc.
  - Create similar regime as in leading countries in technology entrepreneurship and innovation promotion

Finland can be the ideal location for early commercialization.
Fast speed at the early phase accelerates the time-to-mass-market and reduces the risk of investing in production capacity in Russia

First 20+ Cases Have Been Received For FRIAN Process, Mostly from Russia

- Russian industry
  - 8 active cases
  - 1 case terminated due to IPR issues
  - 2 “Perpetum Mobile” cases rejected
- Russian University and Research
  - LETI: 3 active cases plus 2 processed and terminated
    - First commercial partnership project started (NanoLab)
  - FTI im. Ioffe
    - 2 optoelectronics semiconductor cases underway, one industrial partnership under preparation supported by Rusnano
  - Several cases promised by SPb State university and SPb Mining university
- VTT Finland has suggested 6 cases so far, universities catching up speed

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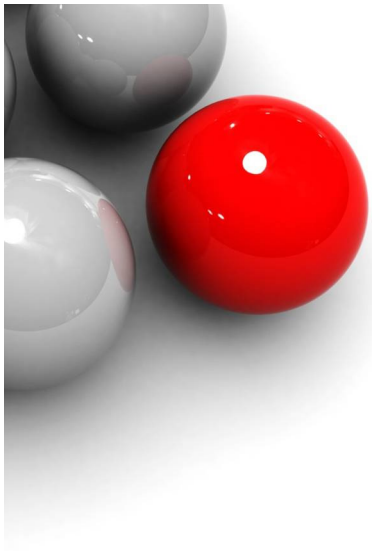

Thank you!

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