



The Key to Success in the Nanotechnology Business

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17 years since the boom – The future direction of nanotech

- ◆ January 2000 – NNI in the US sparks the boom
 - ◆ 2001 – The start of the nanotech boom in Japan
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- ◆ 2000–2007 The dream of nanotech
 - ◆ 2008–2014 The challenging period of nanotech
 - ◆ 2015– The real business of nanotech



The dream of nanotech (2000–2007)

- ◆ Nanotech to change the world
 - ◆ The US promoted nanotech as a symbol of the resurgence of the manufacturing industries
 - ◆ CNT, fullerene, self-assembly, etc. become the stars of nanotech
 - ◆ In Japan, “1,000 university-based startups” plan becomes the engine of growth, and venture capital becomes the fuel



The challenging period of nanotech (2008–2014)

- ◆ Nanotech wakes up from the dream
 - ◆ Bankruptcy of Lehman Brothers in 2008 → Crisis in Greece and the Middle East in 2010 → The Great East Japan Earthquake in 2011 → Crisis in the EU and Strong yen in 2012
 - ◆ The enthusiasm of major enterprises shrinks
 - ◆ Nanotech startups' chances of making profits fade away
 - ◆ Venture capital is frozen
 - ◆ Nanotech firms take a hit and go through downsizing



The real business of nanotech (2015–)

- ◆ Amidst downsizing, nanotech firms become aware of their mission
 - Core competencies (real strengths)
 - Positioning (where to make money)
 - Business models (how to make money)

- ◆ Nanotech moves closer to people's needs
 - From technology development to solution development
 - From “mastering technology” to “combining technologies”



Aiming for a “10-2” business

Creating nanotech products that achieve 1 billion yen in sales and 200 million yen in operating profits

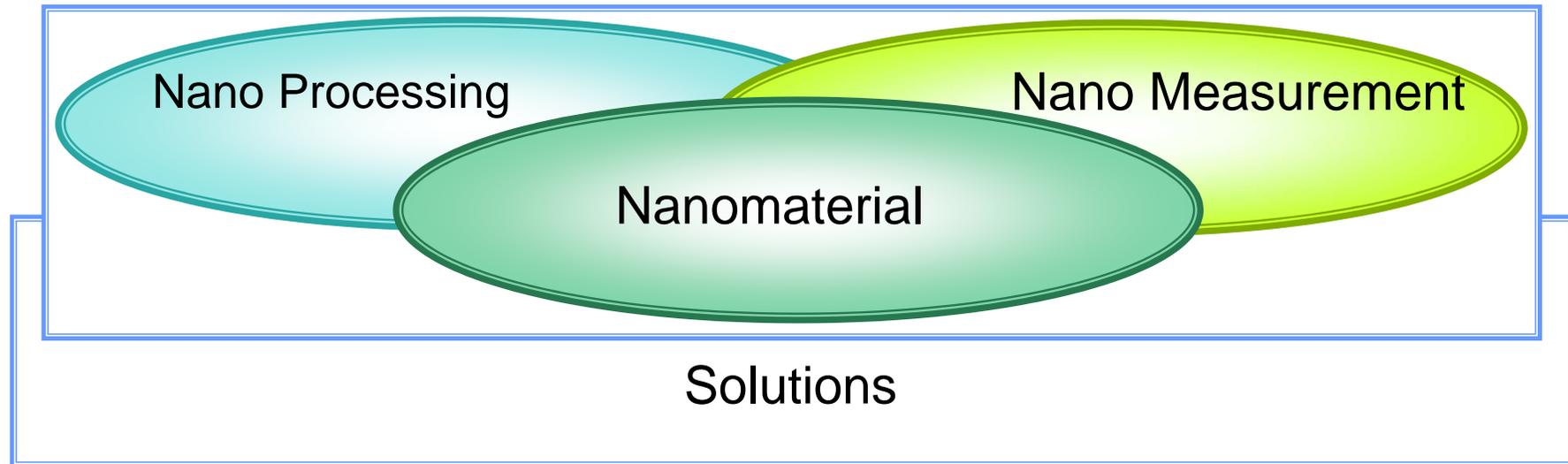
- High-performance nanomaterial
- Photonic crystal
- Nano surface finishing/decoration
- Nanocoating
- Advanced medical materials
- Nanoimprint
- Biochemistry
- Nano inkjet
- MEMS/NEMS
- High-speed AFM



Structure of a business that moves closer to people's needs

- Capture needs directly
- What should be provided are solutions

Nanotech



Customer needs





Structure of a business that moves closer to people's needs

<Case Study> SCIVAX (<http://www.scivax.com/>)

- Nanoimprint started as an alternative technology for semiconductor lithography.
- The company responded by contracting the production of prototypes from clients and pulled in various needs for nanoimprint.
- As a result, the company discovered that there was high demand for technologies to deal with enlargement and curved surfaces even in cases where requirements for precision were not very rigorous. By developing technologies to meet those needs, SCIVAX are succeeding in developing new solutions.
- A few years ago, the company have raised a total of 1 billion yen from the Innovation Network Corporation of Japan and other sources and are moving to volume production. Moreover, the company are now making business development plan rapidly, by collaborating with Toppan Printing Co.Ltd, one of the major printing companies in Japan.



Business models based on “intelligence”

- ◆ Source of profits can be found in “intelligence”
 - Building intelligence-led business models
 - Utilizing partners for production, sales and capital

<Case Study> NanoCarrier (<http://www.nanocarrier.co.jp/>)

- As a pioneer of micellar nanoparticles technology, NanoCarrier was established as a medical product development company utilizing drug delivery systems. In 2009, it was listed on the TSE Mothers market.
- The source of the company’s technology is research by world-class researchers, Professor Kazunori Kataoka of the University of Tokyo and Professor Teruo Okano of Tokyo Women's Medical University.
- NanoCarrier has reduced clinical trial costs of drug development through tie-ups with major corporations including Nippon Kayaku and Kowa.
- In the area of medical material development, the company has capital tie-ups and conducts joint development with Shin-Etsu Chemical.
- Based on all those achievements, the company have been listed in TSE Mothers in 2008, which value is now 350 million dollars.



From individual commissioned production to a mass production system

- ◆ A mass production system based on “intelligence”
 - Bringing in production technology professionals at an early stage
 - Expanding the target market: Needs of developers → Needs of producers → Needs of consumers

<Case Study> Photonic Lattice (<http://www.photonic-lattice.com/>)

- A company established with “photonic crystal” technology developed by Professor Shojiro Kawakami of Tohoku University as its core technology.
- The company develops and manufactures double refraction • phase difference evaluation systems, polarization cameras and photonic crystal elements.
- Previously, photonic crystal slabs were fabricated using electron beam lithography and as each slab was created individually, it was extremely costly.
- The company introduced a production system using nanoimprint technology instead of lithography to cut costs substantially and succeeded in moving to volume production system.
- At present, total sales amount of the company is 3 million dollars and are making profit. They are now expecting to develop further in the field of measurement instruments for lens distortion, and communication devices.



Cultivating markets globally

◆ Nanotech moves into the global market

- Making nanotech into products that can't be found anywhere else in the world
- Aiming for sales in the global market from the startup stage

<Case Study> Research Institute of Biomolecule Metrology (<http://www.ribm.co.jp/>)

- In the 1990s, the company was founded on technology developed in the Biomolecule Visualization Project at the Joint Research Center for Atom Technology (JRCAT) in the former Agency of Industrial Science and Technology (the present Advanced Industrial Science and Technology: AIST). It successfully developed the High-Speed Atomic Force Microscope (HS-AFM), which produces topographical video images at a rate of 20 frames per second (those by other companies produce a single frame in about 2-3 seconds).
- The technology allows the movements of antibodies and DNA to be observed in real time and is evaluated highly by researchers in the field of pharmaceutical development and biotechnology.
- Since its release, the HS-AFM was first sold in Europe and the United States. Later, as its reliability became widely known, it was introduced to leading research institutions and universities in Japan.
- At present, the product is being improved and the company is collaborating with a major measurement instruments manufacturer in preparation for volume production.



Aiming to create an industry

- Realizing dramatically improved cost performance
- Creating new value
- Generating new industries