The world is yours

Nanotechnology in Germany – the investor's perspective

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A presentation to: NanoImpact Tokyo
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A presentation to: NanoImpact, Tokyo
Nanotechnology in Germany

Contents

Brief introduction to 3i

A presentation to: NanoImpact, Tokyo
Brief introduction to 3i

3i – the facts

- A world-leader in private equity and venture capital
- Established for 60 years
- FTSE 100 company valued at €6 billion
- Over 500 trade sales and 83 IPOs in the past 5 years
- Over 250 market-facing investment professionals
- Proven international, cross-border offer

As at 31 March 2005

International scale and reputation

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Brief introduction to 3i

Active across all funding stages

Venture capital

Early stage
Focus on technology

Total investments of €2-50 million

€1.1 billion portfolio*

Private equity

Growth capital

A range of bespoke solutions

Investments of €10-100 million

€2.1 billion portfolio*

Buyouts

Smaller & mid-market buyouts

Transactions up to €1 billion

€3.7 billion portfolio*

As at 31 March 2005

*portfolio value including co-invested funds

An exceptional range of venture capital and private equity solutions

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Brief introduction to 3i

3i's global venture capital team

3i team

3i portfolio of companies

Corporate relationships

Management teams and entrepreneurs

Advisers and intermediaries

Sector communities

3i's people programmes

3i - connecting talent and experience

Overview over German nanotechnology infrastructure

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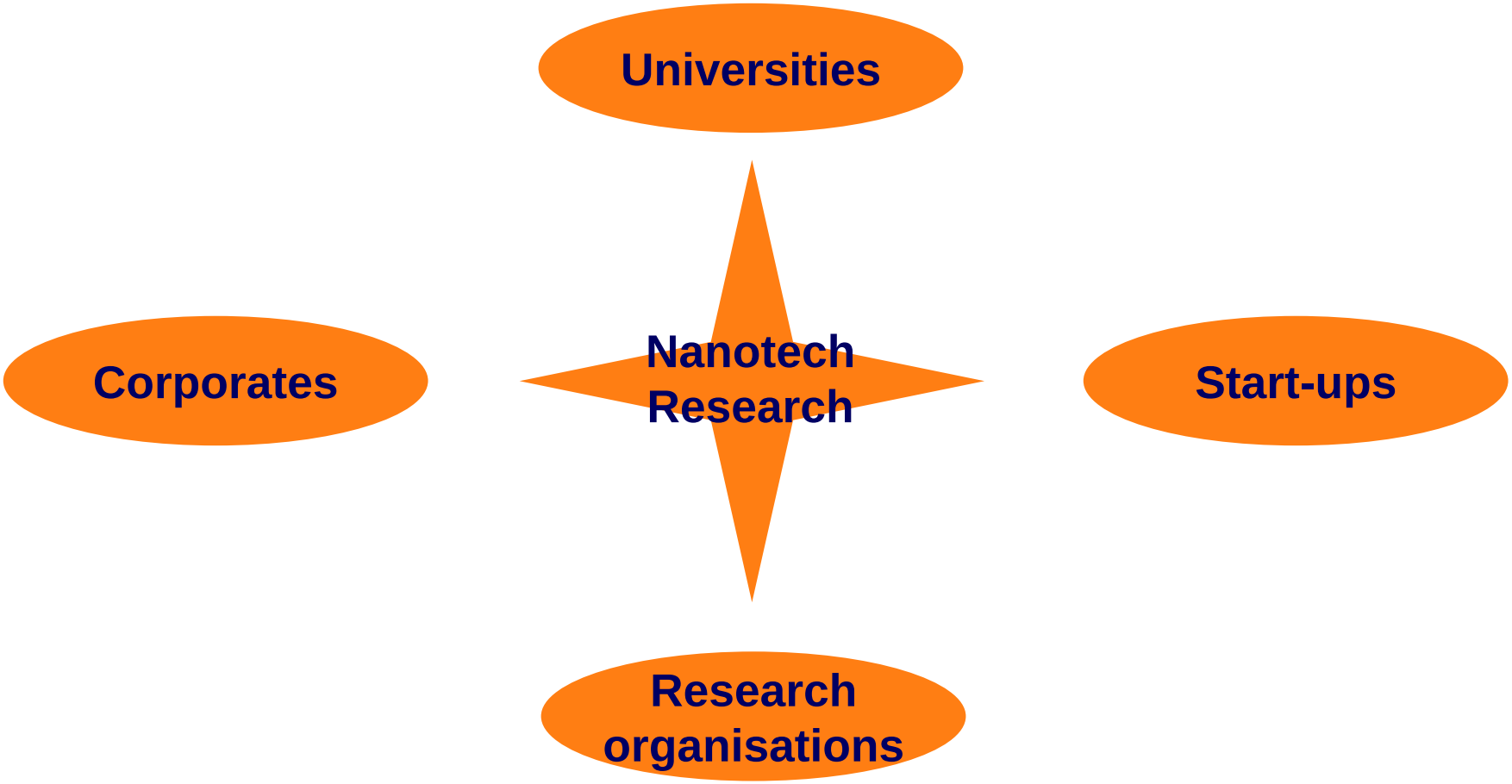
Overview: German nanotechnology infrastructure

Nanotechnology research conducted both in public and private sector



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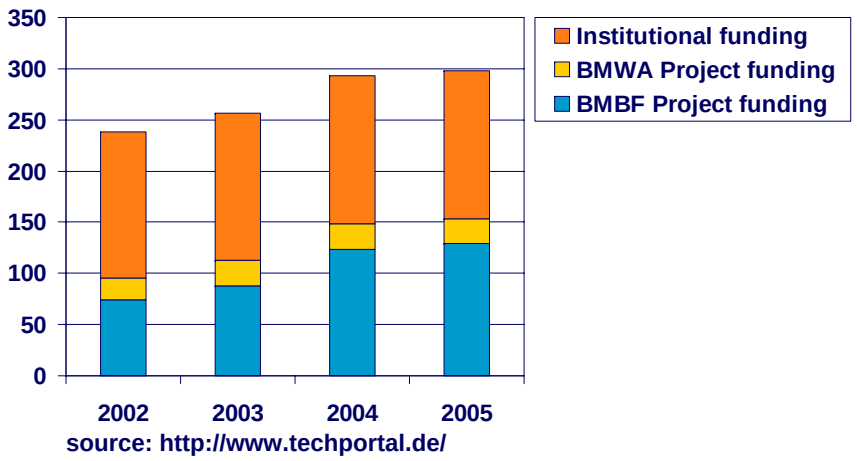
Overview: German nanotechnology infrastructure

Government has increased funds for nanotech research projects continuously



source: http://www.techportal.de/

BMBF funding(in mn €)	2002	2003	2004	2005
Nanoelectronics	19,9	25	44,7	46,2
Nanomaterials	19,2	20,3	32,7	38,1
Optical technology	18,5	25,2	26	26
MEMS	7	7	9,4	10,2
Communications	4,3	4	3,6	3,4
Nanobiotechnology	4,6	5,4	5	3,1
Production technology	0,2	0,8	2,2	2,2
Sum	**73,7**	**87,7**	**123,6**	**129,2**

source: http://www.techportal.de/

Main areas in 2005 are Nanoelectronics, Nanomaterials and Optics

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Overview: German nanotechnology infrastructure

Project funding is complemented by funding for institutions

Nanotechnology funding (in mn €)	2002	2003	2004	2005
BMBF	73,9	88,2	123,8	129,2
BMWA	21,1	24,5	24,5	23,7
DLG & Caeser	61,8	63,3	64	64,4
Wissensgemeinschaft G.W. Leibnitz	23,7	23,6	23,4	23,5
Helmholtz-Gemeinschaft	38,2	37,1	37,4	37,8
Max-Planck-Gesellschaft	14,8	14,8	14,8	14,8
Fraunhofer-Gesellschaft	4,6	5,4	5,2	4,9
Sum	**238,1**	**256,9**	**293,1**	**298,3**

source: http://www.techportal.de/

Private sector also contributes significantly

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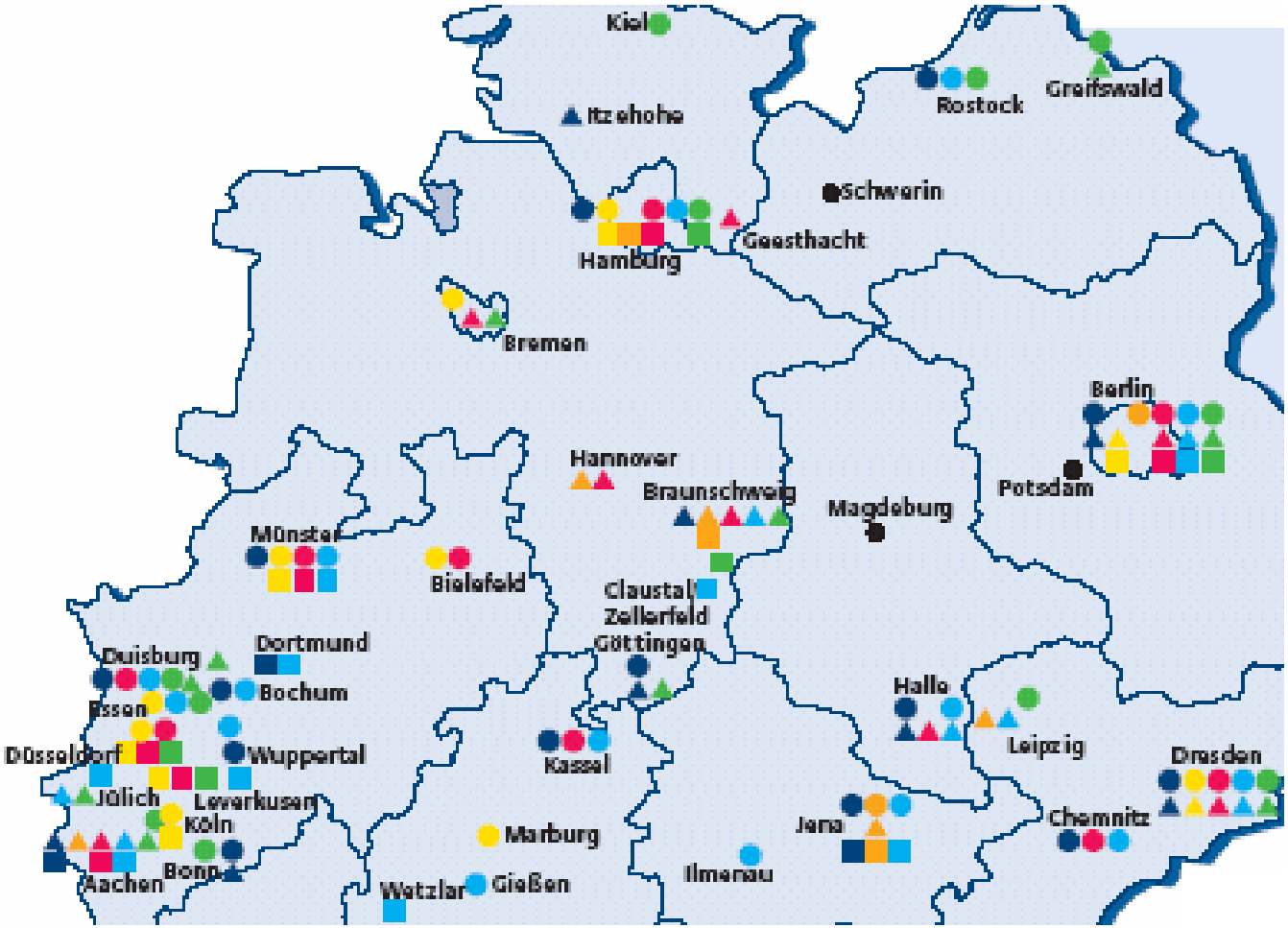
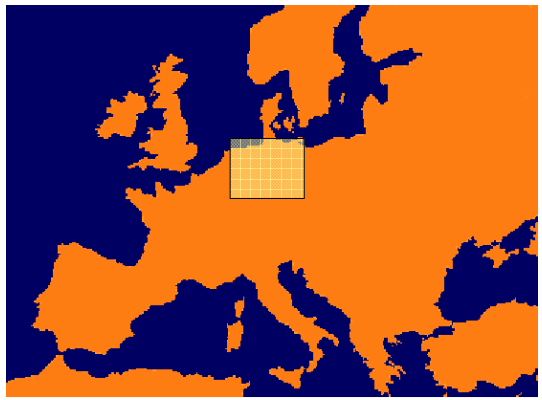
Overview: German nanotechnology infrastructure

Research is highly decentralized (I)



- Ultrathin layers
- Lateral nanostructures
- Nanoparticles
- Molecule architectures
- Ultraprecise surface treatment
- Measurement and analysis of nanostructures

- University research
- Non-university research
- Companies



source: Bundesministerium für Bildung und Forschung, Nanotechnologie erobert Märkte

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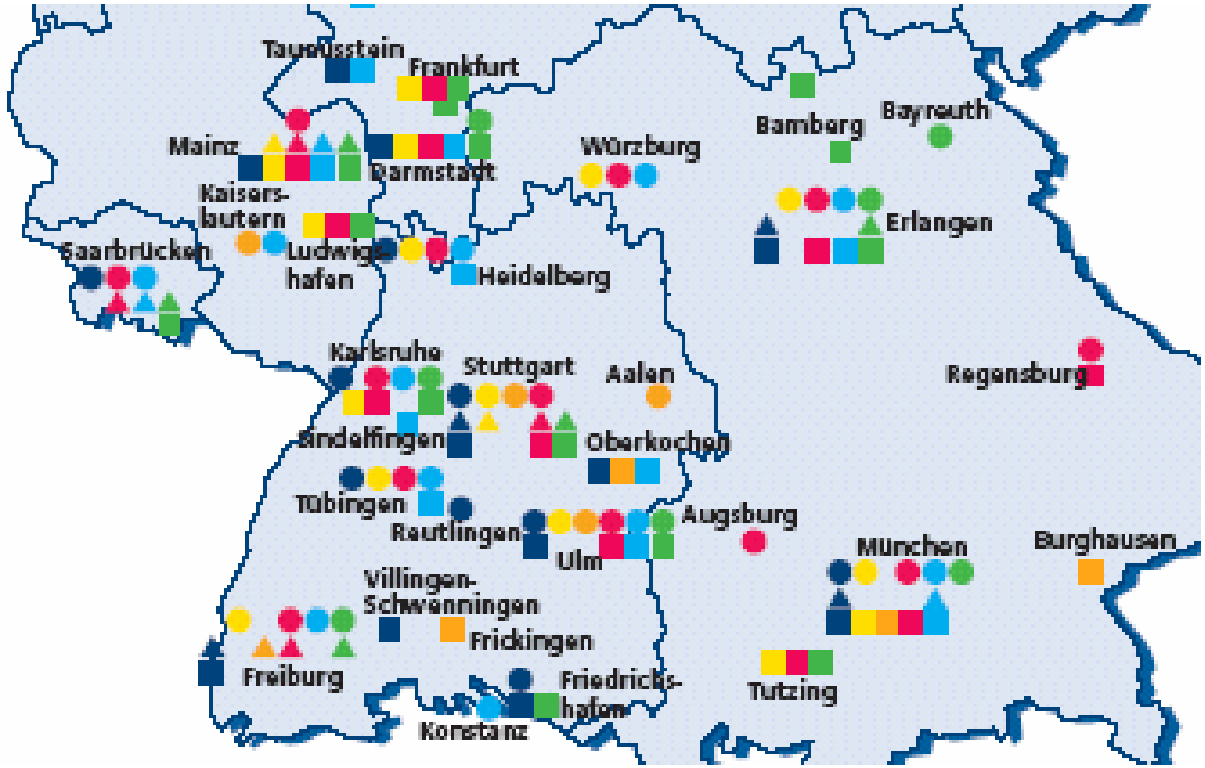
Overview: German nanotechnology infrastructure

Research is highly decentralized (II)



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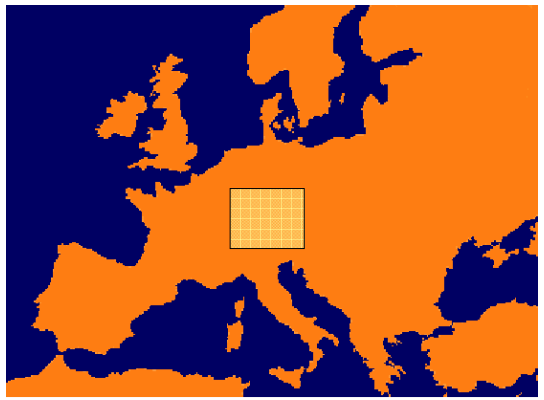

source: Bundesministerium für Bildung und Forschung, Nanotechnologie erobert Märkte

US funding is of comparable size

Nanotechnology funding (in mn €)	2002	2003	2004
NSF	204	221	249
DoD	204	221	222
DoE	89	133	197
NIST	77	66	62
NIoH	59	65	62
NASA	35	33	31
Others	9	9	18
Sum of U.S. funding	**677**	**748**	**841**
Sum of EU funding	**480**	**700**	**740**
thereof German funding	**240**	**250**	**290**

source: http://www.sc.doe.gov/

Areas of interest for a venture capital investor

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Areas of interest

Nanotechnology spans a wide spectrum of R&D

Application areas	Examples	VC Interest
Precision mechanics/optics/analysis	MEMS, Array optics, Diode lasers	Medium - High
Chemistry/Materials	Carbon nanotubes, functional coatings	Medium
Energy/Environmental technology	Hydrogen storage, Dye solar cells	Medium - High
Medicine/Life Science	Tissue Engineering, Drug Delivery, Lab-on-a-chip	Medium - High
Automotive construction	Nano-particles, anti-reflection coatings	Low
Electronics/Information technology	Spintronics, OLED, GMR sensors	Medium

Source: Bundesministerium für Bildung und Forschung

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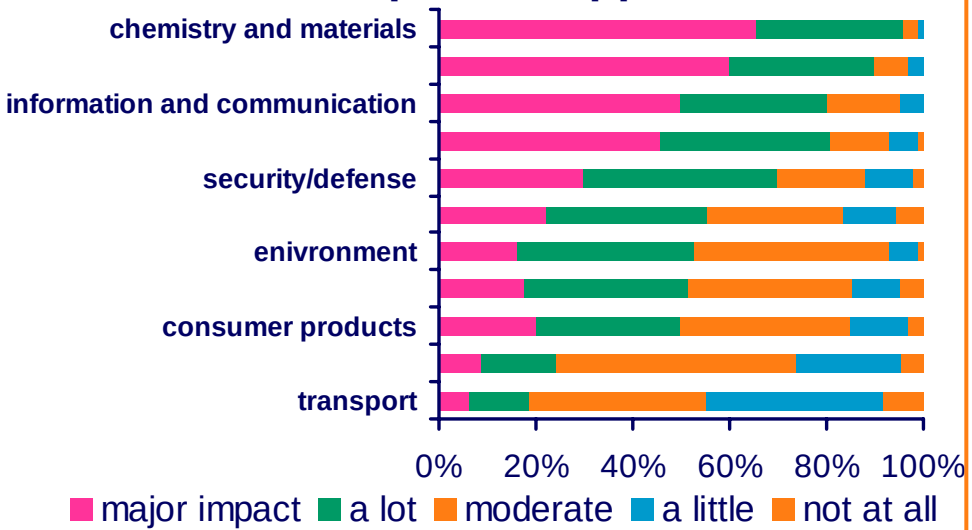
Areas of interest

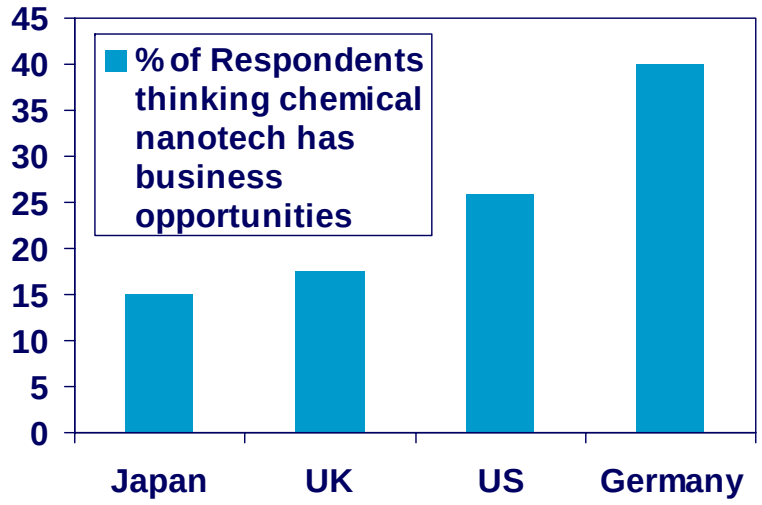
In Germany chemical nanotech is one of the focus areas

Most important applications:



Source:European Strategy for Nanotechnology

Opportunities with Chemical Nanotech?



Source:3i Survey

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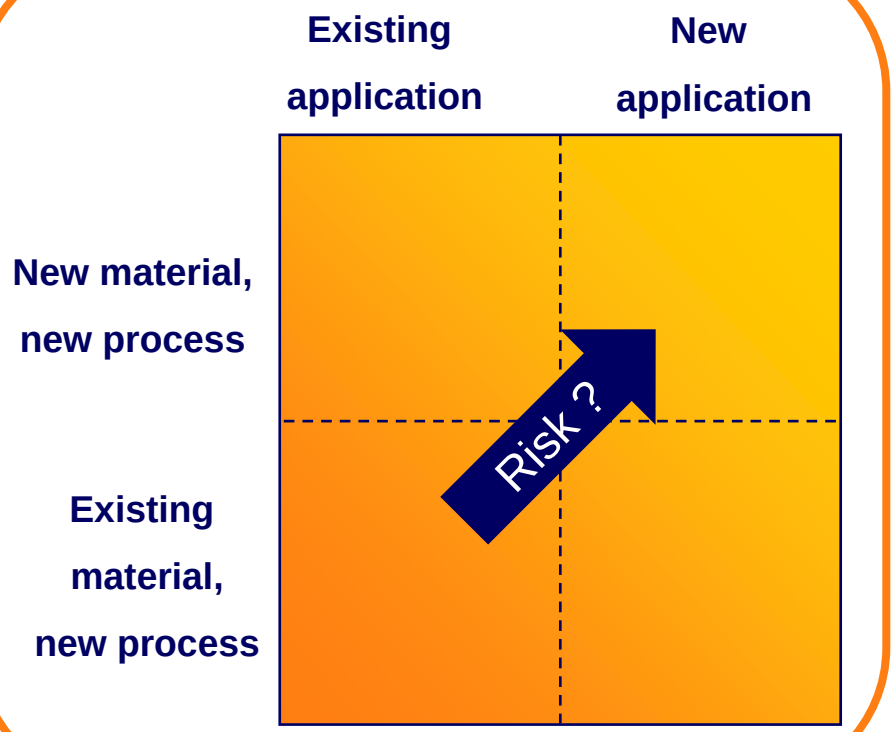
Areas of interest

Appetite with regard to risk / return profiles varies widely



Innovation process

- Core R&D
- Materials Development
- Application Support
- Manufacturing

Challenges associated with VC investments in nanotech

Nanotechnology investing is still in infancy

- Often interesting technology without real, large-scale market need
- Lack of proven business models
  - Materials production (difficult position in value chain, in-house manufacturing not easy for start-up)
  - Licensing (limited value capture)
  - Capital equipment (cash requirements!)
- Long timeframes from research via development to commercialization (40% IRR attainable?)
- Existence of exit markets (especially materials)
- Proven management teams willing to take risks and looking for rewards the VC environment can offer

Examples of German nanotechnology start-ups

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Examples

Advanced Materials and Processes: Other
High throughput experimentation services and equipment

- High throughput experimentation allows acceleration of catalyst development processes
- hte is providing high throughput to chemical and petro industry
- In addition, hte is working on an own line of blockbuster products such as Diesel catalyst
- Customer benefits:
  - Substantial R+D and manpower savings
  - Full offerings of service, know-how and equipment
  - Reduction of development time by a factor 100 to 1000
- Target Markets: Oil & Gas Industry, Chemical Industry, Automotive.

hte AG

- Location: Heidelberg, Germany
- Website: **www.hte-company.de**
- 3i contact: Andreas Kochhäuser, +49 711 222922 0, andreas_kochhaeuser@3i.com
- Dirk Demuth, CEO, +49 6221 74970 dirk.demuth@hte-company.de

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Examples

Nano-coating techniques for every surface

- Nanogate concentrates on inorganic-organic nanocomposites as well as self-organising nano-structures based on chemical nano-technology
- As a complete-services provider Nanogate provides ranges from innovation consulting to materials engineering, production, applications support and marketing all the way to high-availability service.
- The company's focus lies on materials-based processes to develop, manufacture and market multifunctional materials.

Nanogate Technologies AG

- Location: Saarbrücken, Germany
- Website: **www.nanogate.de**
- 3i contact: Sören Schuster, +49 711 222922 0, Soeren_Schuster@3i.com

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