

# Nanotech: Rolling to Market

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EPA Grantees Meeting

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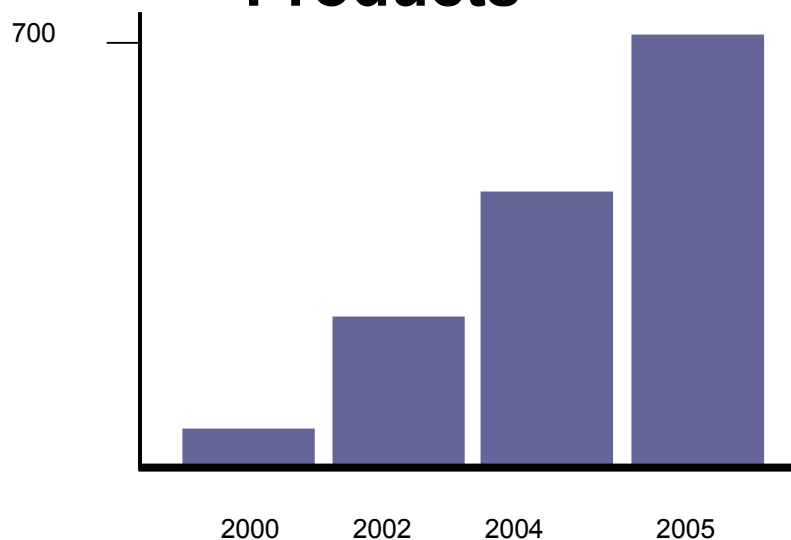
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Project on  
**Emerging Nanotechnologies**  
at the Woodrow Wilson International Center for Scholars



# Products on the Market

## Nanobased Products



**A survey by *Small Times* magazine identified over 1600 companies involved in nanotech, with more than 700 products being produced. An internal EPA survey identified over 270 firms with products on the market.**



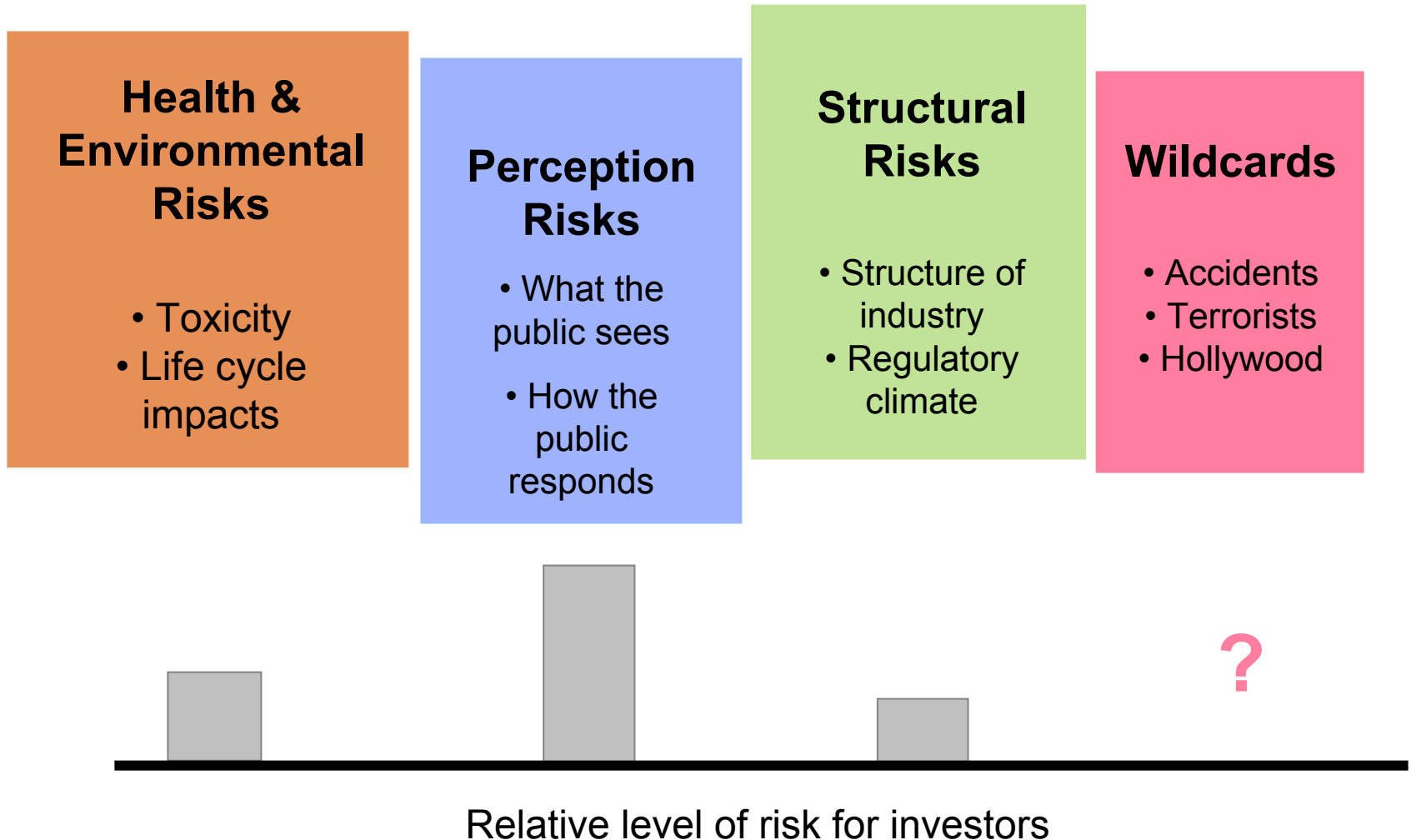
**Asset or Liability?**



nano = "cool"



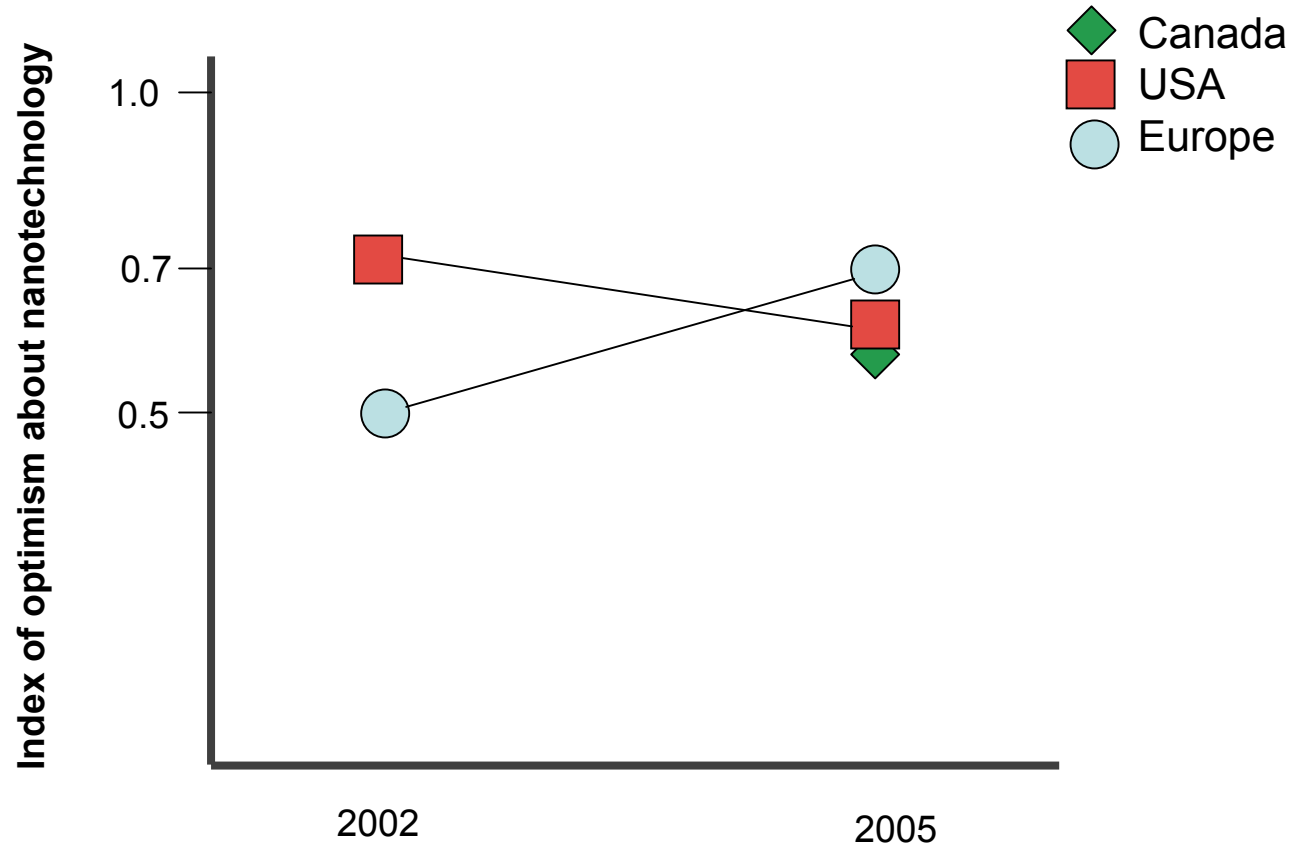
# Where are the Risks?



# Perception Risks: The Ever Fickle Consumer

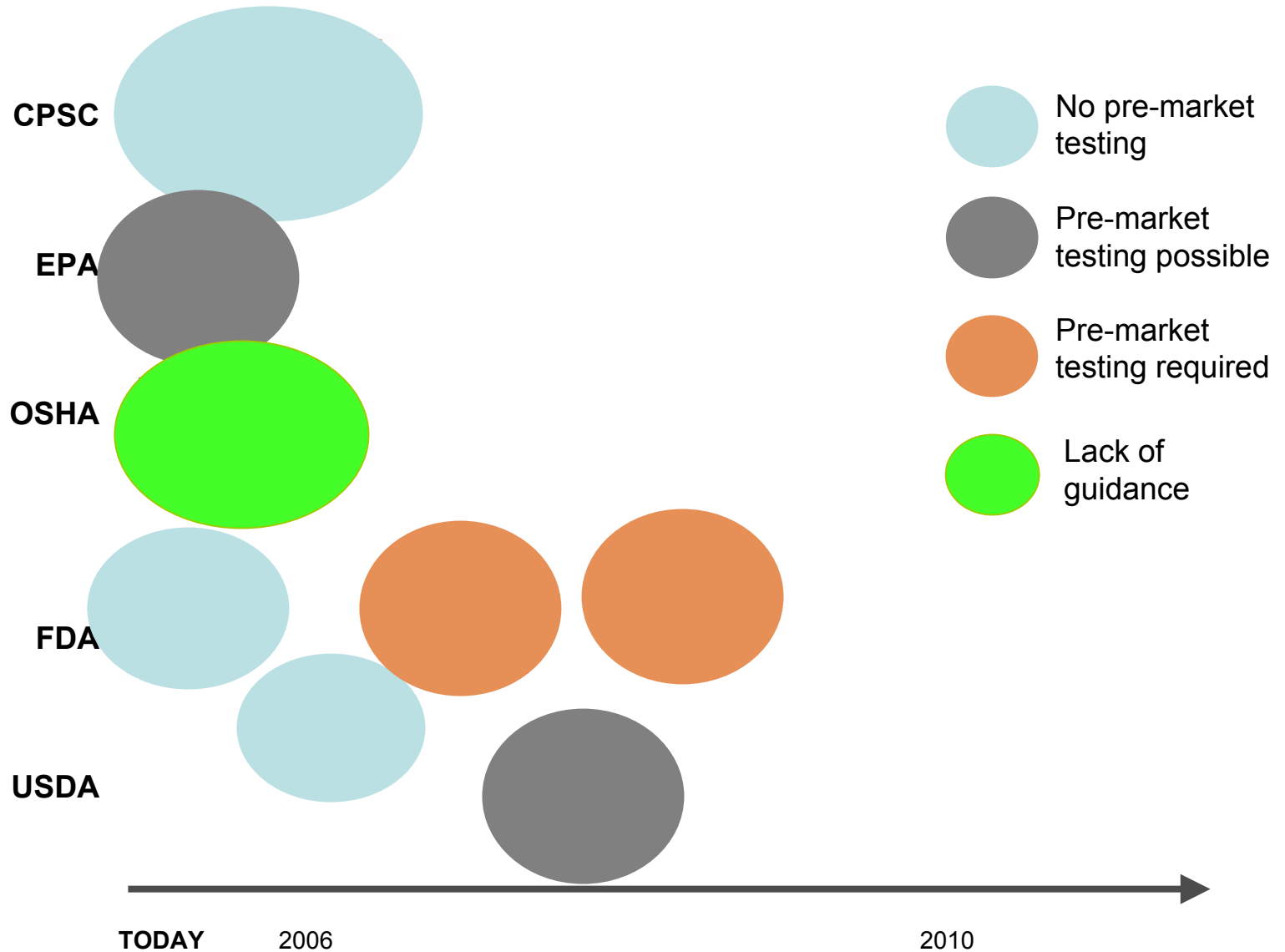
- 60 - 70 percent of the public have never heard of nanotechnology (US, UK, and Canadian studies).
- Once informed, public is excited about benefits in areas such as medicine, health, environment, and energy.
- Trust in both industry or government to manage any risks associated with nanotechnology is low to very low.
- Trust can be enhanced through pre-market testing, more disclosure/transparency, and clear concern for environmental and human health impacts.

# Optimistic about Nano?



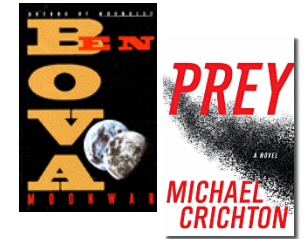
Source: Eurobarometer

# Structural Risks: Gaps in the Regulatory System



# Wildcard: Who Controls Message?

- Over 20 science fiction novels since 1982, including Michael Crichton's *Prey*.



- Variety of films including Spiderman II



- Console video games (*NanoBreaker* & *James Bond 007: Everything or Nothing*)



**Nanobreaker** for PS2

- Embedded messages in ads





# Rolling to Market



OSHA Inspector shows up  
Go Directly to Jail

EPA Declares your  
Nanoparticle a New Chemical  
under TSCA  
Pay \$1 million

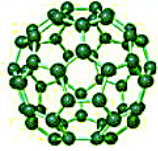
Product endorsement  
in Sierra Club Magazine

Collect \$500,000

You win IP battle with a  
competitor

Collect 5 patents

# Green Nan



Large Potential Benefits  
Low Perceptual Risks

**Dark Green:** Nanotechnology is applied directly to solve environmental problems.

**Light Green:** Nanotechnology provides environmental benefits for other applications.

**Right Green:** Nano-based processes and products are designed to be environmentally low-impact (life-cycle-analysis, design for environment, etc.).

# Critical **Green** Nano Applications

- New materials (lighter, stronger, biodegradable)
- Functional surfaces (antimicrobial, self-cleaning, biocompatible)
- Sensors (lab-on-a-chip, smart tags, biosensors)
- Renewable energy production (hydrogen production/storage, photovoltaics, fuel cells, waste heat recovery)
- Membranes (desalination, filtration, fuel cells)

# Green/Clean Benefits

*“Companies rarely, if ever, take the trouble to communicate to prospective customers all the economic, technical, service, and social benefits they provide.”*

**Tangible Financial Benefits:** Performance that sellers and customers can verify (energy saved, longer life, avoided costs, etc.)

**Nontangible Financial Benefits:** Sellers can convey but buyers cannot easily validate (safety, environmental compatibility, reductions in long-term liability).

**Tangible Nonfinancial Benefits:** Difficult for sellers to quantify but buyers perceive and react positively to it (service).

**Nontangible Nonfinancial Benefits:** Buyers and sellers cannot quantify, but often key to customer retention (environmental commitment).

# U.S. Green Nano Program

- Create at least one dedicated NSF/EPA-funded Center for Green Nano
- Create database of green nano research and researchers and make it available for investors
- Maximize dual use opportunities
- Ensure technology verification for nano-based products
- Utilize government procurement system to pull green nano products into the marketplace.
- Focus SBIR grants for on Green Nano

# Critical Success Factors

- World class science and engineering
- An informed and engaged public
- An innovative and adaptive policy framework

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