FROST & SULLIVAN

Markets & Trends for Micro & Nano Technologies

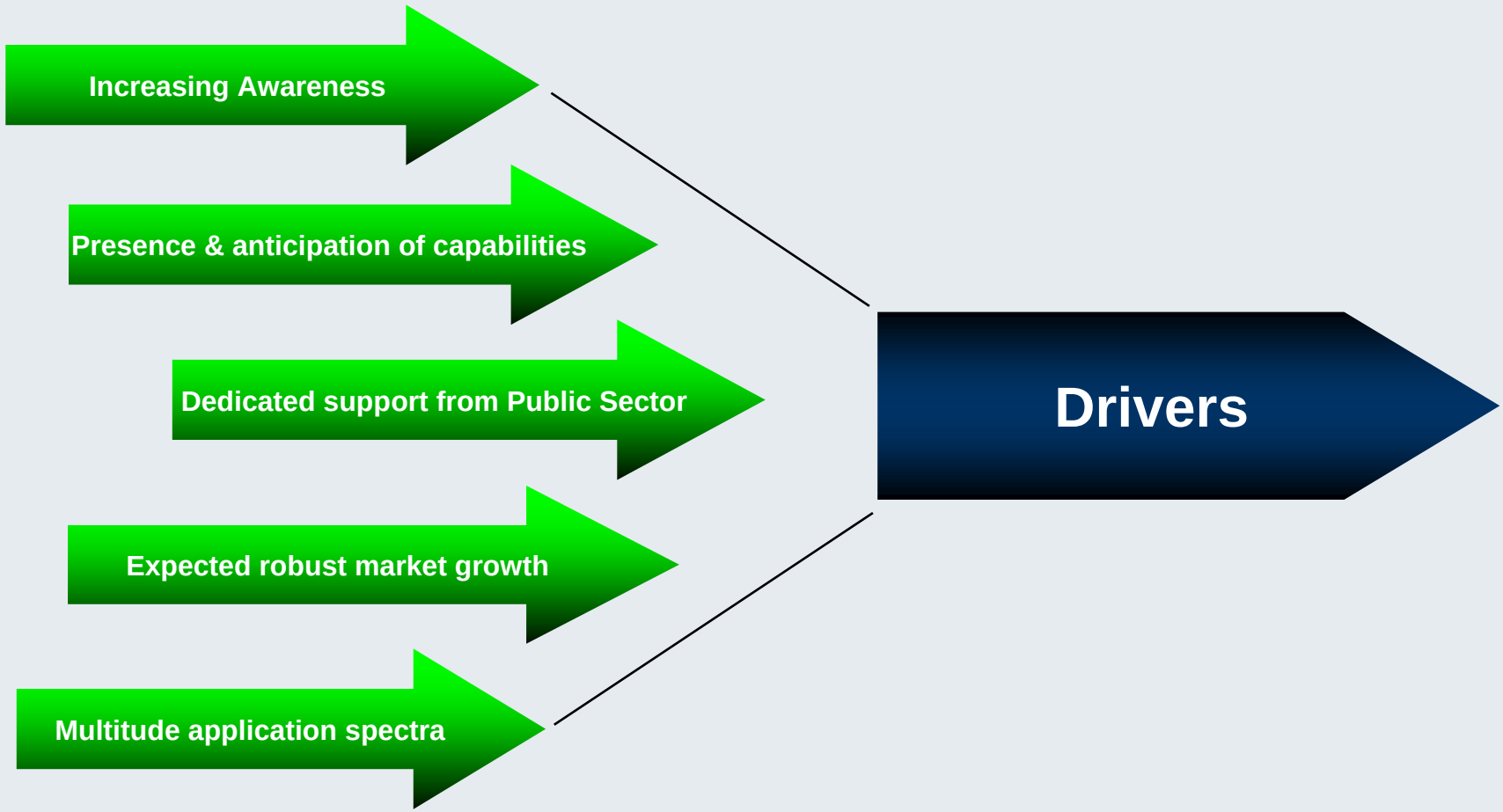
- Technical Insights Division

"Partnering with Clients to Create Innovative Growth Strategies"

Agenda

- Analysis Framework
- Drivers & Challenges – MNT Technologies
- Market Potential – Nanotechnology
- Stakeholder Analysis – MNT Technologies
- Technology & Market Trends – MNT Technologies

Drivers – MNT's

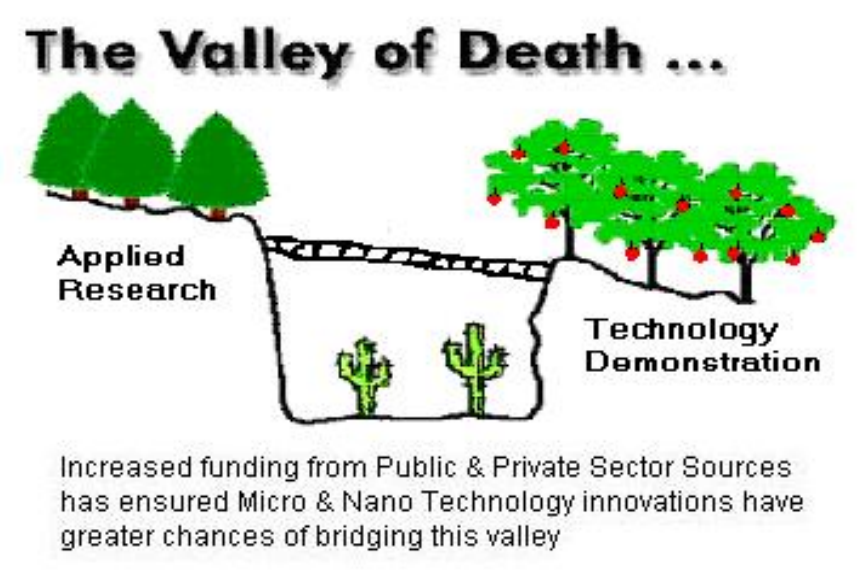


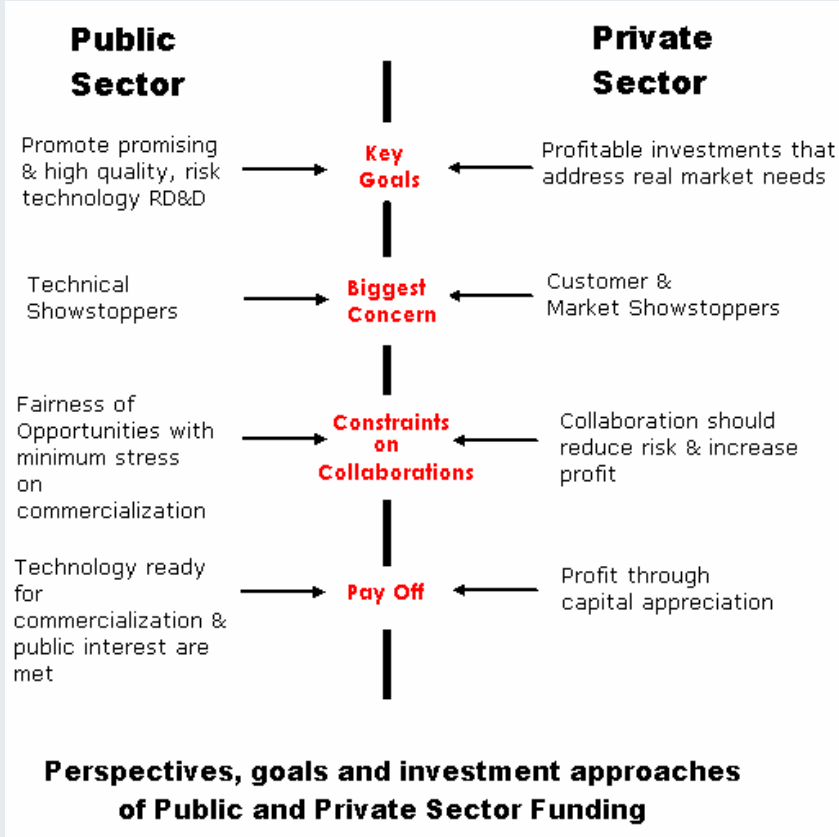
Fueled by a steadily growing commercial interest in MNT's, there will be greater close knit interaction & involvement of stakeholders, triggering high levels of adoption in the next decade.

Challenges – MNT's

These issues need to be emphatically addressed so that MNT technologies can be commercially viable and address a multitude of application needs

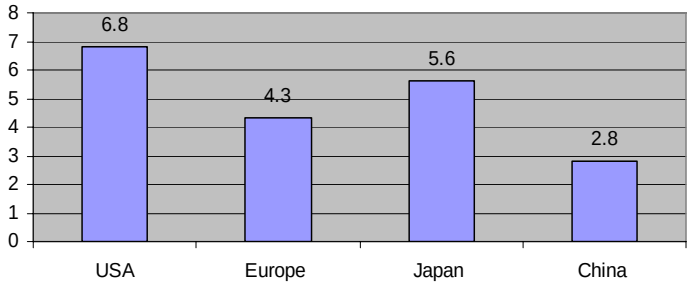
Technology Transfer Opportunities





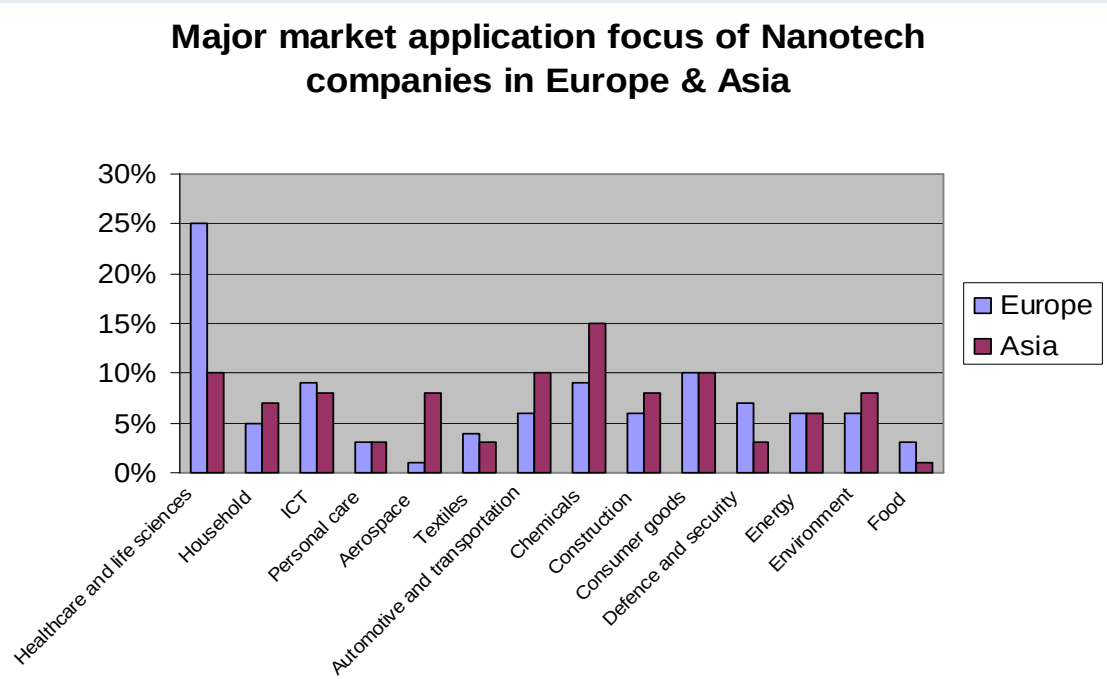
MNT's have evolved over time due to the nature of their value proposition. With the constant funding support from both public and private sector sources, MNT has matured in terms of MNT-enabled products that address a multitude of applications in supportive and disruptive roles.

Nanotechnology Potential



✓Asia Pacific governments & companies are showing more enthusiasm for nanotech strategies and initiatives than their counterparts in Europe

✓There are about 300 companies involved in nanotechnology in Europe and more than 250 in the Asia Pacific region



Global Market Potential

Frost & Sullivan studied R&D expenses for US nanotech industry

Stead growth between 1998 to 2001 but slowed in 2002-2003. However, after that recovered and jumped 10.7% from $278.2 M (2003) to $308.1 M (2004)

On average US nanotech industry spends 15% to 20% of revenues on R&D – typical for early-stage tech-intensive industry

Analysts estimate that VC funding in nanotech startups reached $820 M by 2007

Long gestation periods can discourage investment

However, increase in deals struck: averaged $9.6 M in 2005, $11.5 M in 2006

Through 1/2007, approx. 150 VCs made investments in nanotech startups

At least a dozen of the nanotech startups managed IPOs

Total nanotech R&D spends (by governments, companies, and VCs) exceeds $8 billion

More than half coming from government sources

Global Market Potential (Contd.)

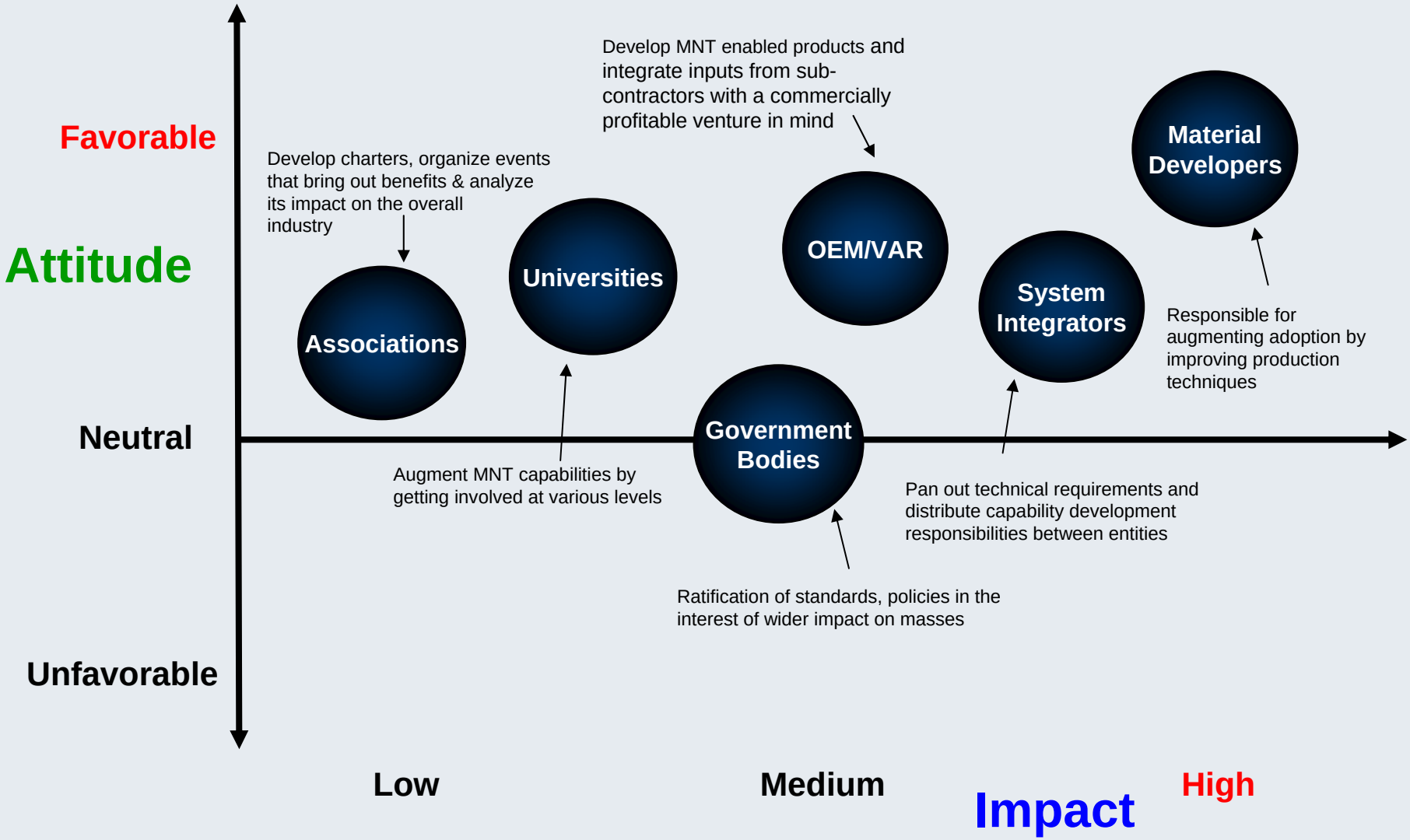
Nanotech 'bubble' – will enthusiastic investors bail out when nanotech products take longer to market?

- Most probably not – scenario very different from the dotcom bubble
- Shortage, selectivity of scientists/engineers who're are key to further exploration through R&D
- Startup companies tend to be spun out from universities with substantial research programs
- However, dotcom bubble has made VCs wary

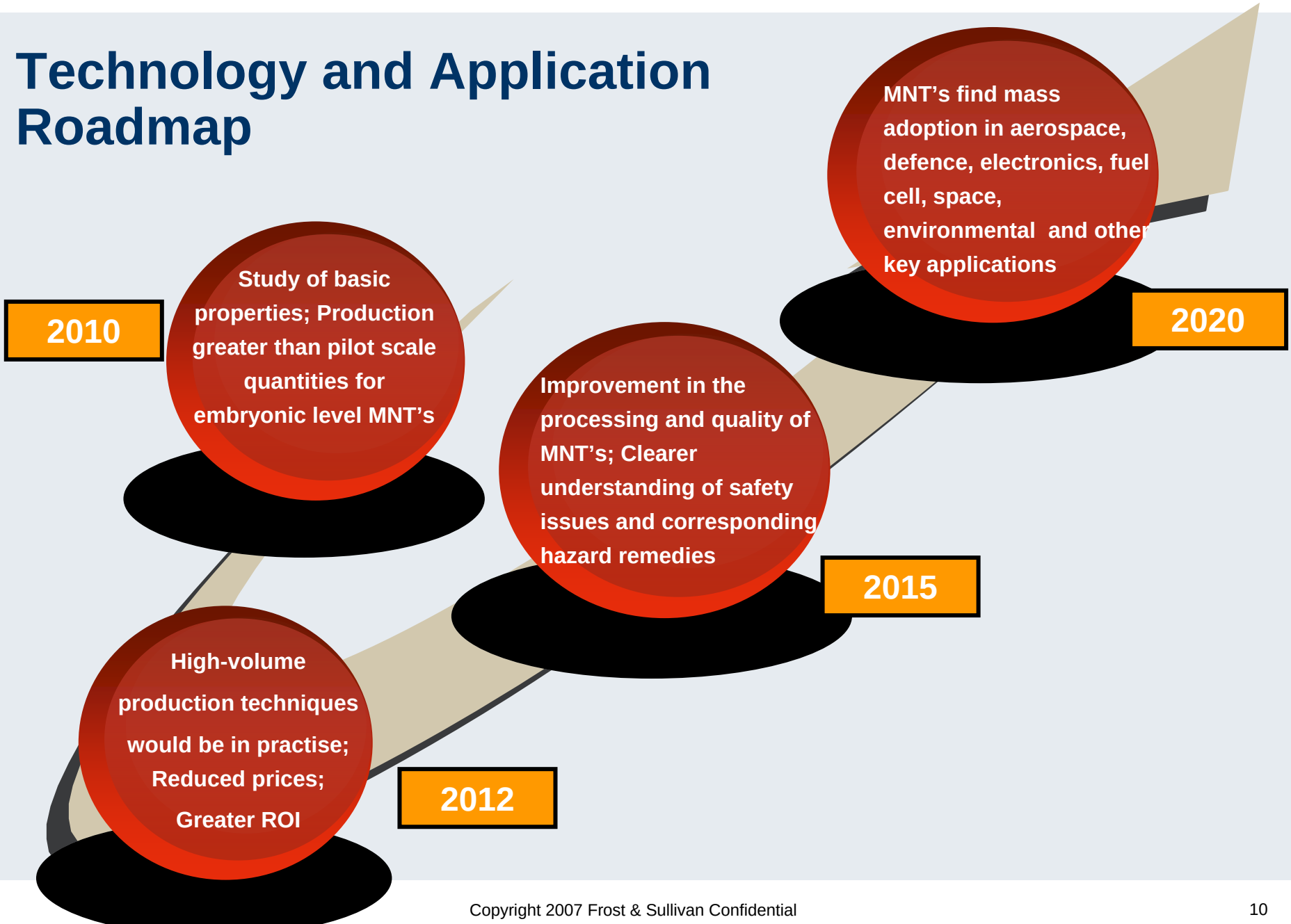
While startups drive nanotech R&D, big companies are important

- Compared to other sectors, large firms like nanotech
- In general, Frost & Sullivan has seen that large firms invest in nanotech R&D even when they have established investments in conventional technology
- Progress, funding, development in these organizations tends to be highly secretive

Stakeholder Analysis



Technology and Application Roadmap



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Thank you for your time and interest …