



The 2004 European NanoBusiness Survey:  
"Use it or Lose it"

The European NanoBusiness Association  
P.O. Box 65,  
Avenue Louise 250,  
050 Brussels,  
Belgium.  
Tel. +34 91 640 74 40  
Fax +34 91 640 71 86



## CONTENTS

<b>1</b>	<b>ABOUT THE EUROPEAN NANOBUSINESS ASSOCIATION.....</b>	<b>3</b>
<b>2</b>	<b>RESULTS AT A GLANCE .....</b>	<b>4</b>
2.1	Business Perception.....	4
2.2	Public Perception.....	4
2.3	European Union Policy .....	4
<b>3</b>	<b>THE 2004 EUROPEAN NANOBUSINESS SURVEY .....</b>	<b>5</b>
<b>4</b>	<b>THE TRENDS .....</b>	<b>6</b>
<b>5</b>	<b>CONCLUSIONS.....</b>	<b>7</b>
<b>6</b>	<b>THE RESULTS .....</b>	<b>8</b>
6.1	Participants.....	8
6.1.1	Location.....	9
6.2	Economic effects of nanotechnology .....	11
6.3	Information.....	14
6.4	Public Perception.....	16
6.5	Regulation .....	18
6.6	European Winners and Losers.....	22
6.7	Global Winners and Losers .....	24
6.8	The European Commission .....	26



## **1 ABOUT THE EUROPEAN NANOBUSINESS ASSOCIATION.**

The European Nanobusiness Association (ENA) is an industrial and trade organisation founded to promote the professional development of the emerging business of nanotechnology at the European level. It reflects the requirements of its member corporations, associated professionals and existing regional nanotechnology associations through:

- Providing education for the public
- Writing of position papers
- Analysis of legislation,
- Drafting of standards
- Providing expert testimony to political leaders and decision makers.

The ENA was formed to ensure that Europe has a dynamic and competitive nanotechnology based industry.

The aims of the association are to:

- Discuss and promote the development of a dynamic nanotechnology based industry
- Build a common forum through which to rapidly share and disseminate well-researched and realistic information for its members and for public education
- Promote the development of promising technology arenas
- Connect its members with the local and global nanotechnology community
- Monitor and benchmark Europe's competitive position in relation to the building and commercialisation of nanotechnology



## 2 RESULTS AT A GLANCE

### 2.1 Business Perception

- 90% of companies believe that nanotechnology will have an influence on their business,
- 55% think this will happen within three years
- 84% believe that nanotechnology will have a significant effect on their competitiveness

### 2.2 Public Perception

- 74% say that negative public reactions to nanotechnology *will not* affect their use of nanotechnology
- 81% say that it *will* change the way they market nanotechnology based products.

### 2.3 European Union Policy

- Over 57% of respondents believe the European Commission is not doing enough to promote adoption of nanotechnology by European industry
- 72% believe that the EU programs are too biased towards academics
- 98% believe EU funding should be increased.



### 3 THE 2004 EUROPEAN NANOBUSINESS SURVEY

While much has been made of the effects of and attitudes to nanotechnology by business most of the evidence to date had been anecdotal. The 2004 ENA NanoBusiness Survey is the first attempt to measure quantitatively the attitudes of European business to questions such as business impact, the effects of regulation, public perception of nanotechnology and the performance of the European Commission.

The survey was conducted between January 17<sup>th</sup> and February 13<sup>th</sup> 2004. Responses were received from a total of 236 participants (224 online and 12 by fax, and 192 from Europe). In some cases, where the answers to some questions received only a small number of responses, these choices have not been included in the final results. In these cases the total responses do not add up to 100%.

The main results are presented below. The survey included other questions, and text responses have also been received from many participants. These have been included where appropriate. The results presented below represent responses from participants in the European survey. Full results from the rest of the world will be available in a separate document, and selected responses are included where relevant.

***The full results are available upon request to European NanoBusiness Association members in XML, text or crosstab format for statistical analysis.***



## 4 THE TRENDS

Four broad trends emerge from the results.

1. Firstly, despite inherent bias due to the survey respondents being drawn, in the main, from companies with an interest in nanotechnology, the consensus is that nanotechnology will have a major effect on the European economy. Furthermore, the effect is imminent, with a majority thinking that this will be within three years.
2. Despite European nanotechnology spending being on a par with that in the rest of the world, the message is not getting through. Both business and the public is poorly educated about nanotechnology, and this poor perception is due to poor communication by scientists and governments alike.
3. Business is extremely concerned about regulation and the majority of respondents felt that regulation would have an impact on their business. While regulation, when handled correctly, can have a positive effect, the recent experience of Genetically Modified Organisms (GMOs) shows the global consequences of getting it wrong.
4. The final trend is a feeling that the European Commission could do more both in terms of funding and regulation. The majority of participants are looking to Brussels for a lead in setting the course of regulation. While many participants feel that the Commission instruments are too biased towards academia, nanotechnology is still an emerging technology and it is unsurprising to see the major thrust aimed at R&D rather than manufacturing.



## 5 CONCLUSIONS

***European governments and businesses can not afford to waste the economic opportunity being handed to it on a plate by European research community.***

Nanotechnology is already affecting companies from Merck through ST Microelectronics to DaimlerChrysler. Europe needs a dynamic and coordinated effort to ensure that the world class academic work is effectively transferred to European industry. The alternative is continued sluggish economic growth while Europe falls further behind in terms of competitiveness.

***Europe is not getting the message across.***

The combination of national and EU initiatives, combined with public ignorance of nanotechnology is sending confusing messages. While much is made of European research, too little is made of real world applications of nanotechnology, and its relevance to the competitiveness of European business and the daily life of European citizens.

***Regulatory bodies need to look beyond nanotechnology and understand the uses to which it being put.***

It is not enough to simply discuss the regulation of nanotechnology. The term nanotechnology encompasses a wide range of technologies, and regulators would face the same difficulties as regulating Chemistry of Physics. To complicate matters, the definitions of nanotechnology are as broad as its applications.

As there is no nanotechnology industry, simply a collection of diverse businesses exploiting nanoscale phenomena, a single regulatory body would be overwhelmed by the diversity of issues. Furthermore, the same nanoparticle, for example titanium dioxide, is used in cosmetics, paints, antibacterial textiles or flexible solar cells, each application raising its own regulatory issues under the relevant legislation for that application. .

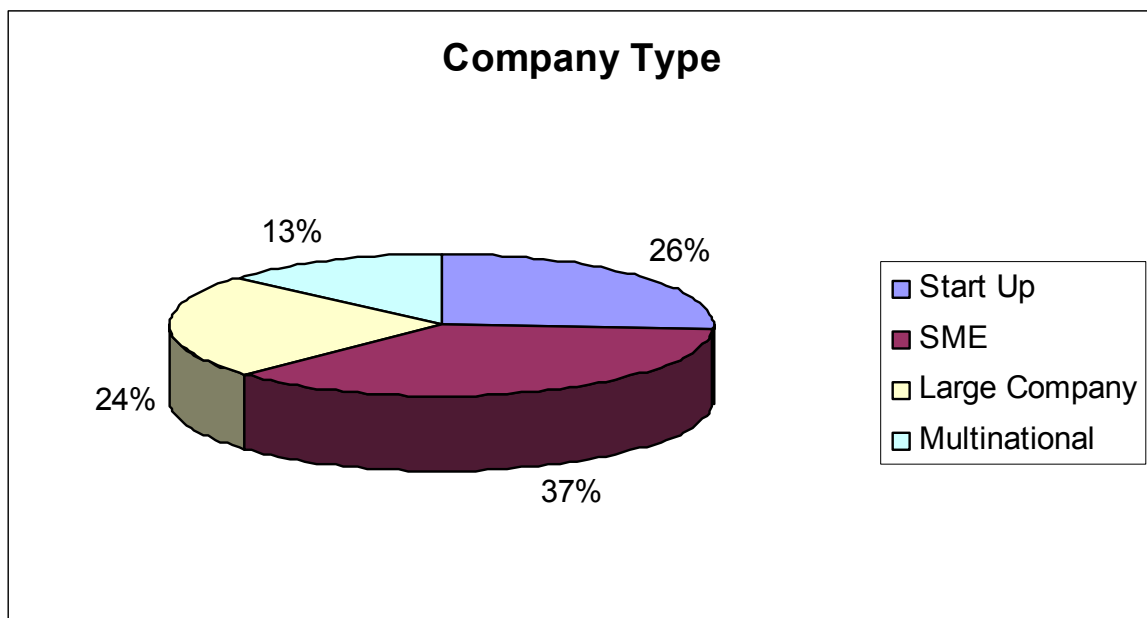
***The European Commission, while ensuring that European nanoscience is world class, needs to do more to translate this into economic competitiveness.***

Funding basic research is only a part of the solution, and European business needs to be more involved in the decision making process for all aspects of nanotechnology, be they academic research priorities or regulatory issues.

Furthermore, the Commissions attempts to communicate its nanotechnology policies and objectives have been so far ineffective. A cursory glance at the Commissions Cordis website and that of the US NNI will illustrate this. The fact that the majority of Europeans are less confident about European prospects for nanotechnology than participants from the rest of the world indicates that urgent action is needed.

## 6 THE RESULTS

### 6.1 Participants

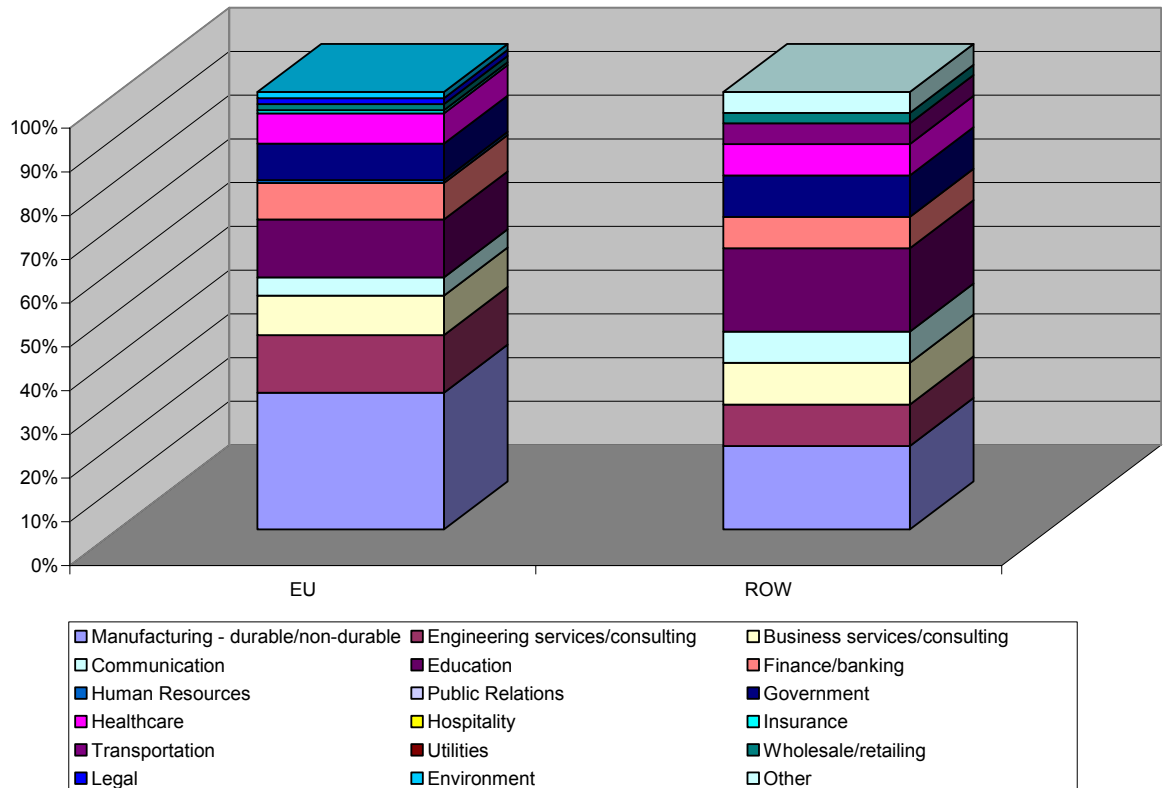


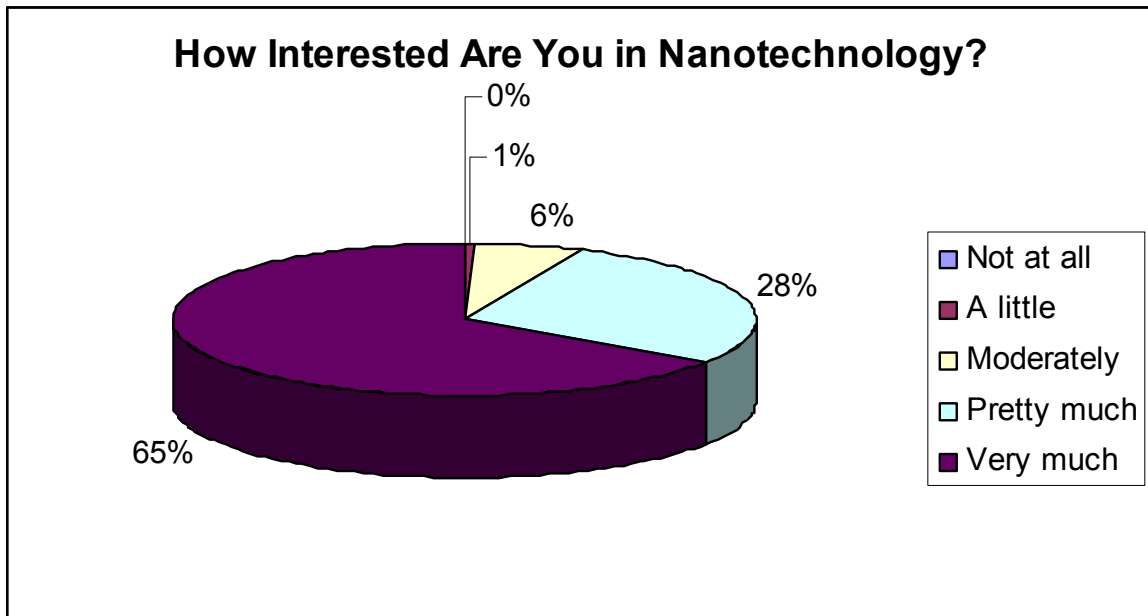


### 6.1.1 Location

Two parallel surveys were conducted, one for respondents within Europe, the other for the rest of the world. In both cases the dominant sector was manufacturing.

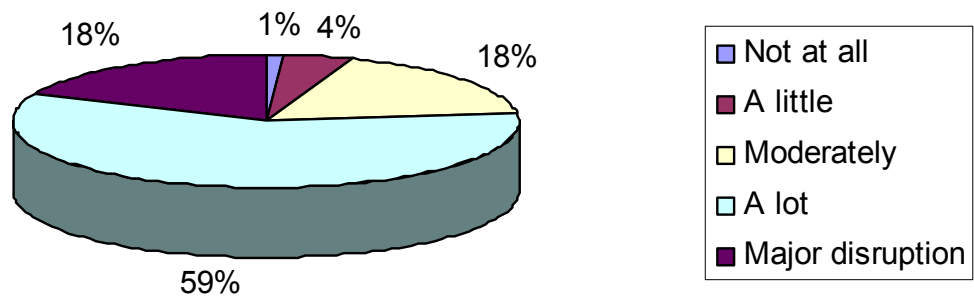
Participants by Sector



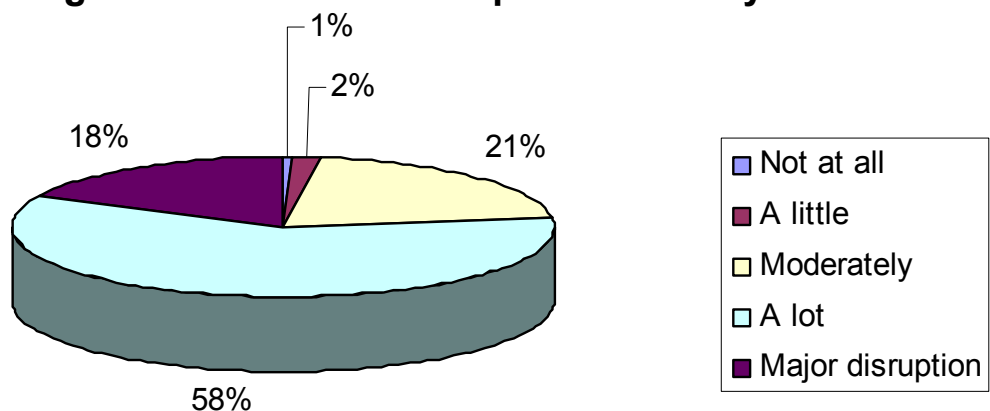


6.2 Economic effects of nanotechnology

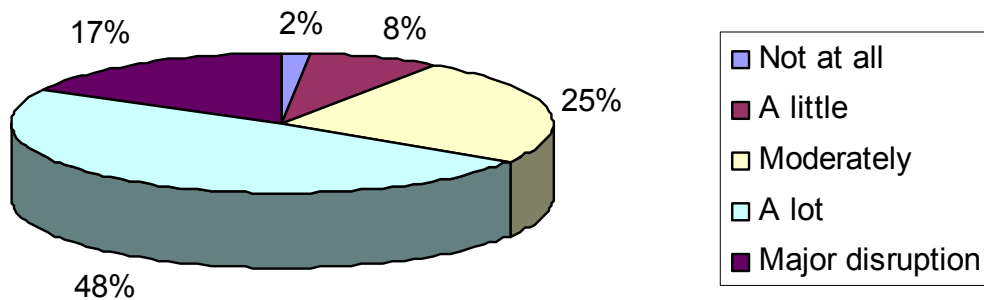
**Do you think that nanotechnology will have a significant effect on the life of the average European citizen?**



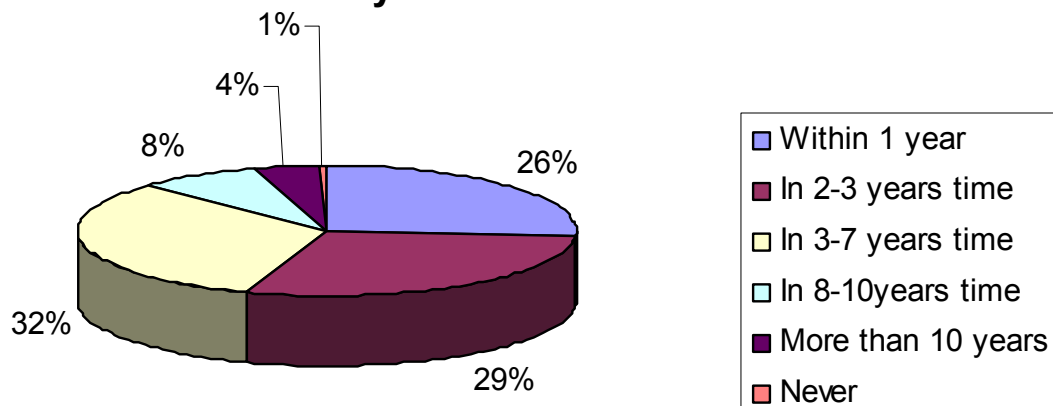
**Do you agree that nanotechnology will have a great effect on the European economy?**



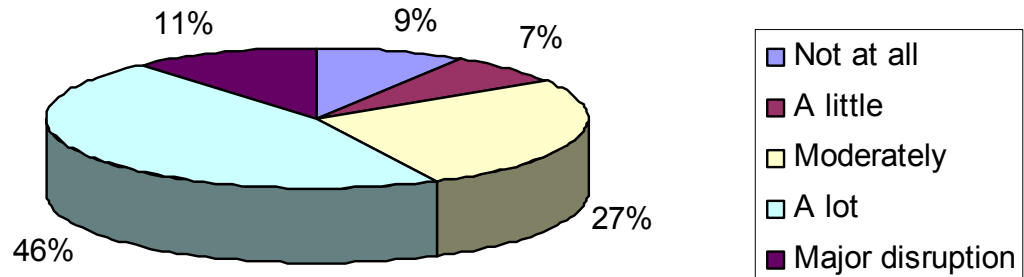
### Will nanotech have an impact in your business?



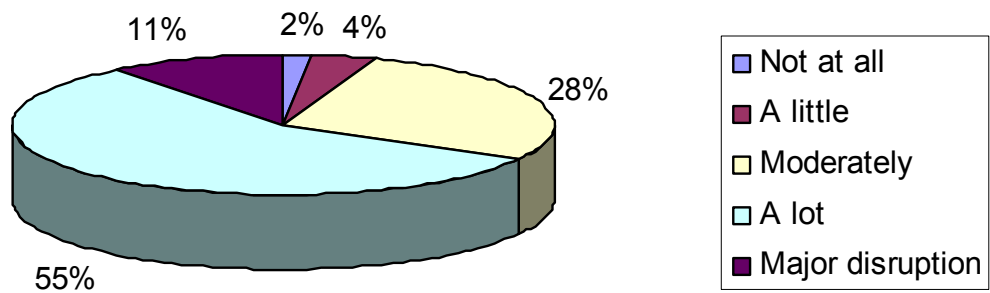
### When do you expect nanotech to have an impact in your business?



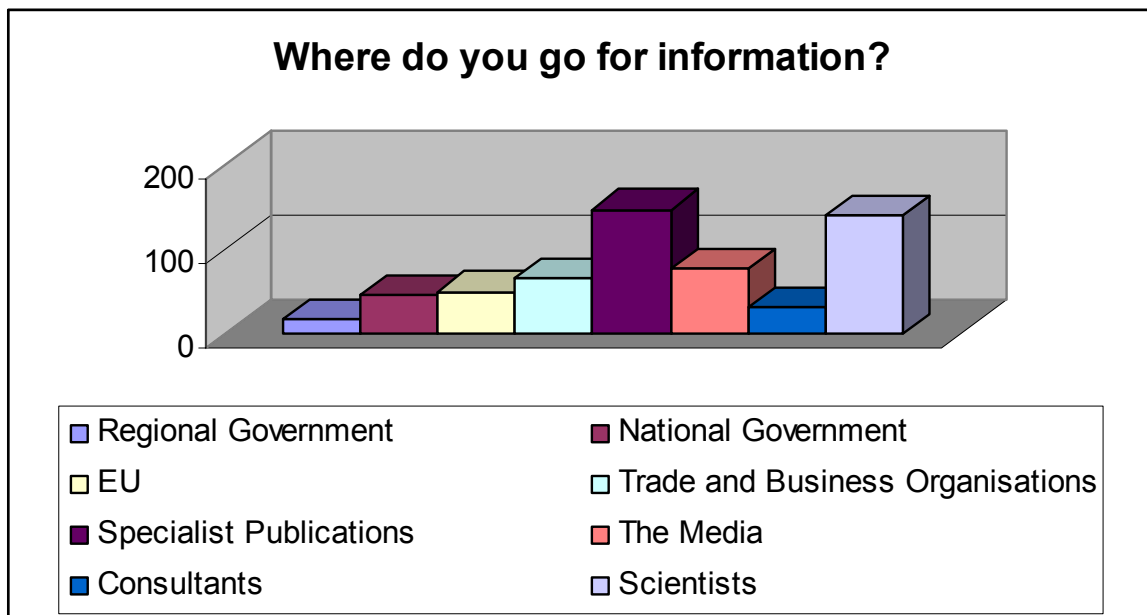
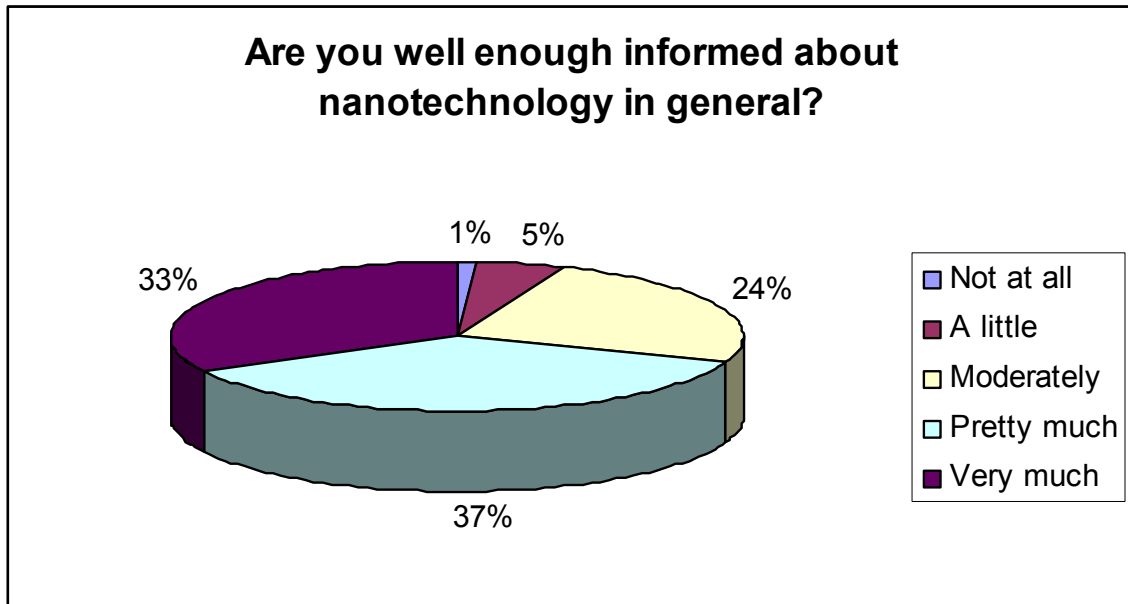
### Will nanotechnology affect the competitiveness of your business?



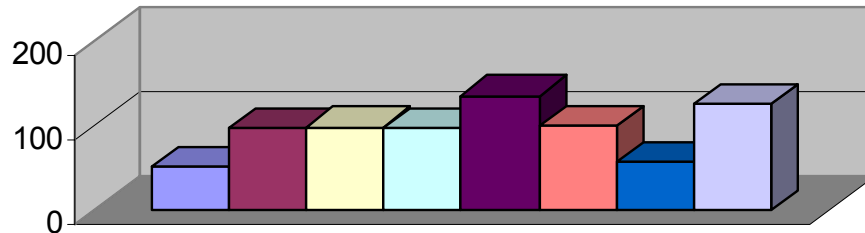
### Will nanotech affect the competitiveness of Europe?



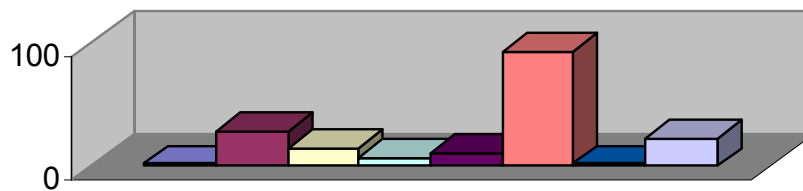
6.3 Information



### Who would you like to see provide information?

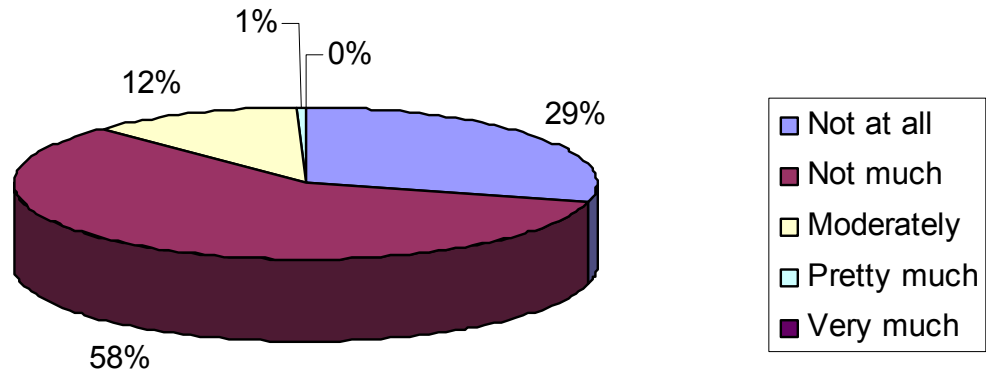


### Who would you like to see providing information to the general public?

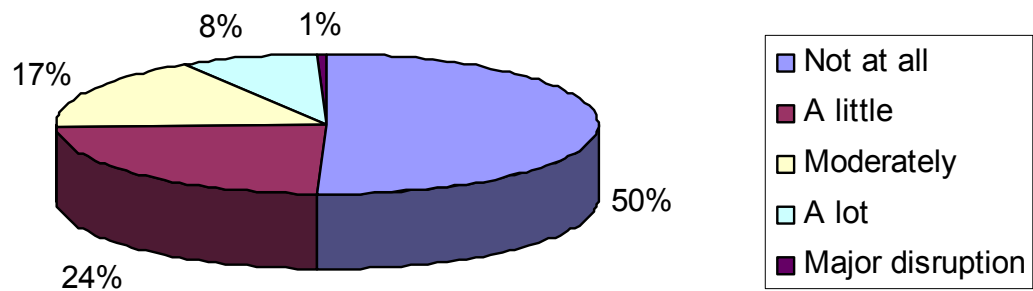


6.4 Public Perception

**Do you think that the general public is well-informed about nanotechnology in general?**

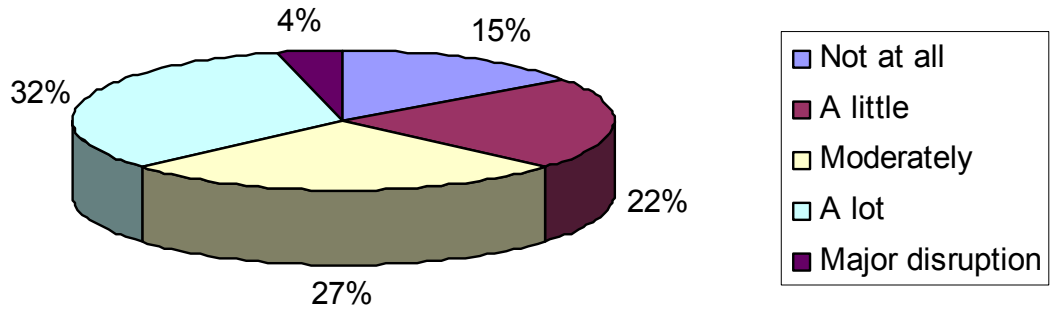


**Will negative public perception change your attitude to using nanotechnology?**

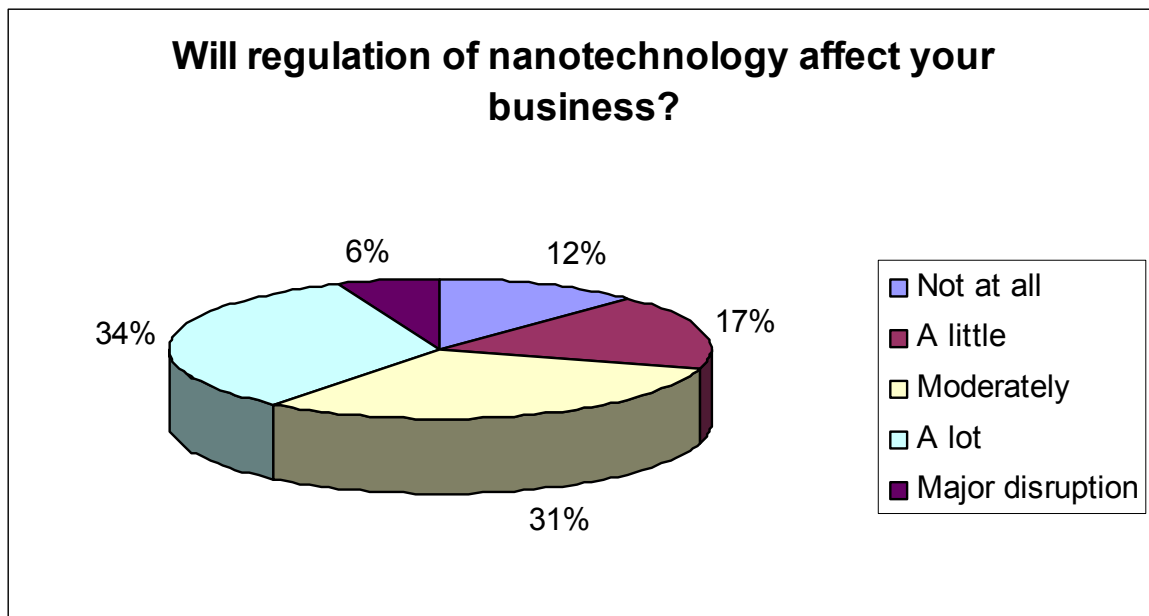


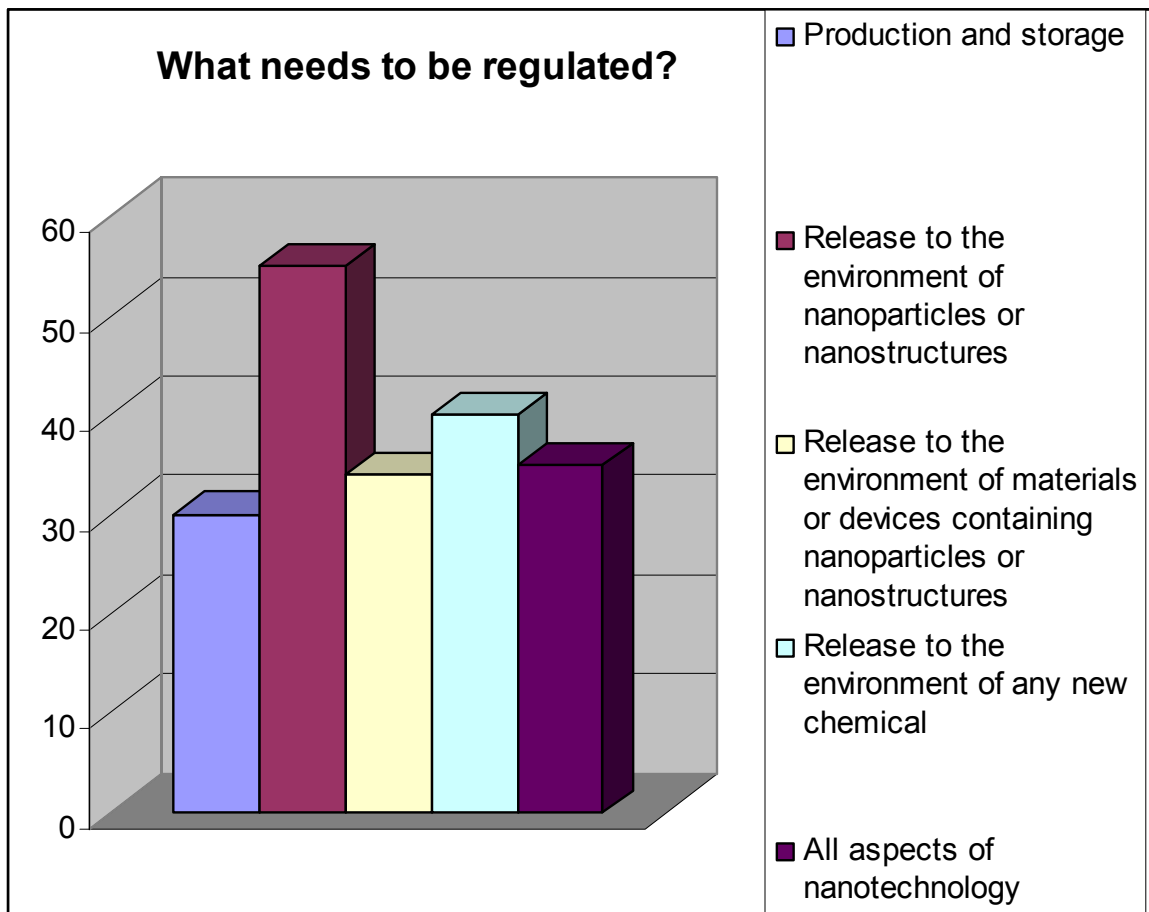


**Would negative public perception change the way you market products using nanotech?**



## 6.5 Regulation

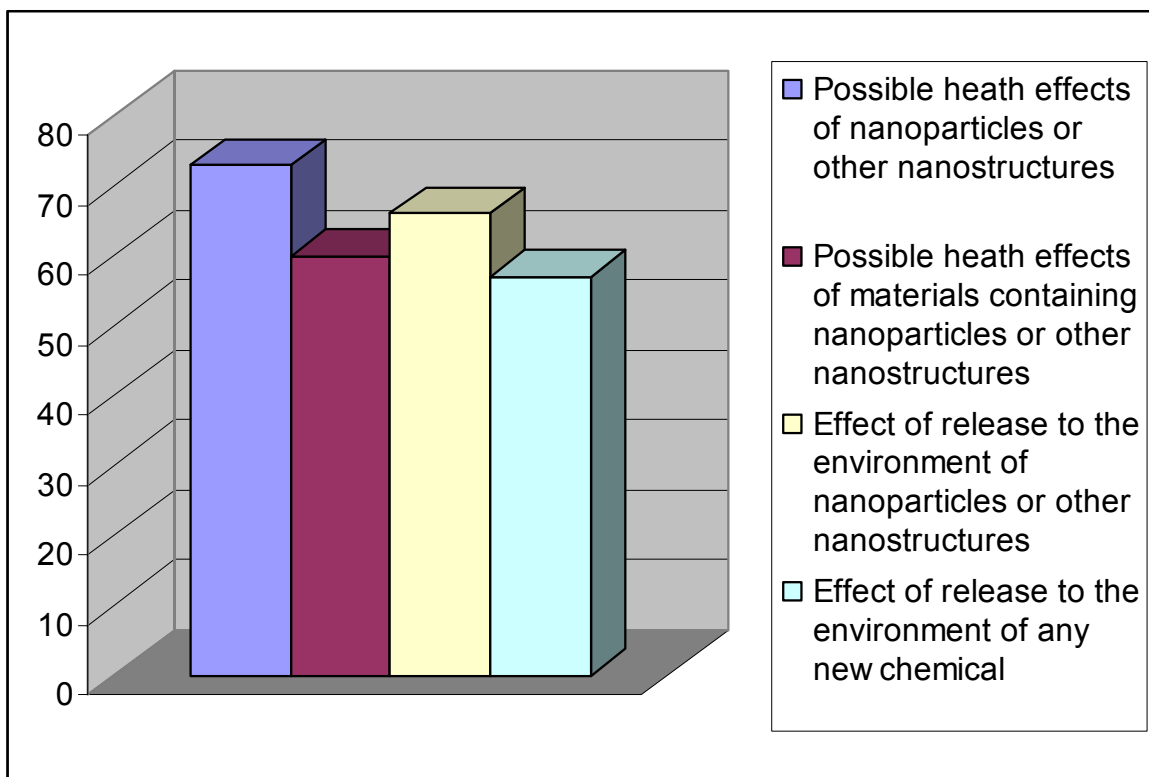




Text responses included:

- Medical/ethical aspects of nanotechnology applications, e.g. safety/efficacy of nanomedicine, military and surveillance applications
- No regulations that slow research in controlled environments. Close review and testing publicly released products to ensure safety and effectiveness.
- In some key areas, even information should be regulated. Already a lot of information on bio research is under cover.
- Believe standardization is required in specific areas for the nano-business to take off. You have to know what you get when you buy a nanotechnology product, ie. carbon nanotubes.
- Existing laws are probably adequate, for the next several years. Nanotechnology is so very many things, and the most dangerous are several years (or decades) away still. Unless and until there is widespread use of novel (possibly self replicating) products, this just isn't that big a deal.
- Self-replicating systems. I'm in favour of a combination of self-regulation by consensus standards and government regulation.
- Regulations need to be enacted wherever a personal, public, or environmental danger is reasonably assumed to be present. It is dangerous, and irresponsibly cautious to apply the precautionary principle in such a large and diverse area.

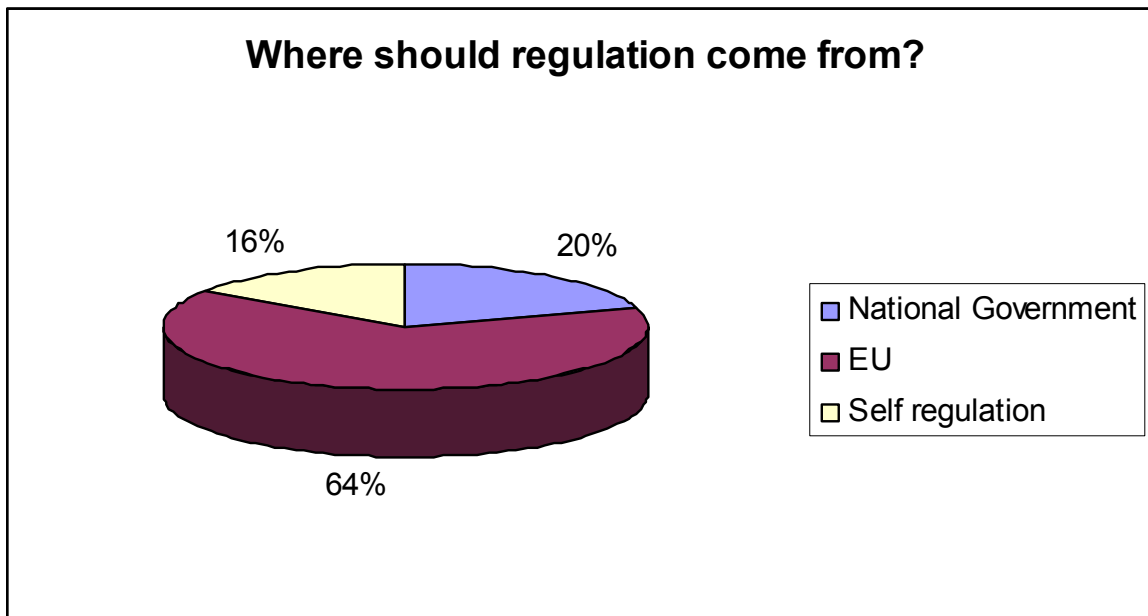
- We do not know if nanoparticles released into the environment actually cause a problem. EU ought to find out sooner rather than latter. New chemical, definition of a new chemical is required. Change in particle size may cause it to have radically different chemical behaviour in which case it is new. Given answers to these questions will determine whether we need special regulations or not.
- Protection (Health and safety) of workers with nanoparticles
- Regulation will ether be generalised, have to be on a case by case basis or sub groups [as yet to be defined] of nano tech will be created to regulate against
- Depends on material nature and usage: Personal and environmental impact as with any other new chemical or material depending on its pattern of use. In the main existing safeguards e.g., FDA regulations should be sufficient.
- Wrong information from educated personalities, government agencies and above all illiterate Ministers and political leaders.
- It is important to differentiate between the different sectors within Nanotechnology. My organisation supplies instruments for the semiconductor industry and much work at the nano scale today without undue concerns about health and safety or the environment. Clearly, this may not be the case with some nano developments but it is important that the distinction is made to avoid unnecessary regulatory burdens.



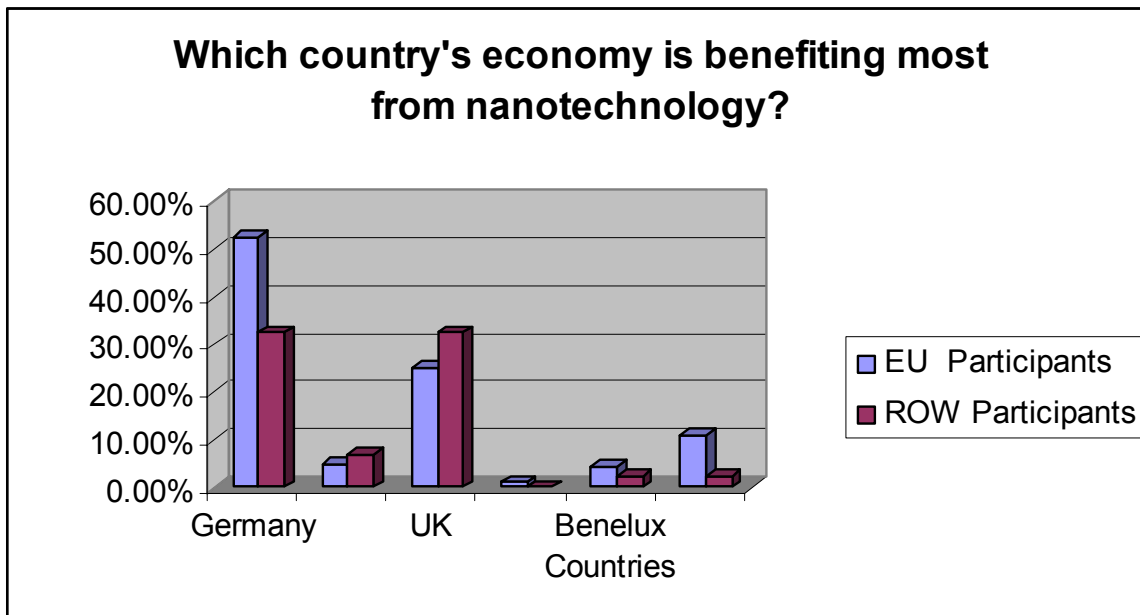
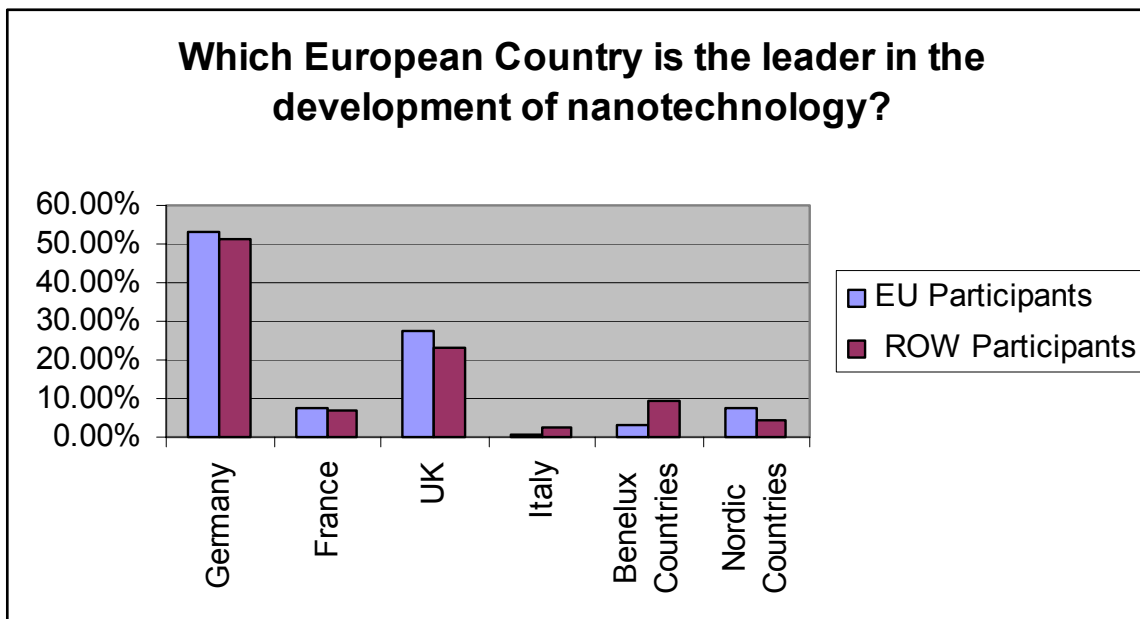
Text responses included:

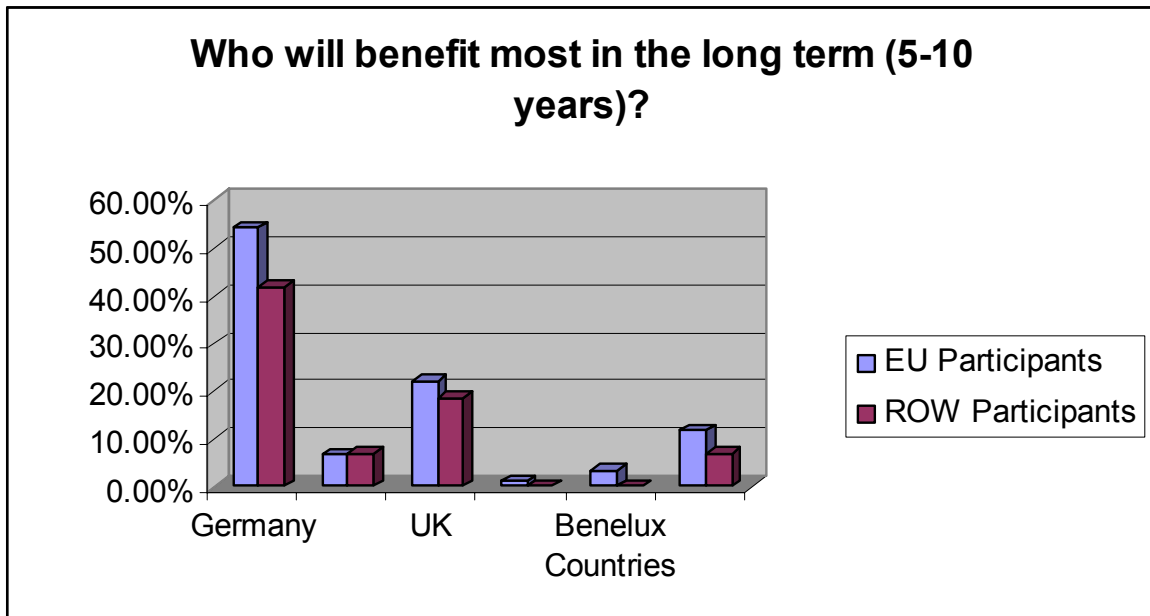
- If it can be done WISELY, not with the hysteria that the EU put to Genetic Engineering

- Important to develop appropriate handling and disposal procedures for nanowaste. 2. Important to formulate appropriate nanotechnology standards, procedures, and regulations
- This question must be addressed before regulation can be considered. Without a reasonable understanding of toxicological and environmental effects, the talk of regulation or the lack thereof is ignorant and therefore irresponsible.
- Current processes development, new processes, development of new products thanks to nanotech, new products quality and reliability

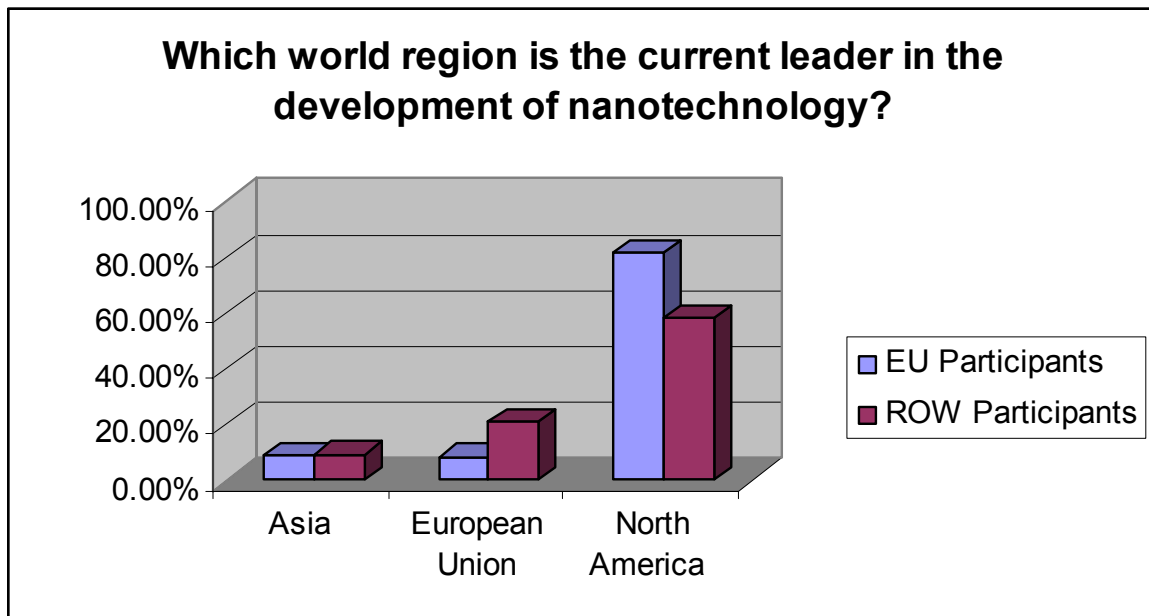


## 6.6 European Winners and Losers



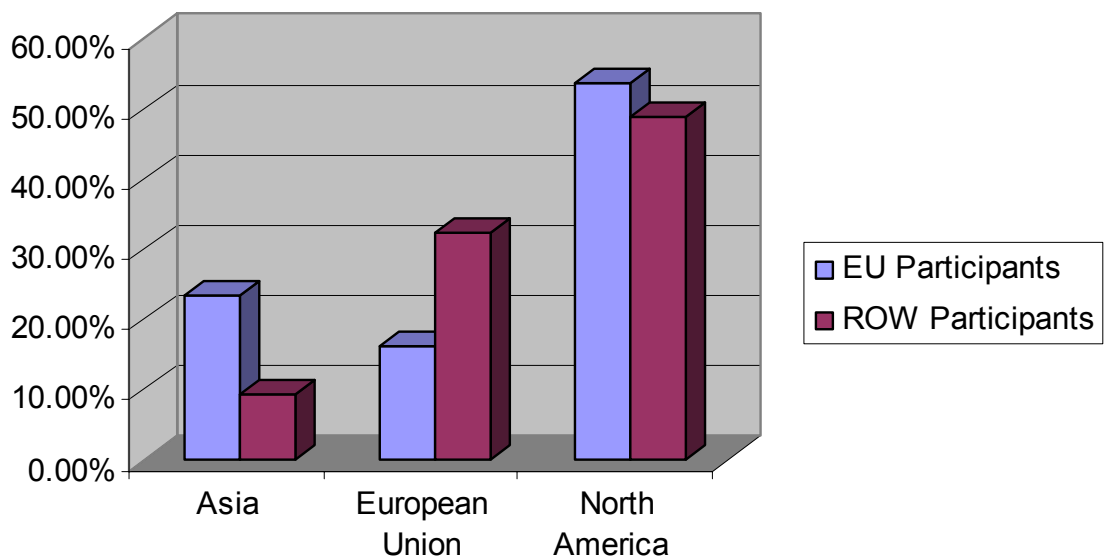
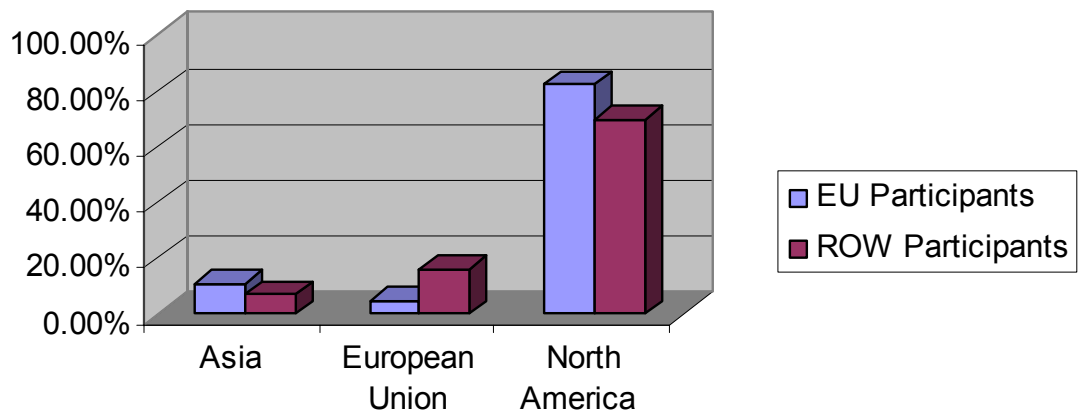


## 6.7 Global Winners and Losers



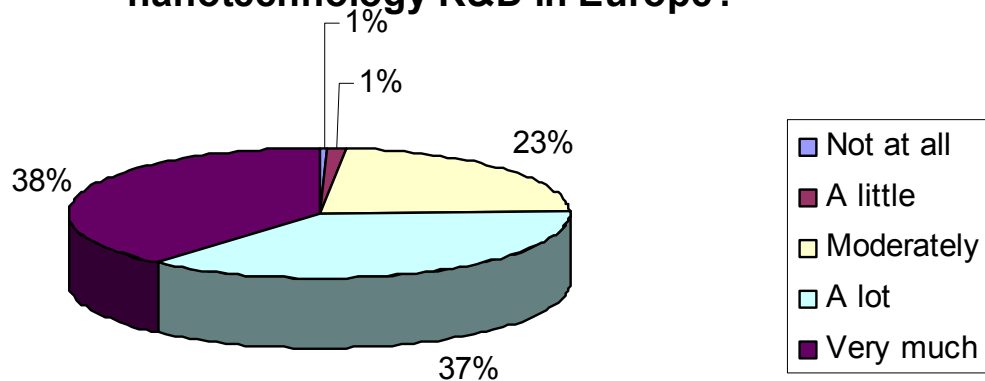


### Which economic area is currently benefiting most from nanotechnology?

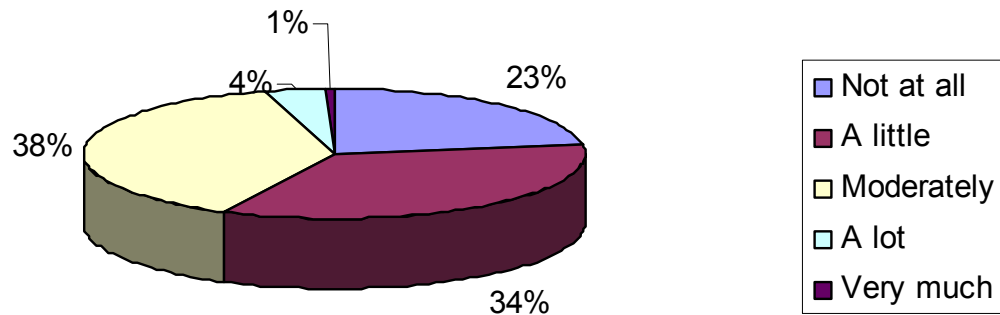


6.8 The European Commission

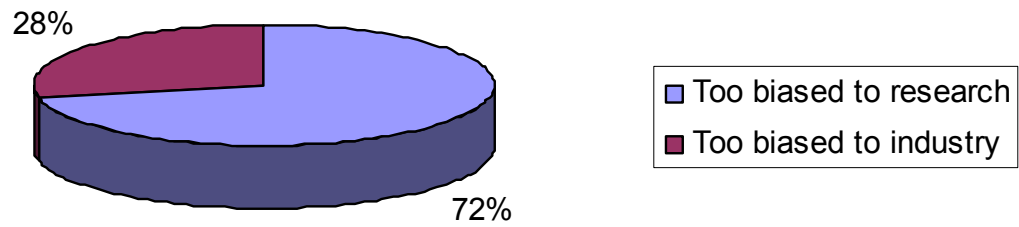
**Do you think that the EU should increase the support and the level of funding for nanotechnology R&D in Europe?**



**Do you think that the EU is doing enough to promote the adoption of nanotechnology by the industry?**



### Are the instruments for developing nanotech in Europe right?





Participating Companies and Organizations

*Note: response to this question was optional.*

Abend Consulting  
ABR Innova Oy  
Advanced Resource Managers Ltd  
Air Products & Chemicals  
AKE  
A.I.Cuza-University Of Iasi Romania  
American University In Cairo  
Amirkabir University Of Technology  
AMTS Consulting  
ARC Seibersdorf Research  
ASA Austrian Space Agency  
AsesorıA Industrial Zabala, S.A.  
ATMEL Rousset  
BASF Aktiengesellschaft  
BCMEA  
Biodot  
Biopharmacy & Bioavailability Res. Ltd.  
Black Swan Trading  
Borgwarner  
Cabot Corporation  
Capitalvenue, Inc.  
Case Western Reserve University  
CEA Leti  
CEA-Grenoble  
Center For Responsible Nanotechnology  
Central Microstructure Facility Rutherford  
Appleton Laboratory  
Centre De Recherche Public Henri Tudor  
Chalmers University Of Technology  
CIDETEC  
Cis Institut F□R Mikrosensorik Ggmbh  
Cnr  
Comp-Optics, LLC  
Composites Worldwide Inc  
Consumer And Biotechnology Foundation  
Crossroads Animal Hospital  
CSEM SA  
CSIR, M&Mtek  
CSTB  
Degussa AG  
E.G.O. Elektro-Ger., Tebau Gmbh  
EADS Corporate Research Center  
Earthnet Institute  
EDS  
Electronic Security Products AS  
Enablingm3  
ESL EUROPE  
ESRF  
Etech AG  
EUCIP Norge As  
European Commission  
Evaluate Srl  
Federal Government; Industry Canada  
Firststage Capital  
FIST SA  
Fraunhofer Institute IZM Berlin  
Fraunhofer Institute Systems And Innovation  
Research  
Future Media  
GE Healthcare  
GENO  
Greenville Eye Associates  
Gyros AB  
H.J.C  
HELLENIC-PETROLEUM SA  
Helsinki University, Instrumental Centre And  
Dept. Of Applied Biology  
IAL Consultants  
Icetek  
IIC Gmbh  
IIT Bombay  
IMEC  
Inanov  
Inasmet  
Inet-Bridge  
Infineon Technology  
Institute Of Physical Chemistry Of Romanian  
Academy  
Integran Technologies  
Invest Northern Ireland  
IR Search BV  
Israel Nanotechnology Trust  
Isw Institut  
Ivcon.Net [Http://Nano.Ivcon.Org](http://Nano.Ivcon.Org)  
Jaakko Poyry Consulting  
Johns Hopkins University



## The 2004 European NanoBusiness Survey

Journal Of Nanotech And Precision  
K.K. Shinkou Kagaku Kogyosho  
Kavlico Corp.  
Kingwood College  
Kronos International, Inc.  
KSB Import-Export  
La Hourne  
LBB Consulting  
LETI  
LOT Oriel  
Lviv Medical University  
Materia Nova  
Materials Res. Labs., ITRI  
MDS Capital  
Merck Kga  
MIC Tech University Of Denmark  
Micra Ingenieria S.A.  
Micron Technology  
Mikromasch  
Mitsui & Co. Deutschland Gmbh  
Morris Consulting  
Motorola  
MRI Of Cleveland  
Multitask  
Nanatitania Sdn Bhd  
Nanobusiness Alliance  
Nanofilm, Ltd.  
NANOLEDGE  
Nanomix Inc.  
Nanonordic.Com  
Nanoprobes, Incorporated  
Nanoscape AG  
Nanoscience Technologies, Inc.  
National Physical Laboratory  
Nikolaev Institute Of Inorganic Chemistry Of  
Siberian Branch Of Russian Academy Of  
Sciences  
Norwegian Trade Council  
Openstrike  
Oxford Instruments PLC  
Oxonica  
PDQA  
PHARMACIE CENTRALE DE FRANCE  
Pharmexa A/S  
Plasma Coating Corp.  
Plasmachem Gmbh

Polish Supramolecular Chemistry Network  
Foundation  
Polymer Institute, Technical University Of  
Szczecin,POLAND  
Project Development And Investment Ltd.  
Pronano AB  
PTB  
Punk, Ziegel & Co  
Qinetiq Nanomaterials Ltd  
Quesant Instrument Corporation  
Quinta Da Nespereira S.A.  
Renishaw  
Research Center Karlsruhe Gmbh  
Riso National Laboratory  
Rouse & Co International  
Siemens AG/Siemens Venture Capital Gmbh  
Siemensvdo  
Silvertown UK Ltd  
Sipa Spa  
Southwest Nanotechnologies, Inc  
Space Shuttle Hi-Tech Co., Ltd  
SRI CONSULTING BUSINESS  
INTELLIGENCE  
ST Microelectronics  
SUSS Microtec  
TASTECH  
Teknomedia AS  
Tetronics Ltd  
THALES LTD.  
The Honorable Guild For Diminution  
The Strategic Synergy Group  
TNO  
Tres Puentes S.L.  
UBS Financial Services  
Univ Of Cambridge  
Universitat Autònoma Barcelona  
University Hospital  
University Of Barcelona  
University Of Sofia  
University Of Surrey  
University Of Zaragoza  
US Navy  
Van Cemens & Co.  
Venture Analytics, Inc.  
Venturos Venture AS  
Wageningen UR



## The 2004 European NanoBusiness Survey



## The 2004 European NanoBusiness Survey