

Communicating Risks of Nanomaterials

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Key issues

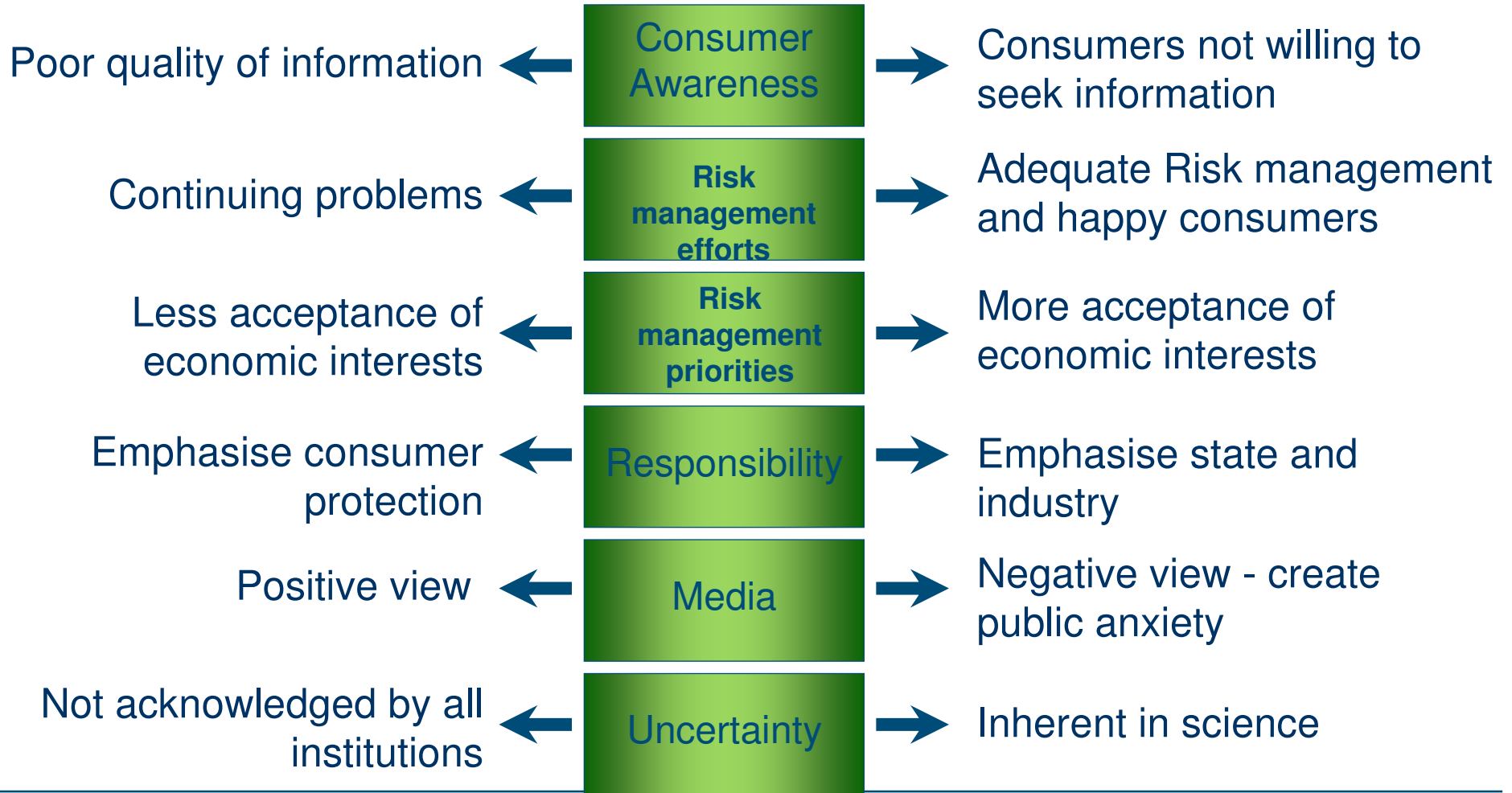
- Increasingly impact assessment associated with technology is focusing on *both risks and benefits*
- Citizen and consumer decision-making involves a trade-off between *perceived risk and benefit*
- New *governance models* are beginning to
 - Incorporate integrated risk-benefit metrics at the assessment stage
 - Consider health, environment, socio-economic and ethical impact as assessment metrics

Misalignment between expert and citizen perspectives regarding risk management?

Consumers & Experts: A Perceptual Divide

Consumers

Experts



Does communication provide the bridge between
the “perceptual divide?”

The 1999 Dioxin crisis

The 1999 Dioxin controversy in Belgium

- Dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin)
- Stable in environment and organisms, resists degradation and metabolism
- Accumulates in fatty tissues, not excreted, half-life in humans approximately 7 years
- Biomagnification = concentration increases up the food chain
- Destruction by incineration at a temperature above 850 ° C
- Human health effects
 - Exercise precaution by keeping exposures and TDI estimates to very low levels
 - Focus of research to reduce uncertainty
 - Dioxin levels in environment appear to have peaked and are slowly declining, maintain trend?

The 1999 Dioxin controversy in Belgium

January 1999

- A storage tank of fat at the processing plant of *Verkest*, a feed producer, contaminated with industrial oil containing dioxin

March 1999

- *Da Brabender*, an animal producer, send a feed sample to a Dutch laboratory for analysis. Government takes discrete action to isolate the supply chain involving Verkest

May 1999

- Tests reveal high levels of dioxin throughout the supply chain

29 May 1999: the story hits the news

The impact

End May 1999

- Belgian government notifies EU and its member states. Public health minister orders removal of all domestic-produced poultry and eggs from shelves

1 June 1999

- EU agriculture commissioner announces legal action against Belgium for late notification. Belgian agriculture minister resigns

2 June 1999

- European Commission authorises ban on import of Belgian poultry products (extended to pork, beef and dairy on 4 June 1999)

30 June 1999; Domestic consumption of poultry slumped to 69% of June 1998 levels

The need to communicate risk assessments

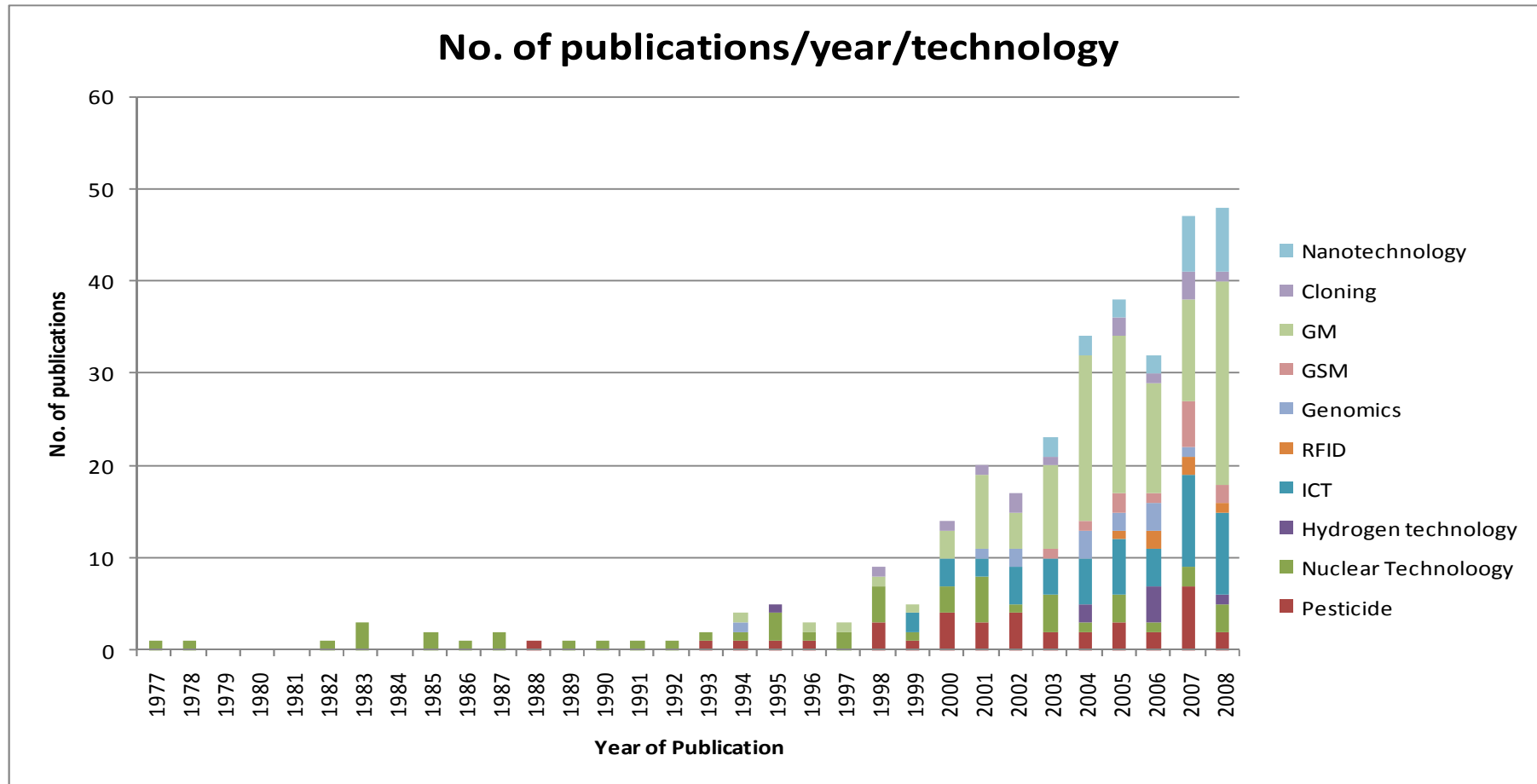
- The "ownership" of the dioxin issue stayed with environmental pressure groups
- The only available information about dioxins was provided by these groups
- Industry or regulatory bodies did not communicate the complex issue of dioxin risk to the general public, including uncertainty associated with risks and ongoing research being applied to clarify these issues
- Public response was therefore "risk based"
- Public perception that the truth was being hidden to promote vested interests of industry and regulators

Effective risk communication is essential

From risk communication to risk-benefit communication

- Considerable (and increasing) research activity directed towards perception of, and communication about, emerging technologies
- Most research has focused on risk communication?
- What impact does benefit communication have on attitudes?
 - Transparent technology governance
 - Effective citizen participation
 - Informed consumer choice

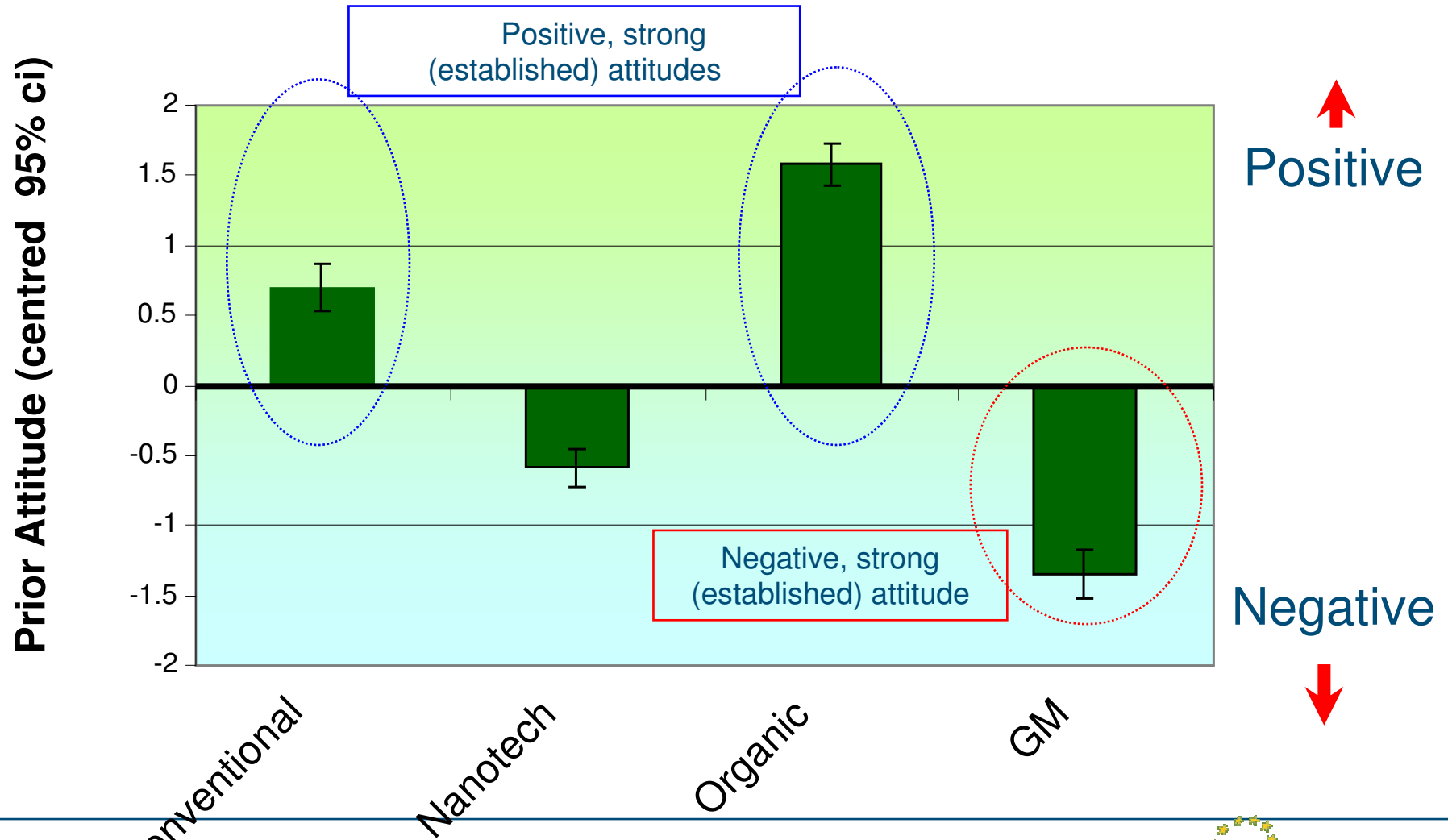
Publications on technology and society 1977-present



Nanotechnology applications associated with risk, benefit and cost

Application	Benefit	Risk	Cost	Uncertainty
Foods which have the potential for cognitive enhancement	Improved cognitive performance	Overuse /misuse of substances Nanoparticles in human body	Financial (who can afford to be enhanced?) Creation of socially excluded individuals	Unintended effects? Population level variability?
Nano-enabled microsensors in animals	Real-time monitoring of health status through ICT application	Animal welfare issues(?)	Disadvantaged groups of farmers (e.g. in developing countries)	Effects on human health through ingestion (?)
Nanoscale genetics	Improved food production /Personal care products /Pharmaceutical production	Negative consumer attitudes (from the GM debate)	Research and development if consumer acceptance does not occur	Environmental and health risk benefit assessment adequate?

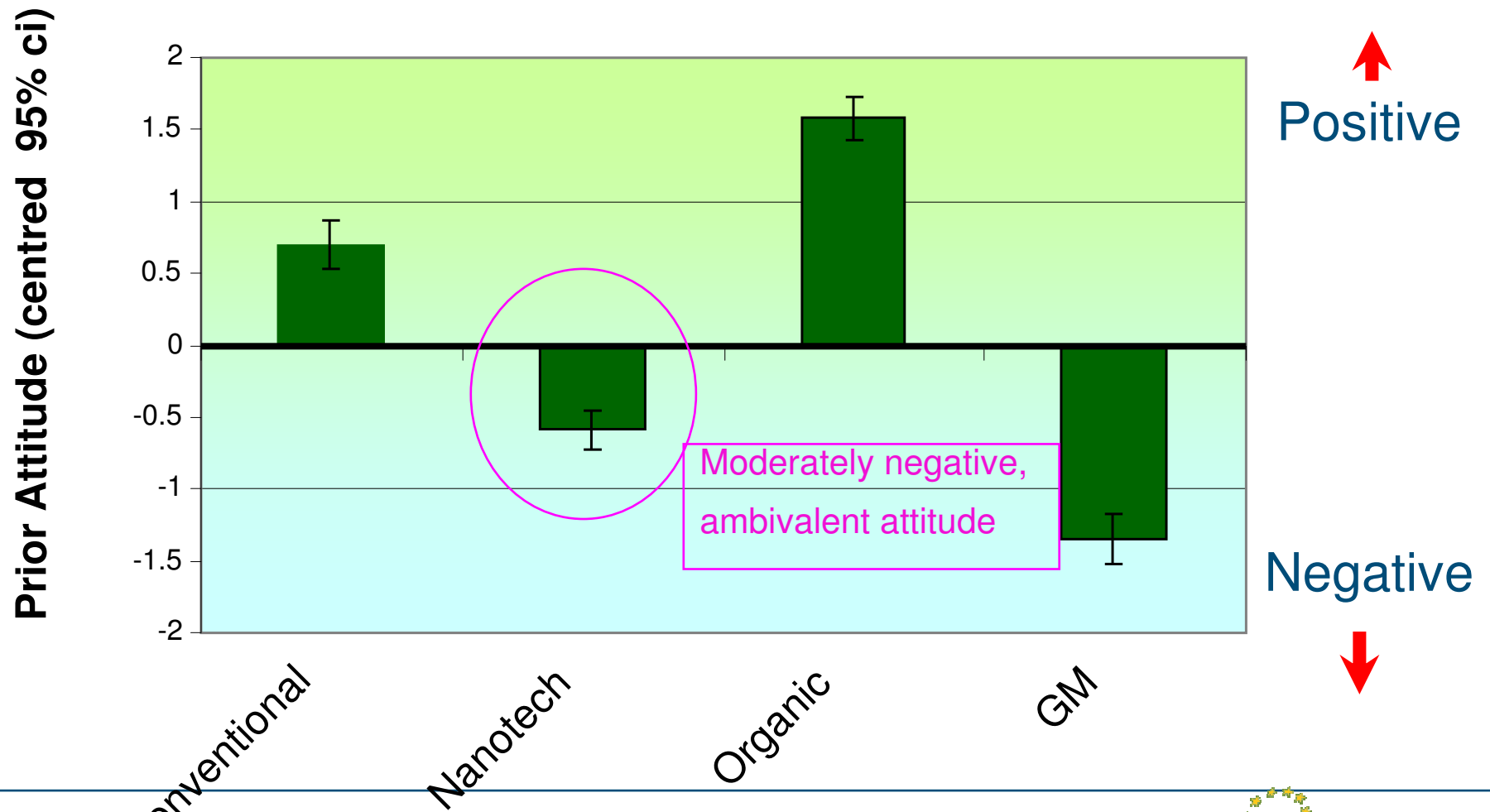
Citizen attitudes to different agri production technologies



Impact of risk-benefit information on established attitudes

- Negative attitudes become *slightly less* negative
- Positive attitudes become *slightly less* positive

Citizen attitudes to different agri production technologies



Risk-benefit communication

- Ambivalent negative attitudes (*nanotechnology*).
 - People more amenable to be influenced by whatever information becomes available
 - Does attitude shift in the direction of the information?
 - i.e. Does risk information
 - » Shift attitudes to negative
 - » Strengthen attitudes

Framing information in terms of losses or gains

- Losses have greater impact on attitudes than gains

(Kahneman and Tversky, 1979).

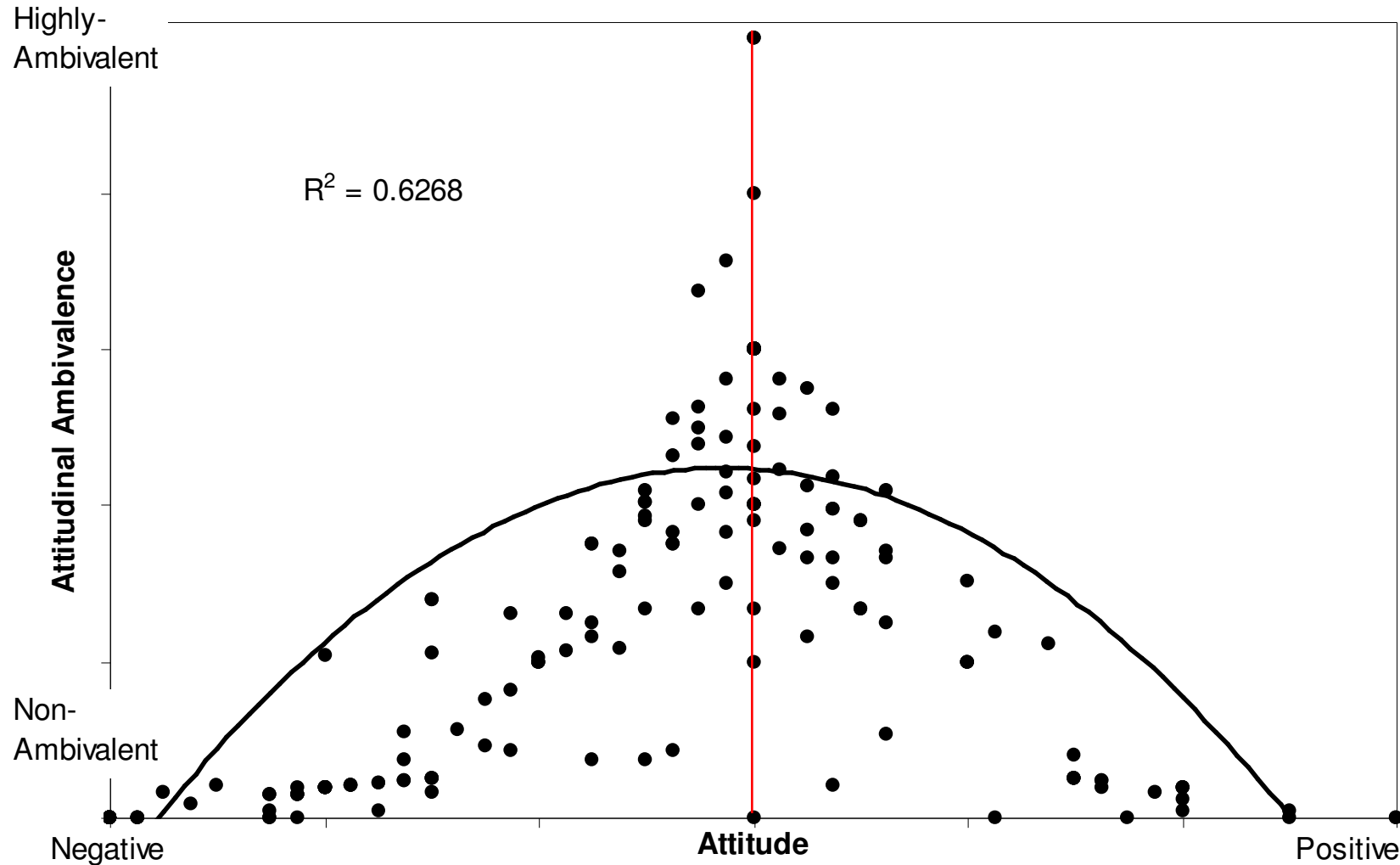
- People weigh risk information as more important than benefit information

- Impact of balanced information higher on risk perception than on benefit perception

(Fischer and Frewer, accepted
van Dijk et al., submitted).

How are attitudes towards nanotechnology distributed?

Inverse U-shape relation between attitude and attitudinal ambivalence



Three “segments” of consumers

- *Group 1 (42%) became more negative*
 - *Less / average education*
- *Group 2 (46 %) didn't change*
 - *Less / average education*
- *Group 3 (12%) became more positive*
 - *Younger or older*
 - *Male*
 - *Highly educated*

Potential marketing segments

- GROUP 1 –
 - "Food technology rejectors"
- Group 2
 - "ambivalent"
- Group 3
 - "*Battlestar Galactica* fans"



Impact of communication on attitudes

Provision of risk information

- **Increases** risk perceptions

Provision of benefit information

- **Increases** benefit perceptions

Provision of balanced risk-benefit information

- **Increases** risk perceptions
- **Reduces** attitude **ambivalence**

Does this imply that technology innovators
should only communicate about benefits?

Almost certainly not.....

Why?

- Increased ***transparency in risk governance*** systems results in risks and benefit assessment becoming transparent
- Communicating only about benefit implies that the “***truth***” about risk is being hidden
- Public ***trust*** in the communicator will quickly be lost
- ***Balanced risk-benefit communication*** is required

Who will set the agenda for public debate...

- Who will set the agenda for public debate...
 -those people and societal groups who are either extremely positive or negative towards the food technology ...
- Industry must provide “honest” risk-benefit communication if consumer trust is to be maintained
- Undecided individuals will absorb the attitudes of those with whom they perceive to share values
- Future food technology is dependent on developing products which people want and need
- Consumer choice is essential

Thank you!

Any questions?

