



มหาวิทยาลัยกรุงเทพธนบุรี  
BANGKOKTHONBURI UNIVERSITY



# Knowledge and attitude towards safety and ethics of nanotechnology

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**“Maximize benefit, minimize risk”**

**National Nanotechnology Center  
(NANOTEC), NSTDA, MOST**

**•Nanosafety and Ethics Strategic Plan  
(2012-2016)**

- Public hearing (mid of 2010-early 2012)**
- Training (regional level) for science teacher in high schools**
- Nanowatcher network, etc.**

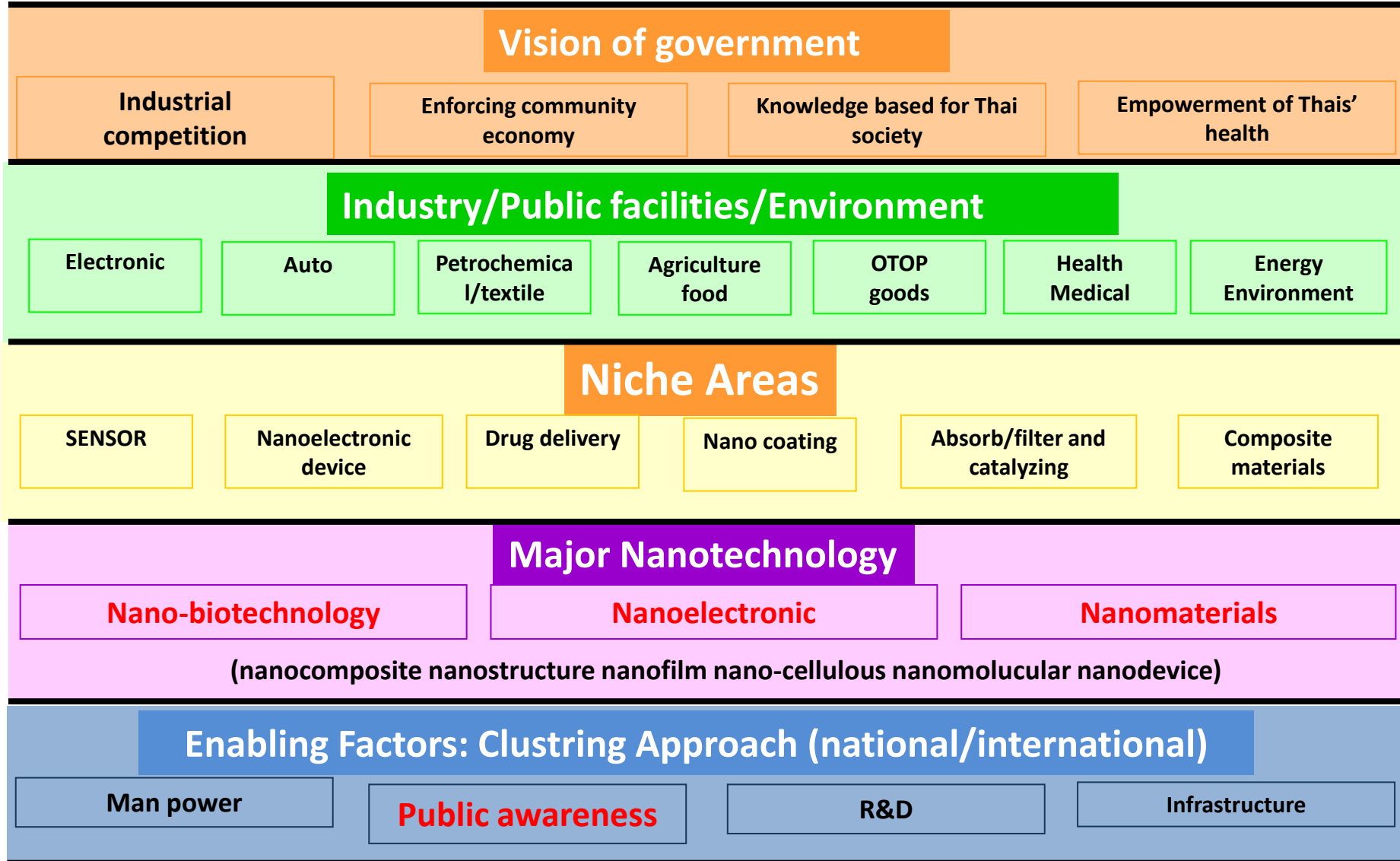
## Nanosafety and Ethics Strategic Plan (2012-2016)

- 1. Construct and manage knowledge about safety and ethic for nanotechnology and nanoproduct**
- 2. Develop and reinforce legal mechanism towards monitoring and enforcement**
- 3. Strengthen and encourage public participation**

**“Rights to choose” by having knowledge, not by choice limited**

# Nanotech development strategy

## Framework Strategy for Thailand Nanotechnology Development 2004 – 2013 (10-years)



## Nano safety authorized by NANOTEC

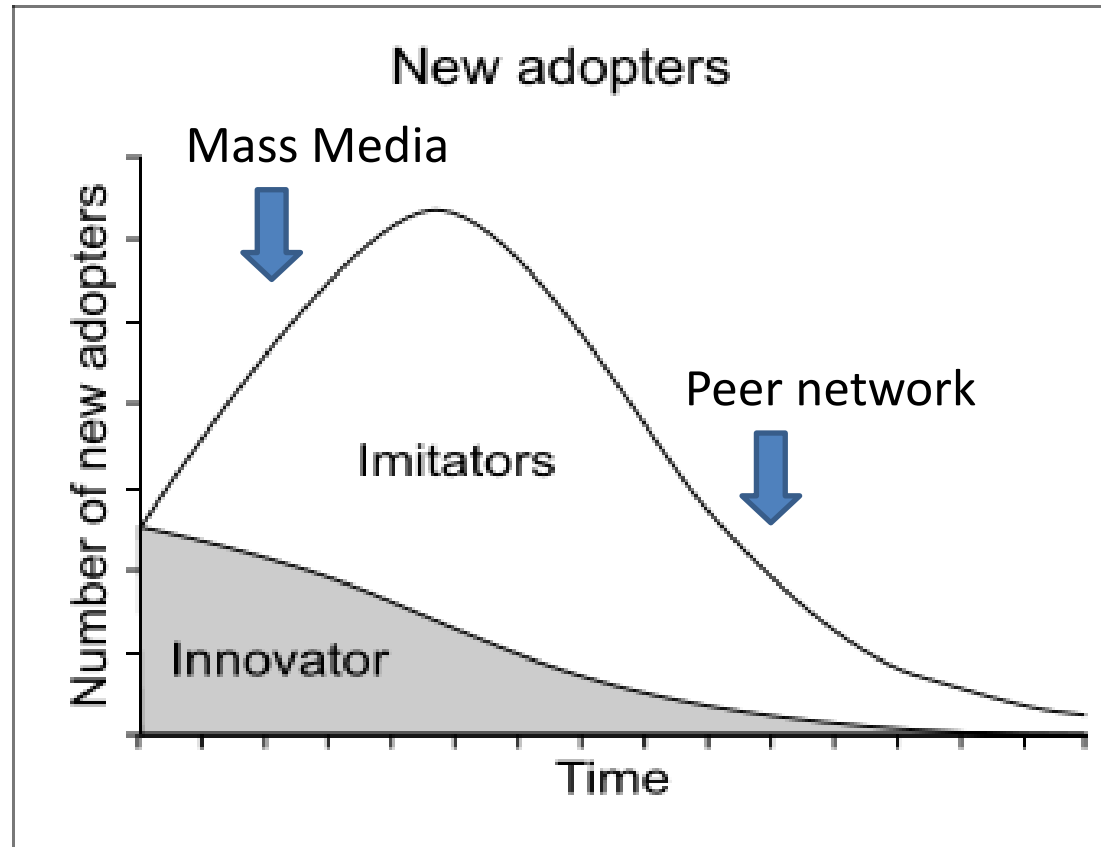
- 2011 launched NanoQ (nano labeling) for nano products
- 2016 will launch Nano safety label

## Nano ethic authorized by

Chulalongkorn U., NANOTEC with  
“Knownano.org”

- **What is safety & ethic of nanotechnology (nanoproducts) in terms of understanding among Thais?**
- **What source of information do Thais gain for S&T?**

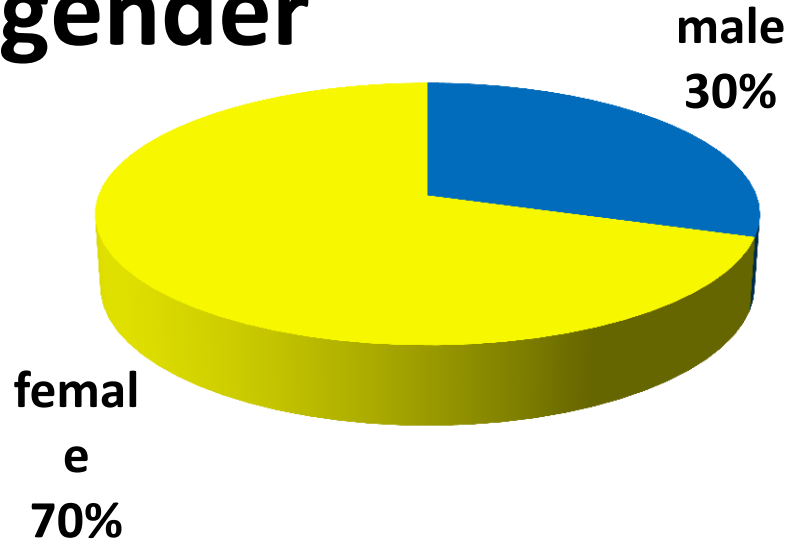
# Theories on S&T information for public



**Roger, 2003**

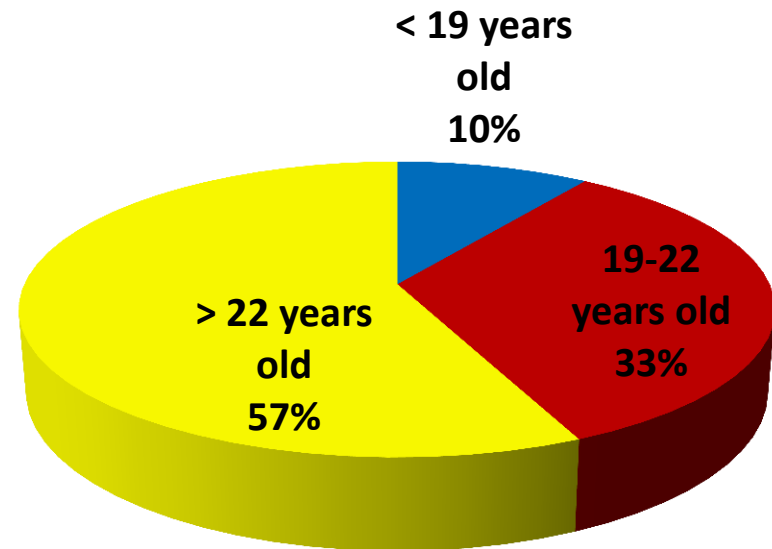
# Characteristic of samples

gender



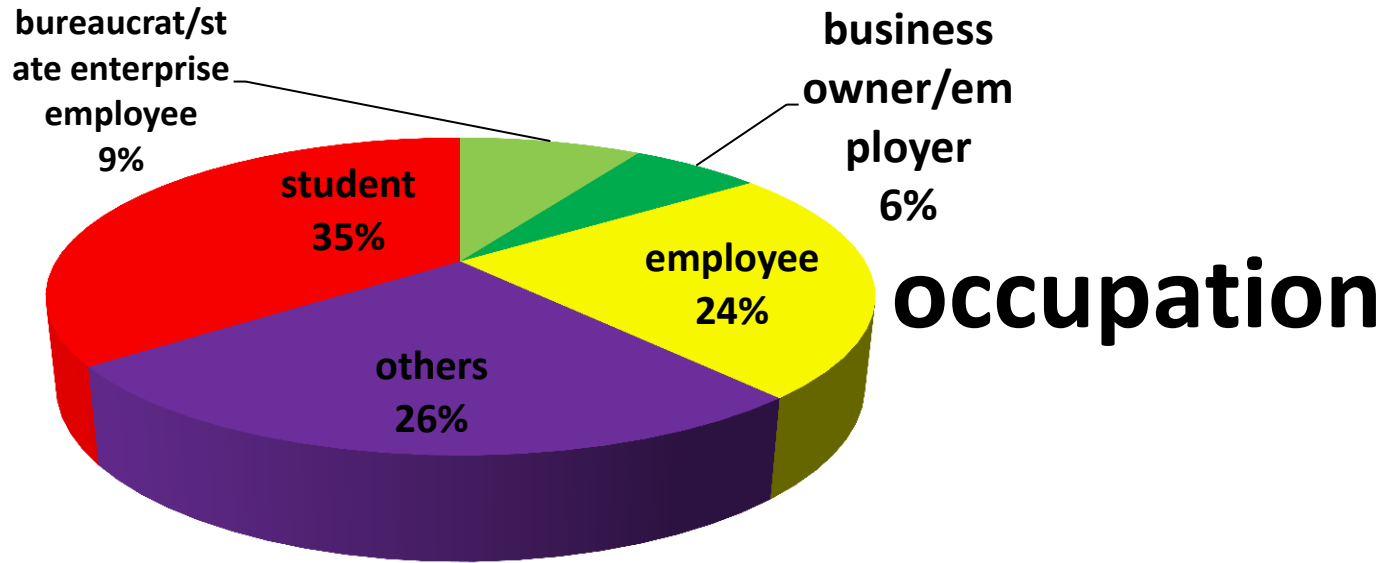
**n = 400**  
**Urban, well  
educated**

age

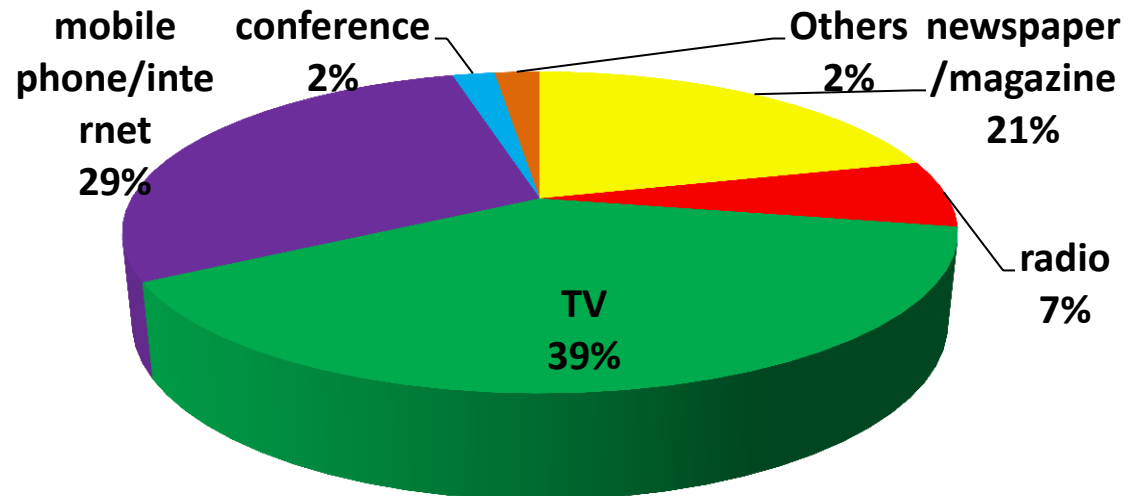




# Characteristic of samples



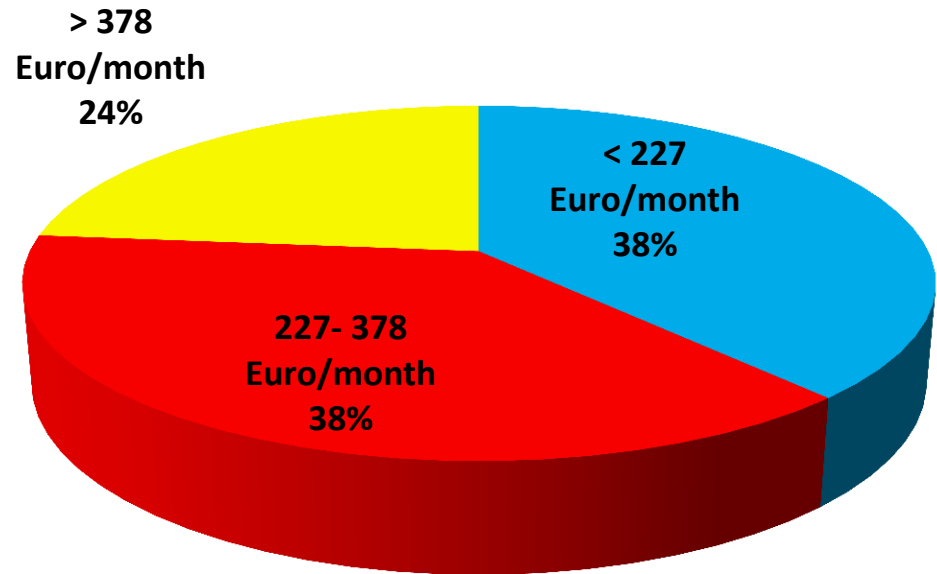
## Source of S&T information



# Characteristic of samples

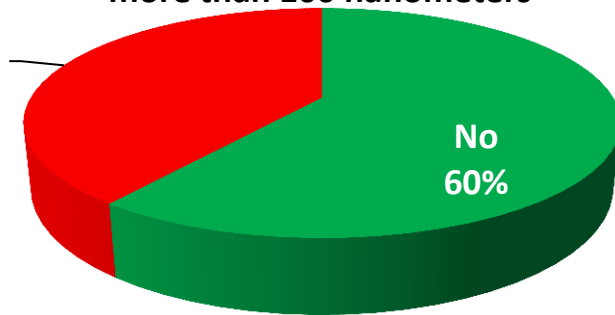
Roger's diffusion of innovation :  
More secure, more easy to adopt

**Income**

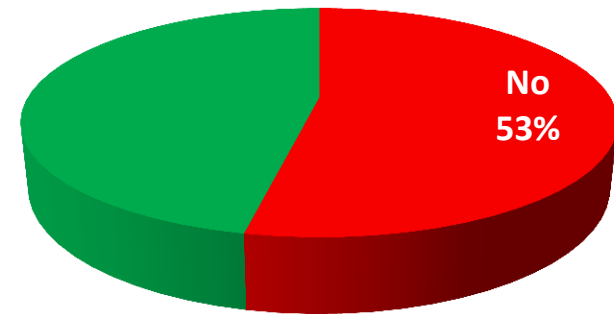


# Knowledge on nanotechnology

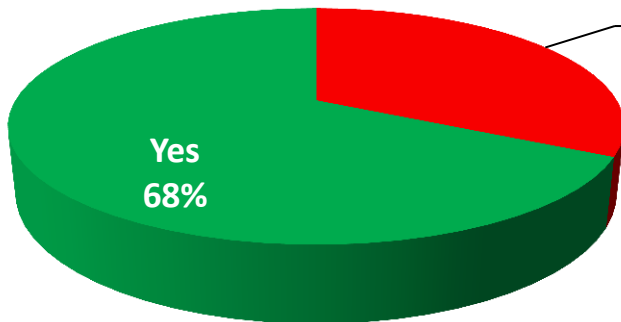
Nanotechnology is about a synthesis, analysis and control material at scale more than 100 nanometers



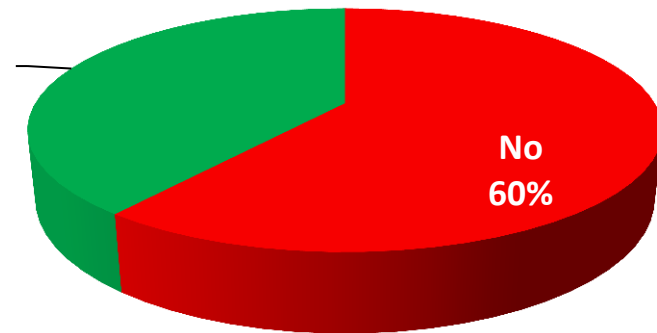
Nanomaterials is a type of materials at nanometer scale



Nanoproducts is a type of product use nanotechnology/contain nanomaterials

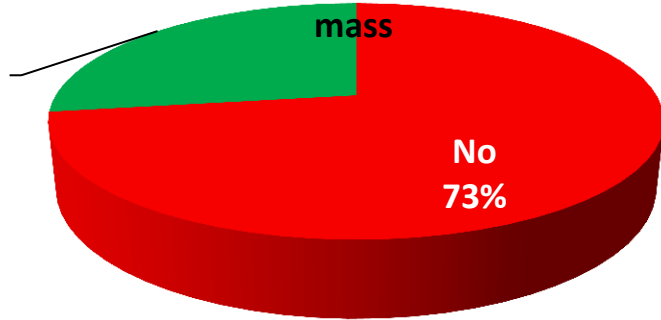


Due to tiny scale can make nanomaterials penetrate into living organism easier than other materials

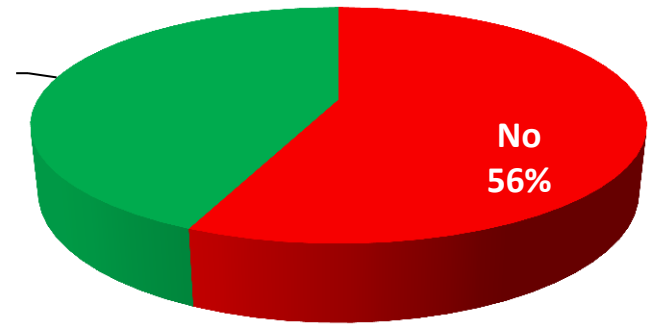


# Knowledge on nanotechnology

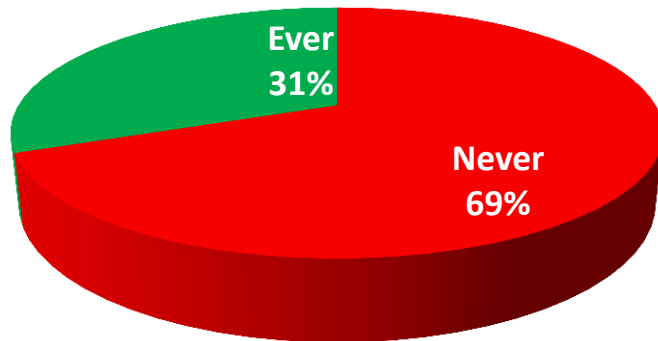
Nanomaterials may have more toxic than other materials due to it has more surface area by comparing with same mass



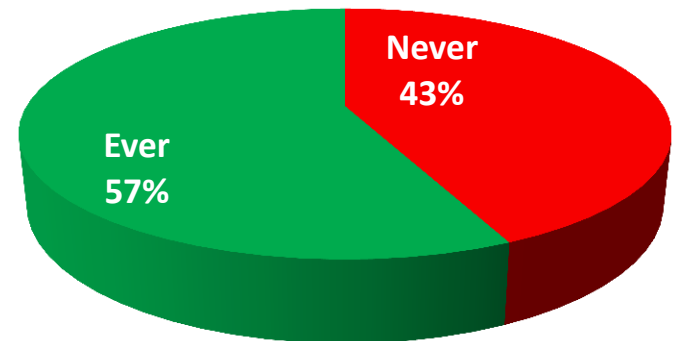
Many nanomaterials can not be biodegradable in short time



I ever obtained information about safety and ethic of nanotechnology

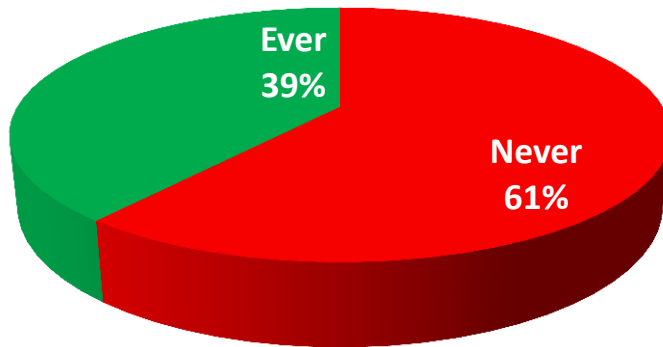


I ever use/expose nanoproducts like cosmetic, medicine, coating, etc.

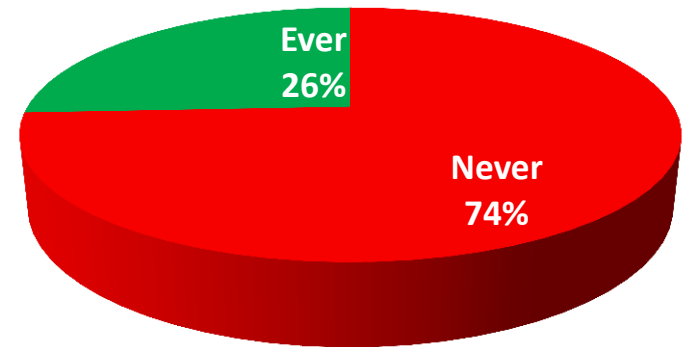


# Knowledge on nanotechnology

I ever obtained information about safety of nanoproducts

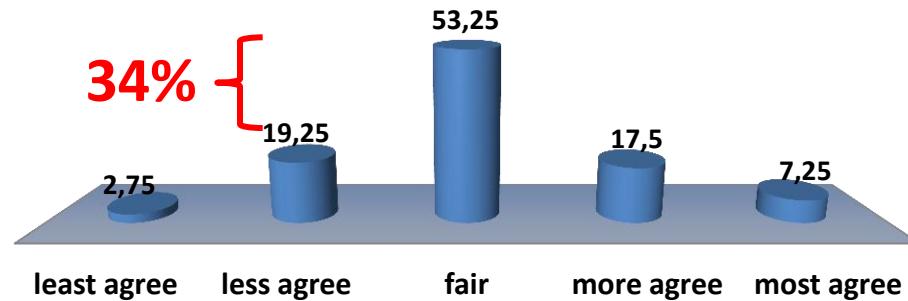


I ever heard about there is the nano safety & ethic strategic plan in Thailand

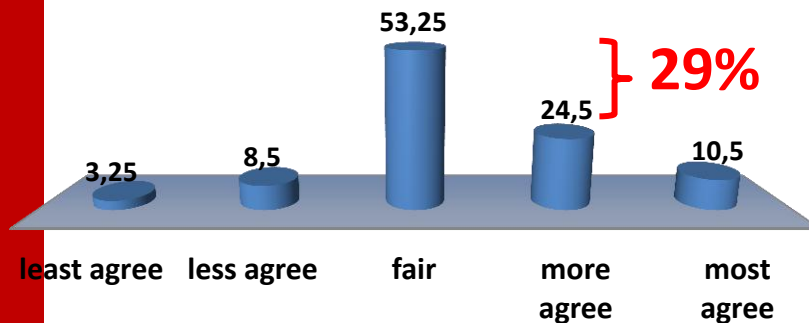


# Attitude on nanotechnology

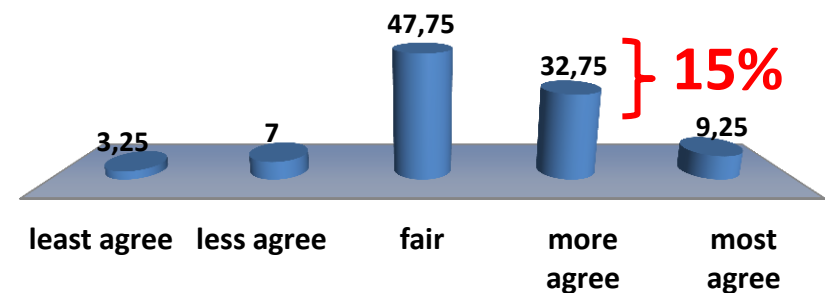
Many nanoproducts should register as chemical



Nanoproducts generate more benefit to industry than risk

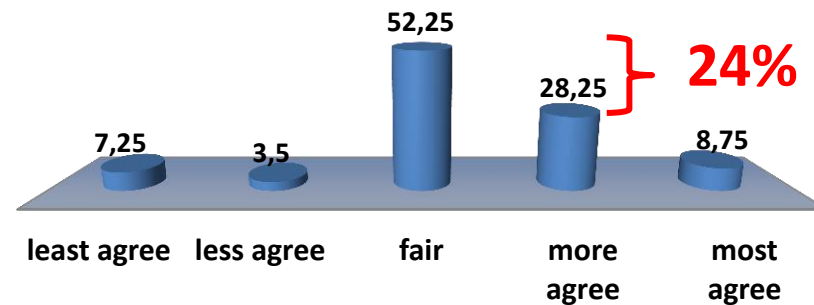


Nanoproducts generate more benefit to medical profession than risk

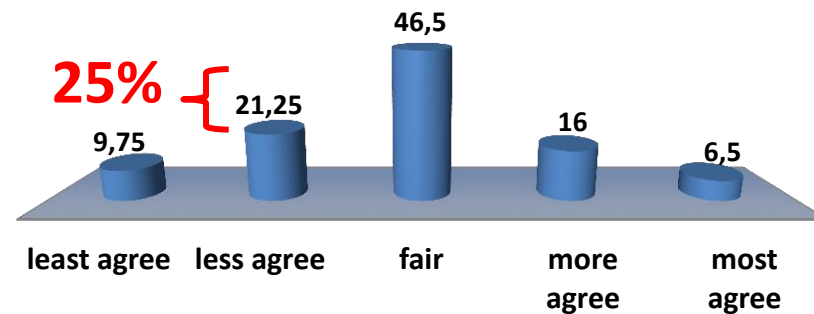


# Attitude on nanotechnology

Nanoproducts generate more benefit to electronic industry than risk



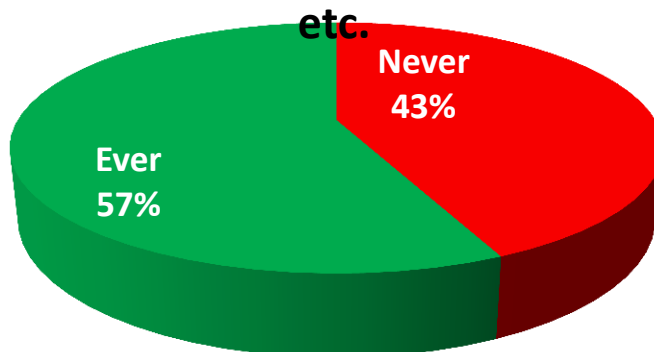
Nanoproducts may increase environmental pollution



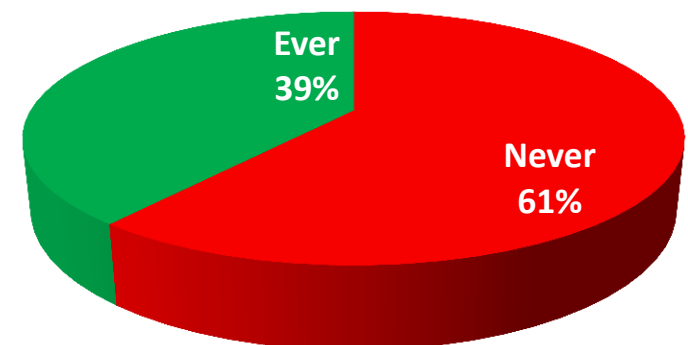
## Adjust proportional probability of nanoproduct usage

•when controlling for gender, age group, education and income, there are about 64.27% of those who obtained S&T information from internet will use nanoproduct at statistical significant level .01

I ever use/expose nanoproducts like cosmetic, medicine, coating, etc.



I ever obtained information about safety of nanoproducts





- How to strengthen **“Rights to choose (by know)”** for public (strategic no.3)?
- This study confirmed as mass media **“internet”** still play significant role at this moment under Thai context.
  - What information on internet still need further studies.

## Empirical finding

- **Low level of Thais understanding toward safety & ethic of nanotechnology still exist while internet significantly affects public perception about S&T information**



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THANK YOU