

# Nanoteknologi dan Peluang Bisnisnya

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- ❖ Peneliti di Pusat Teknologi Farmasi dan Medika BPPT
- ❖ Ketua Divisi Nano Farmasi, Masyarakat Nano Indonesia
- ❖ Komisaris PT Nanotech Herbal Indonesia

# DR ETIK MARDLIYATI, M.ENG



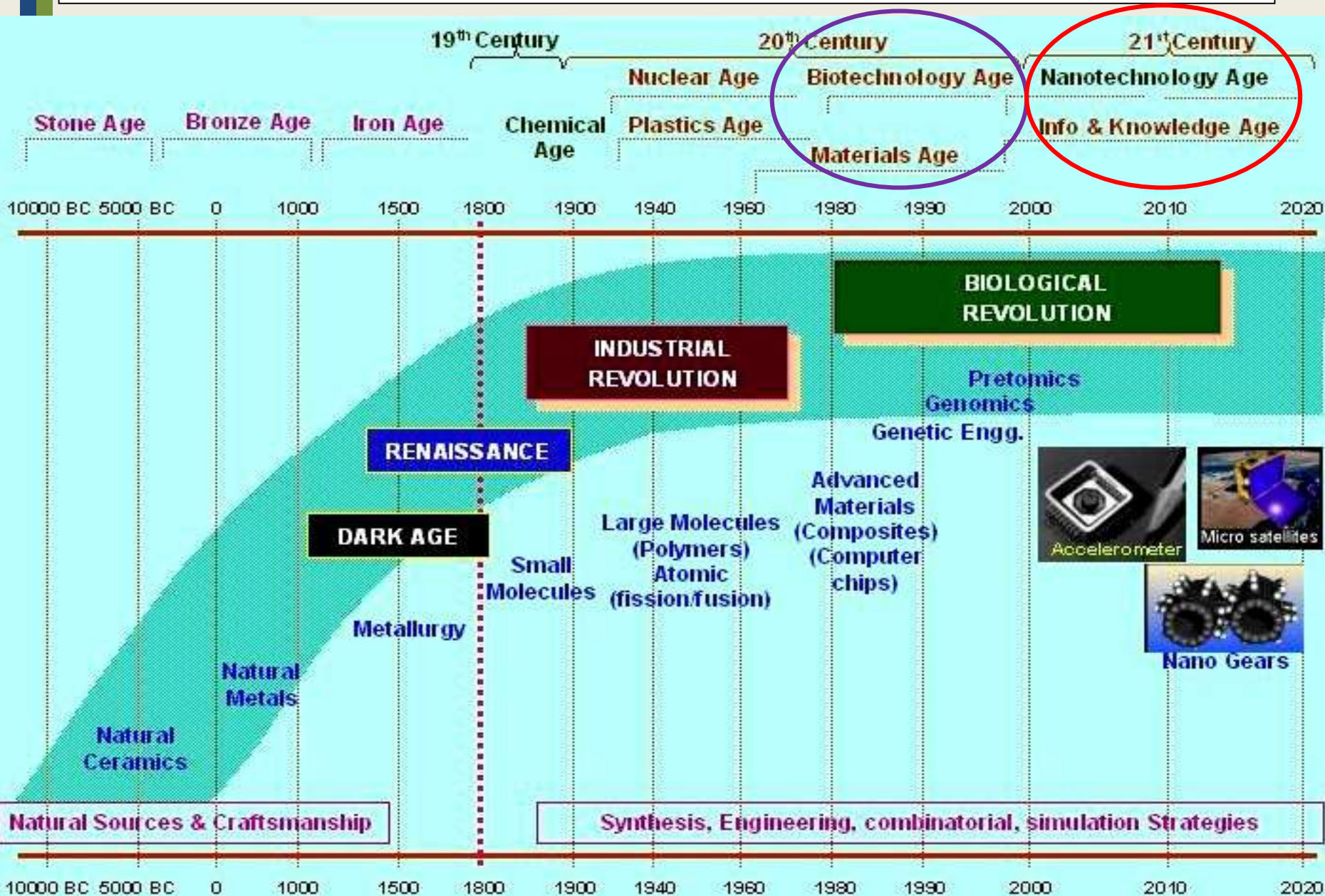
TTL	: Kediri, 30 September 1971
Pekerjaan	: Peneliti di Badan Pengkajian dan Penerapan Teknologi
Jabatan	: Peneliti Senior Pusat Teknologi Farmasi dan Medika Komisaris PT Nanotech Herbal
Alamat Kantor	: Gedung 614 LAPTIAB
Pendidikan	: S1, Teknik Kimia Terapan, Kumamoto University S2, Teknik Kimia, Kagoshima University S3, Ilmu & Rekayasa Material, Kagoshima University
Bidang Keahlian	: Biomaterial, Nanoteknologi



# NANO TEKNOLOGI



# TEKNOLOGI DARI MASA KE MASA



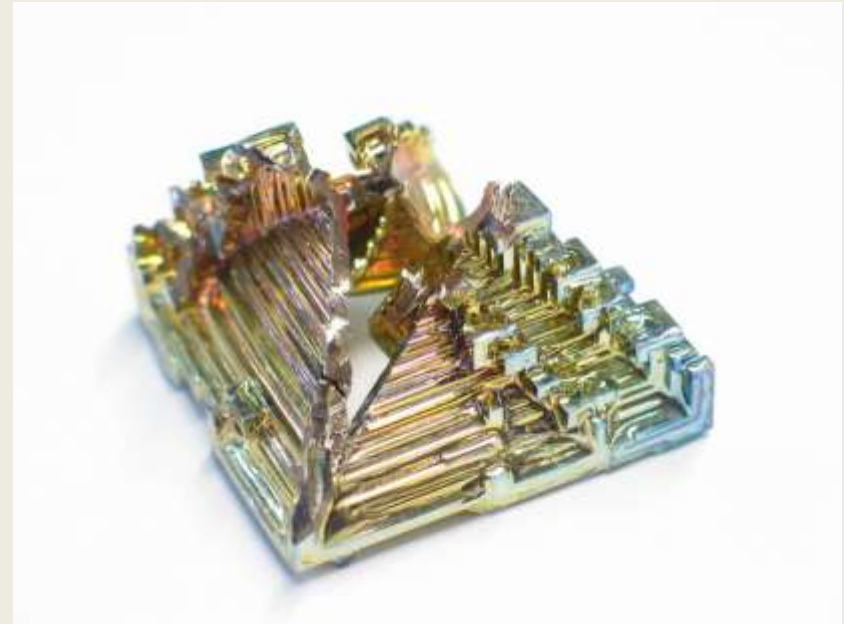


# SEJARAH NANOTEKNOLOGI

The concepts of nanotechnology are not new to nature or to mankind. An early example of a manmade nanoproduct is stained glass.



Stained glass windows



Picture of gold nano particles

## History of nanotechnology



Richard P. Feynman

**"There's Plenty of Room at the Bottom"**

Why cannot we write the entire 24 volumes of the Encyclopaedia Britannica on the head of a pin?

Nobel Prize in Physics 1965



K. Eric Drexler

First used the term "nanotechnology" in a 1974



Norio Taniguchi

**Gives the idea of Molecular Machinery, Manufacturing, and Computation in 1980's**

1 nanometer = 1 per billion meter

1 nm =

1

1.000.000.000

m

**One Billion!!!!**



50 mikrometer = 50.000 nanometer

# Berapa besar ukuran nanometer?



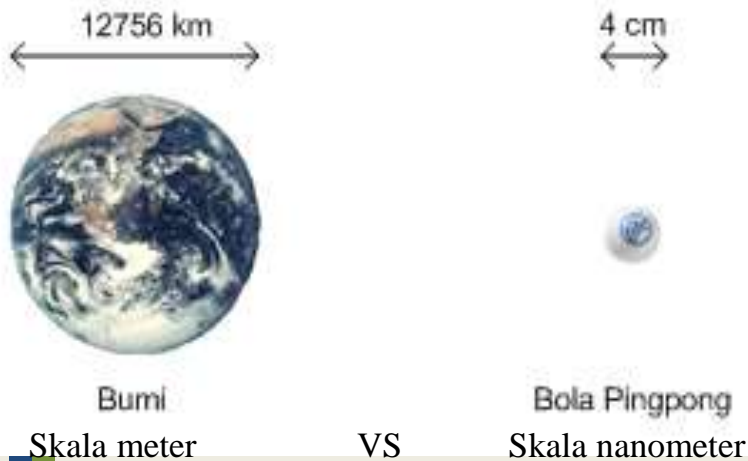
- Ketebalan ukuran kulit gelembung sabun ketika ada warna pelangi sebelum meletus



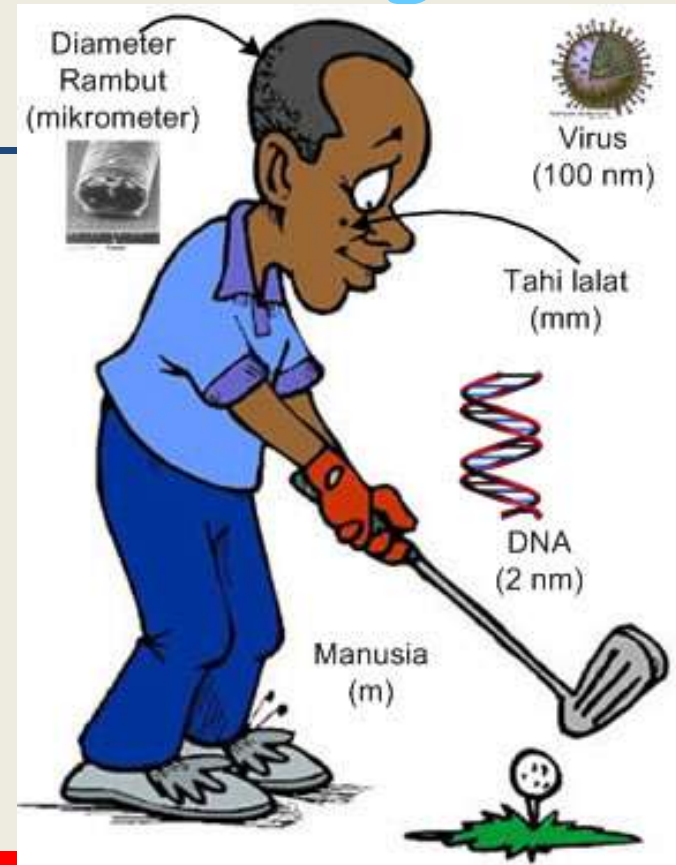
# Nanosains dan Nanoteknologi?

## Nanosains?

Ilmu yang mempelajari tentang sifat-sifat bahan/ objek dan fenomena alam yang terjadi dalam ukuran di bawah 100 nanometer ( $1 \text{ nm} = 10^{-9} \text{ m}$ ).



Perbandingan skala meter dan nanometer, seperti bumi dan bola pimpong.



## Nanoteknologi?

Ilmu dan teknik menyusun dan mengontrol atom demi atom atau molekul demi molekul untuk membuat "new world".

# Selamat datang di dunia NANO..

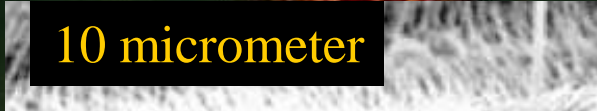
1 centimeter



100 micrometer



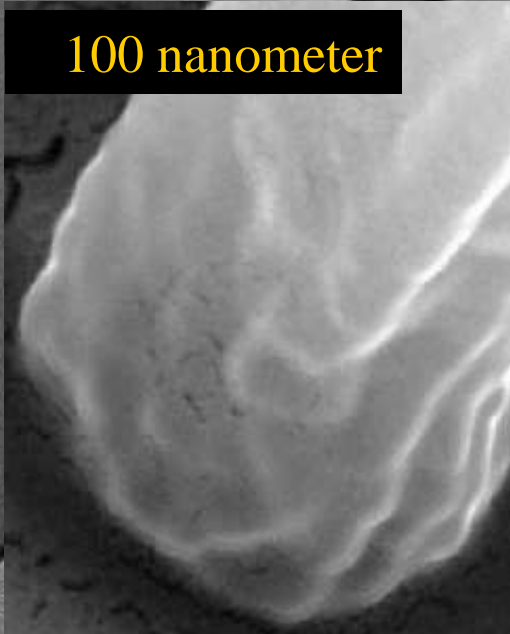
10 micrometer



1 micrometer



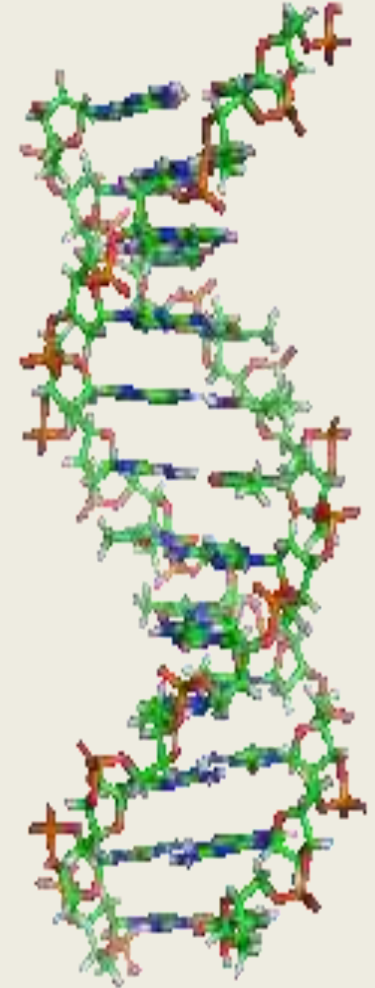
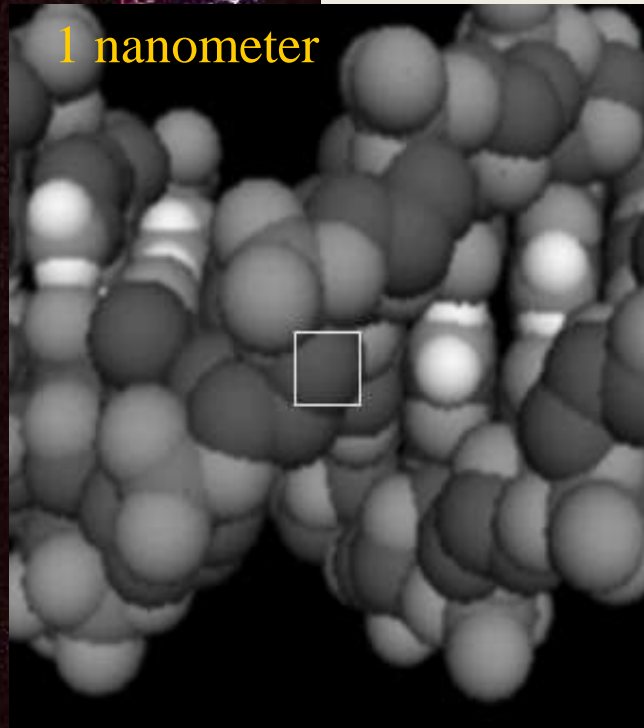
100 nanometer



10 nanometer

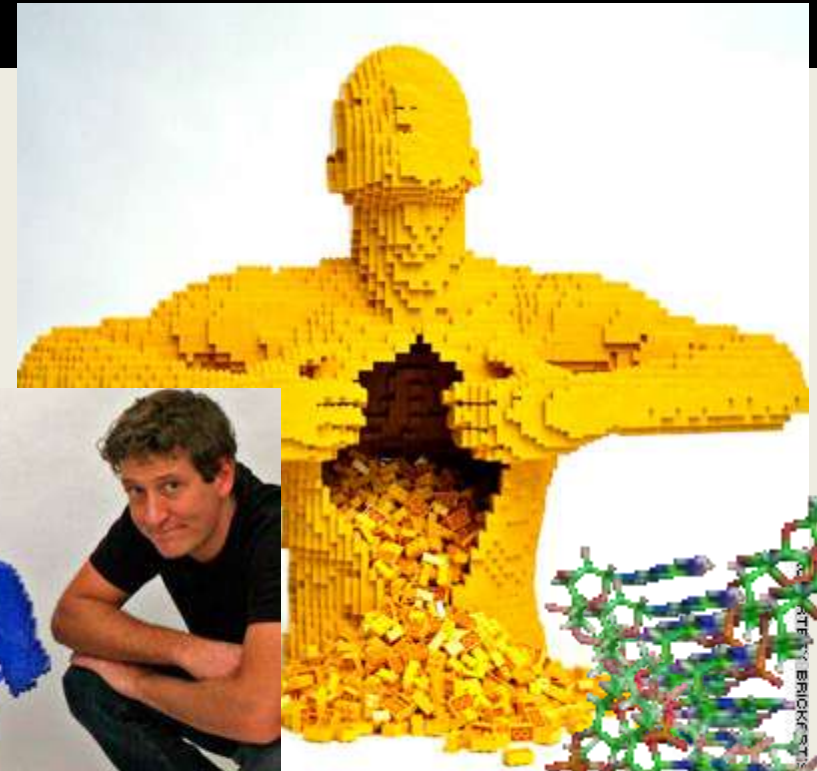


1 nanometer



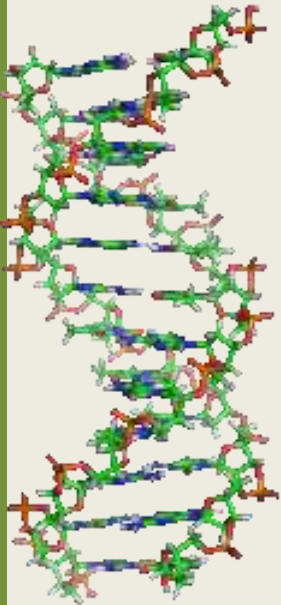
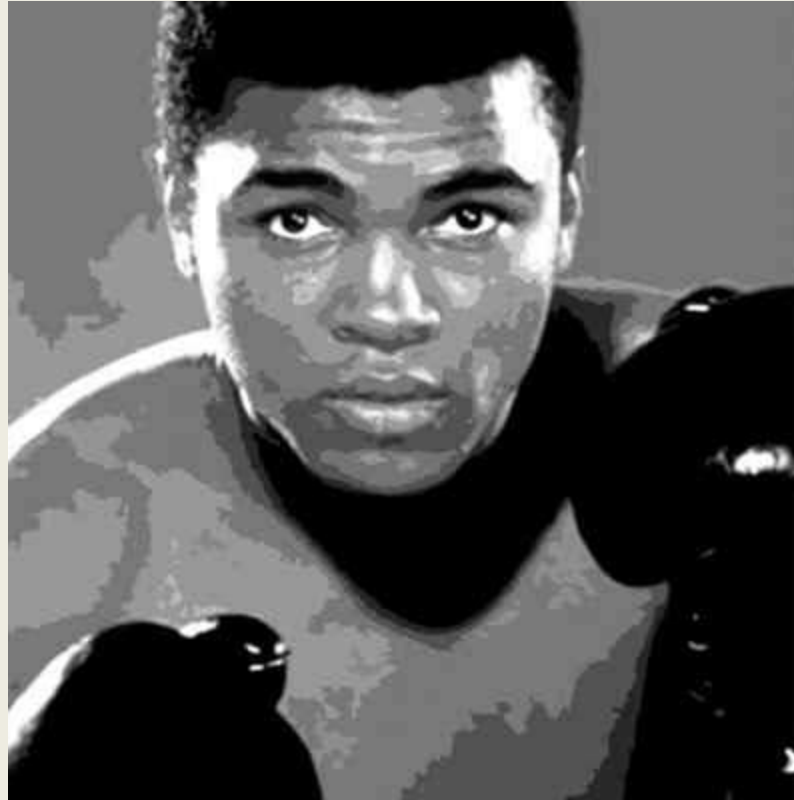
DNA; 2-3 nm

# MATERIAL NANO: BLOK LEGO



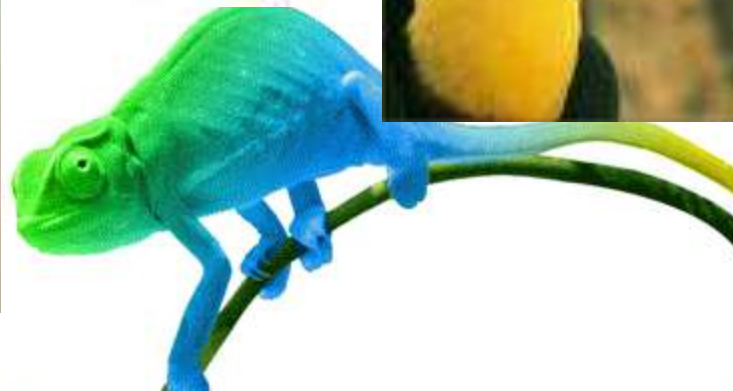


# Perbedaan LEGO

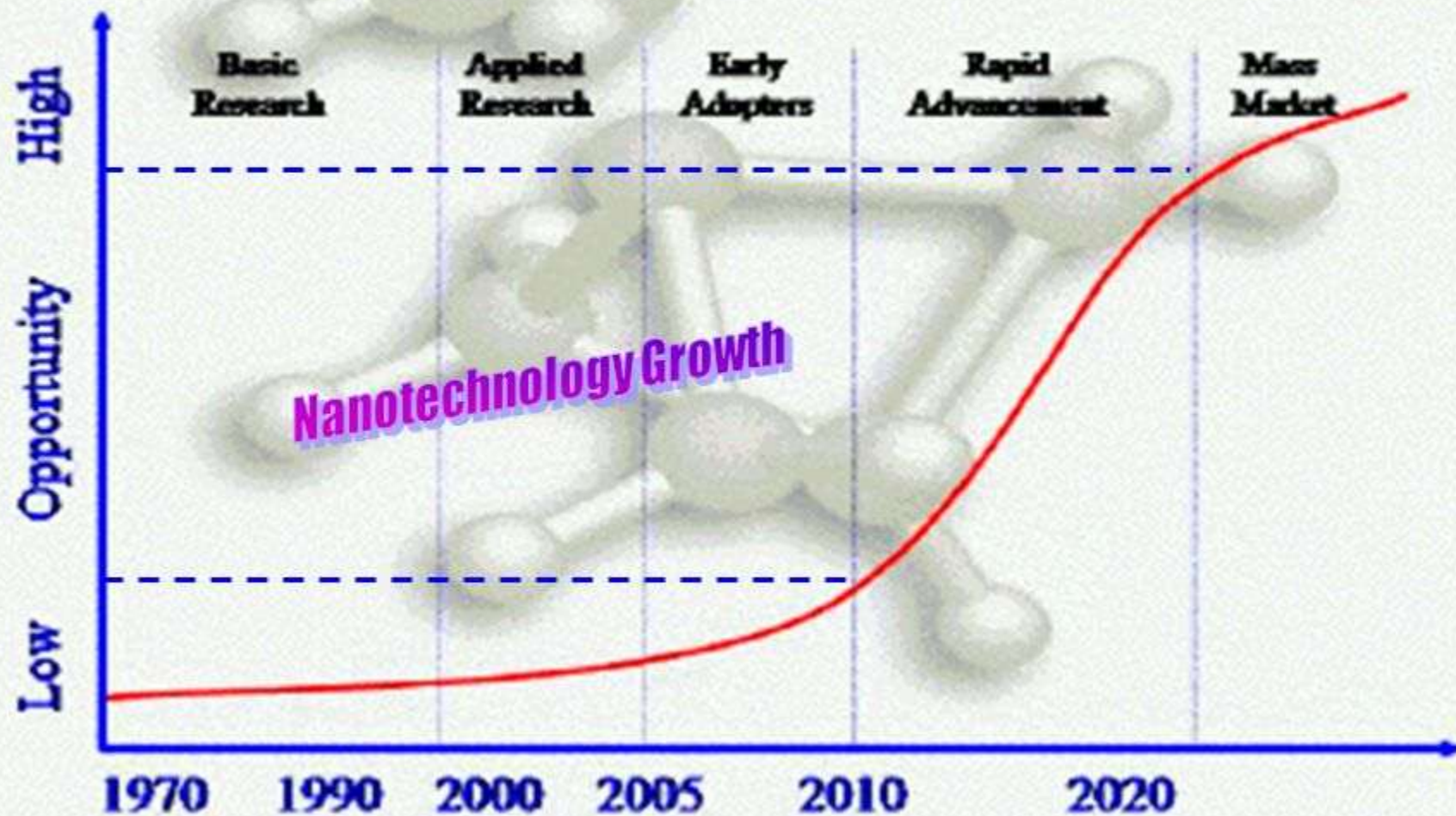




# NANO di Alam

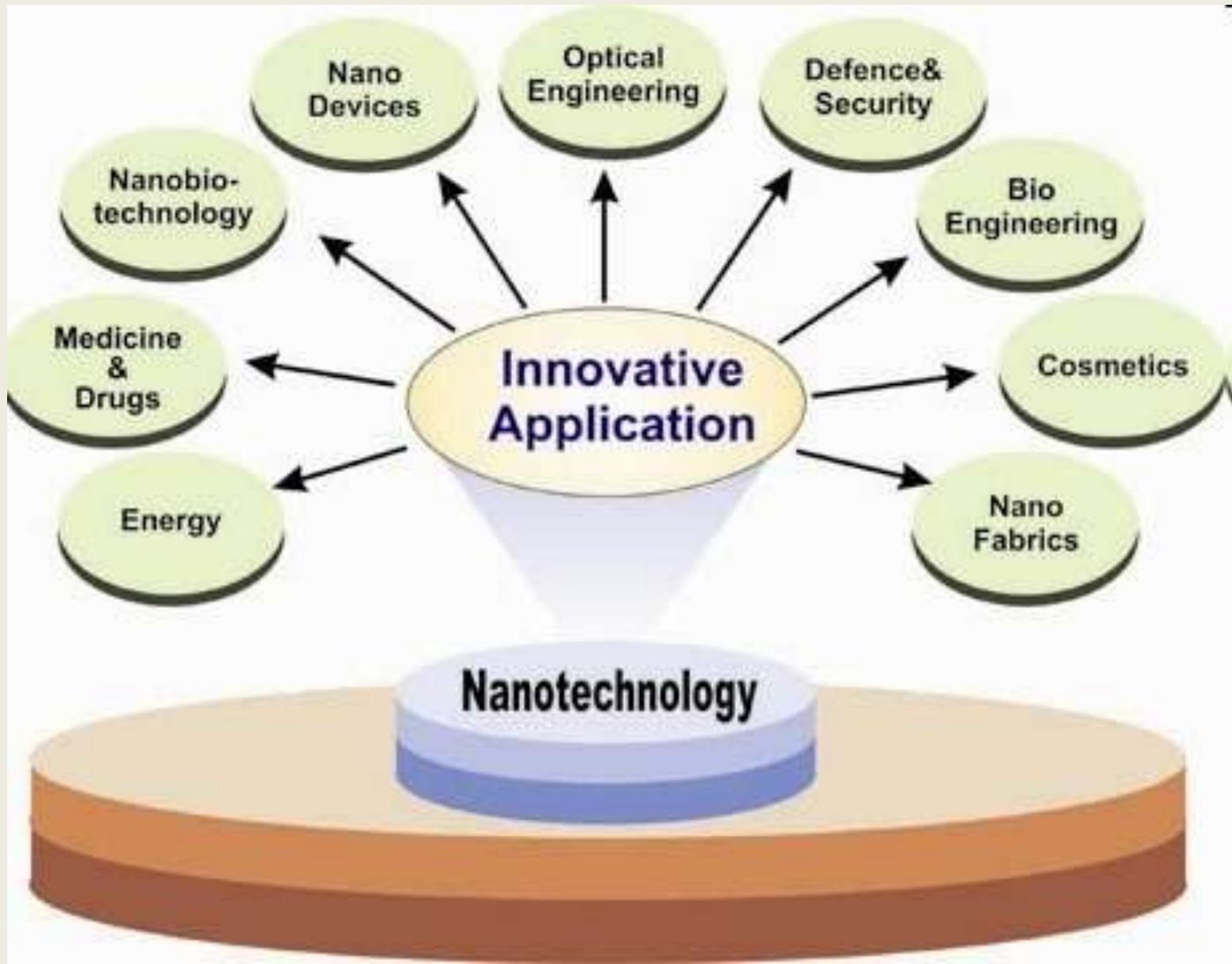


# The Evolution of NanoTechnology





# Diverse applications of nanotechnology in today's life



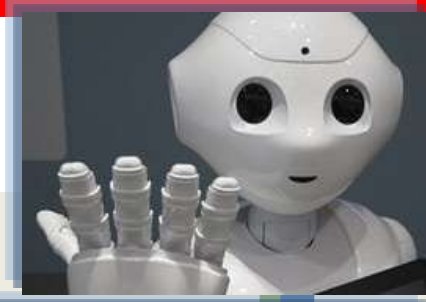






# Produk2 berbasis nanoteknologi

Dewasa ini, banyak produk-produk berbasis nanoteknologi yang telah dijual bebas di Indonesia!



**fatigon**  
**SPIRIT**  
MEMBANTU MEMULIHKAN STAMINA  
TENAGA DAN AKSIKORAN

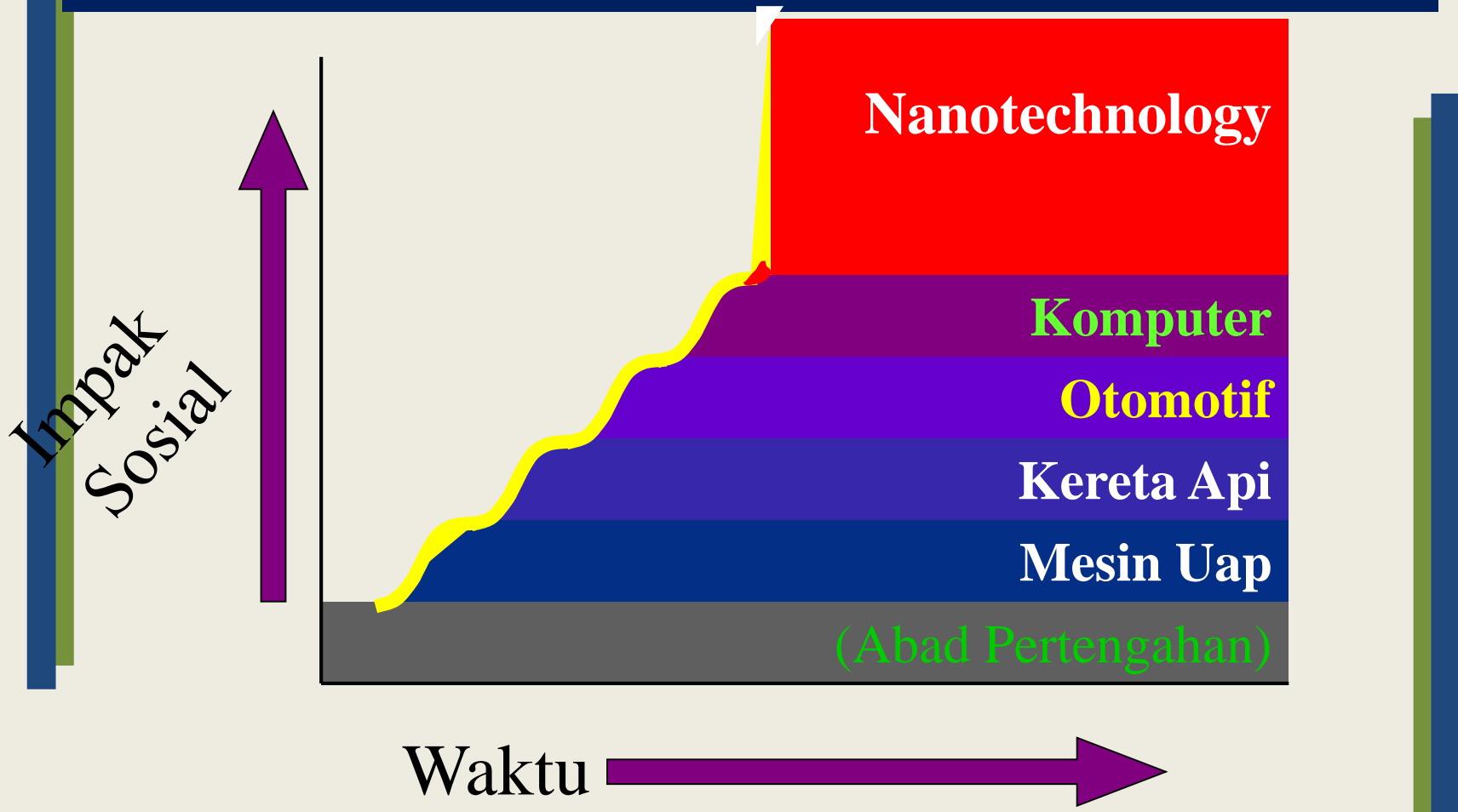
**LEBIH SPIRIT**  
dengan  
**Improved Formula**

**STAMINA LAGI  
DAN LAGI**

**BCAA**  
Lebih Berenergi,  
Lebih Tahan lama

**Nano Ginseng**  
Lebih Cepat diserap,  
Lebih Berstamina

# Revolusi Nanoteknologi




**Revolusi Nanoteknologi akan memberikan dampak sosial sebanding dengan 4 revolusi industri sebelumnya dgn waktu yang lebih cepat**





**NANOTECH  
BASED  
PRODUCTS**

- **Good market acceptance**
- **Major investments already over**
- **Time to reap the benefits**

- 
- **Low returns, high investment**
  - **Toxicity/safety concern**
  - **Poor intellectual rights protection**
  - **High risk/uncertainty**
  - **Absence of harmonized regulation**
  - **Developmental and scale up issues**



**CONVENTIONAL  
PRODUCTS**



# Peningkatan Investasi Global pada Nanoteknologi



Cumulative global funding of nanotechnologies (source: Cientifica Ltd 2011)



**PROSPEK  
PEMANFAATAN  
NANOTEKNOLOGI  
DI INDONESIA**



# INDONESIA



✓ Indonesia dikarunia kekayaan sumber daya alam termasuk keragaman hayati (no 2 di dunia) → Sbg bahan baku produk nano



✓ Populasi terbesar no 3 di Asia dan no 4 di dunia ± 275 juta populasi → Potensi Market



# Tanaman Obat



Temulawak  
(*Curcuma xanthorrhiza* ROXB.)



Sambiloto  
(*Andrographis paniculata* Ness)



Brotowali  
(*Tinospora crispa* L.)



Pegagan  
(*Centella asiatica*)



Jahe  
(*Zingiber officinale*)



Laban Abang  
(*Aglaia odorata*)



Keji Beling  
(*Strobilanthes  
crispus*)



Kina  
(*Chinchona* spp)  
Source: from many literatures



# TANAMAN UNTUK PERAWATAN TUBUH DAN KOSMETIK



Aloe vera  
(*Aloe barbadensis*  
Milleer)



Papaya  
(*Carica Papaya* L)



Jasmine  
(*Jasminum sambac*



Cananga  
(*Canarium*



Seaweed  
(*Zingiber officinale*)



Mangosteen  
(*Garcinia mangostana*)



Langsat  
(*Lansium domesticum*)



Kemuning  
(*Murraya paniculata*)  
Source: <http://www.chemeditions.com> literatures

# IRONI PEMANFAATAN SUMBER DAYA ALAM

## Studi Kasus Pasir Besi



Nilai Ekspor Rp. 500 Trilyun

- Ekspor Bahan Mentah
- Tujuan



Penyerapan Lapangan Kerja Tinggi:

- Pekerjaan lapangan
- Minim pekerja intelektual




Kebutuhan Industri Tinggi

- Mengapa diekspor?
- Mengapa tidak digunakan sendiri?

**MENGAPA BISA TERJADI?**



- 
- A world map with various regions color-coded: North America (orange), South America (light blue), Europe (purple), Africa (pink), Asia (yellow), and Australia (red). Indonesia is highlighted in red and has a circular inset image of a large cargo ship. Two text boxes are overlaid on the map.
- SDA Indonesia tanpa diolah diekspor besar2 an dengan harga murah

- Impor bahan  $\frac{1}{2}$  jadi dari bahan mentah yang kita ekspor
- Harga naik menjadi minimum 10 kali lipat hingga 1000 kali lipat

### **APA YANG SALAH DI NEGARA KITA?**

- Kemampuan mengolah bahan baku rendah.
- Strategi pengelolaan bahan alam menjadi bahan baku lemah.



**INOVASI NANOTEKNOLOGI  
BERBASIS SUMBER DAYA  
ALAM INDONESIA**



**Bagaimana  
inovasi yang  
berdampak?**



# Hasil Penelitian



# INOVASI HASIL LITBANG

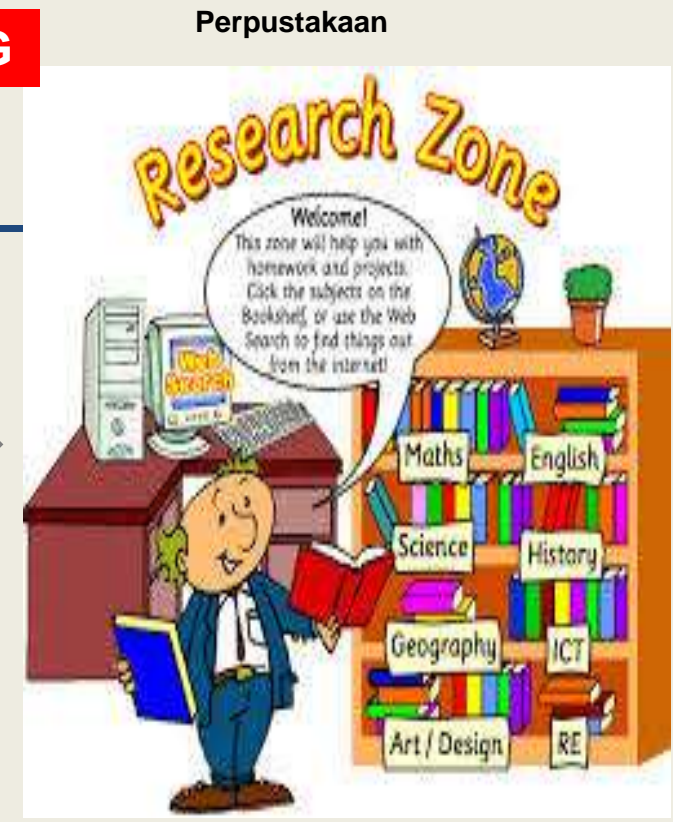
BPPT



R&D Universitas



R&D Kementerian



Perpustakaan

Arsip

Paper



# Komersialisasi

**Hasil riset harus  
bisa dirasakan  
manfaatnya**





# Singgung Anggaran Penelitian Rp 24 T, Jokowi: Apa Hasilnya?

Hendra Kusuma - detikFinance



Home Nasional Internasional Ekonomi Olahraga Teknologi Hiburan Gay

Home > Nasional > Berita Peristiwa

## Anggaran Riset 2017 Rp29,9 Triliun, Hasilnya Dipertanyakan

Ihsan Dalimunthe, CNN Indonesia | Senin, 04/06/2018 20:56 WIB

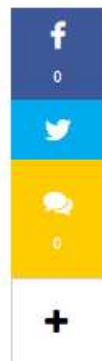
Bagikan :   

Home > Oto Tek > Trendtek

## Menristek: Penggunaan Anggaran Riset Harus Berbasis Hasil

Rabu 17 January 2018 12:48 WIB

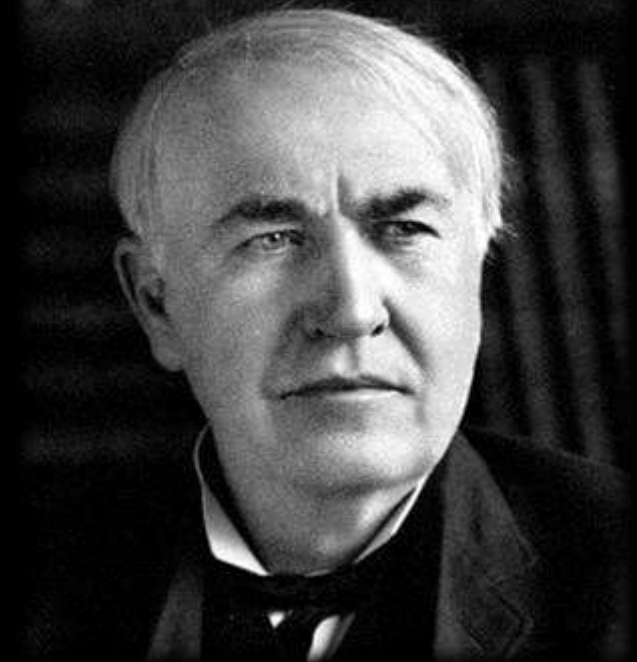
Red: Esthi Maharani



“Anything that won't sell, I don't want to invent.  
Its sale is proof of utility, and utility is success.”

~**Thomas Edison**

“I found out what the world needs.  
Then I go ahead and **INVENT** it”



# Nilai sebuah inovasi ditentukan di pasar/ ketika dapat dirasakan manfaatnya

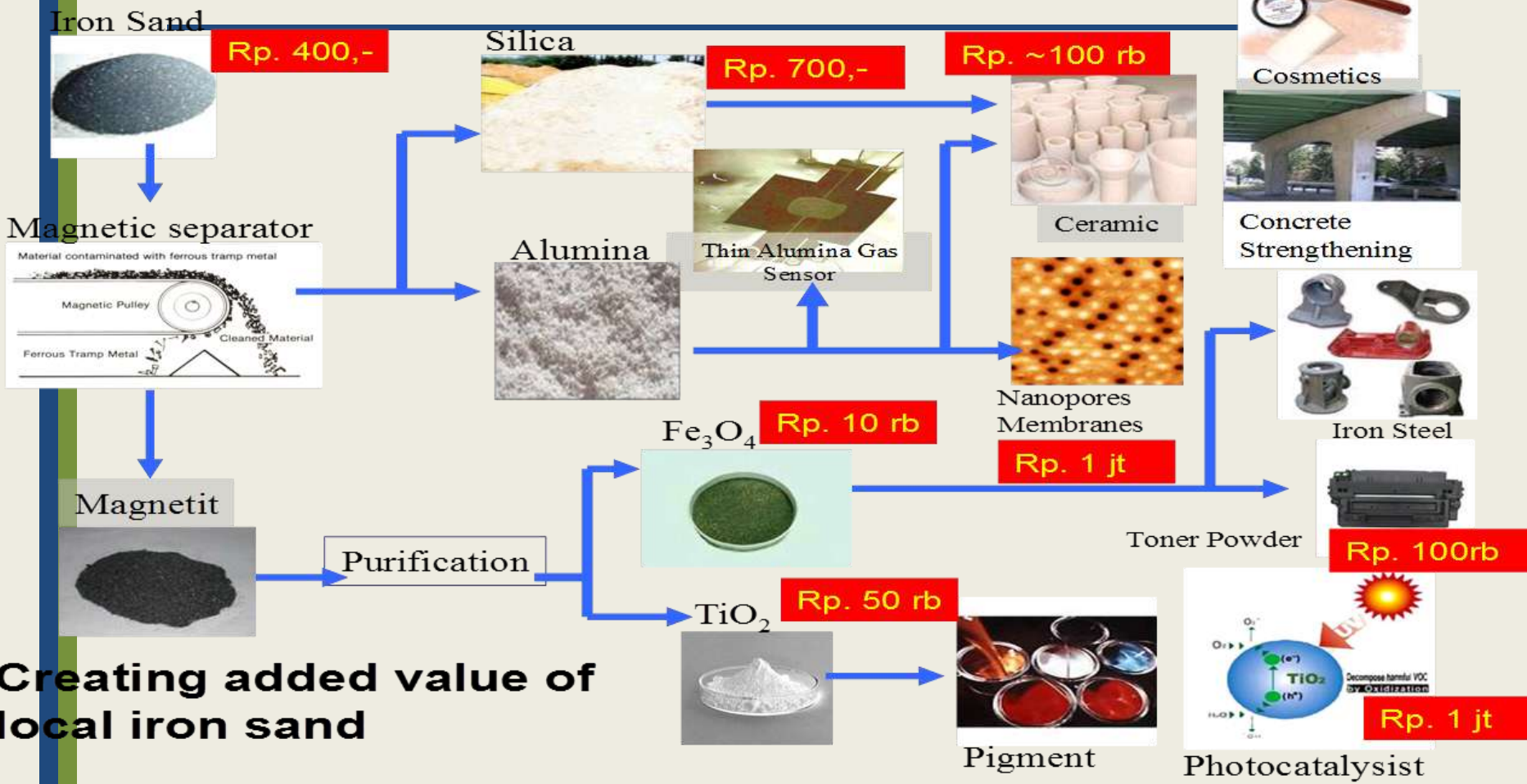
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- “... the test of an *innovation*, after all, lies **NOT in its novelty, its scientific content, or its cleverness. Its lies in the success in the marketplace...**” Peter F. Drucker (1993)
- Nilai suatu inovasi ditentukan di pasar
- Komersialisasi KI/teknologi (pada barang atau jasa)
  - Upaya membawa KI berhasil di pasar





# BAGAIMANA IPTEK MEMBERI NILAI TAMBAH PADA SUMBER DAYA ALAM ?

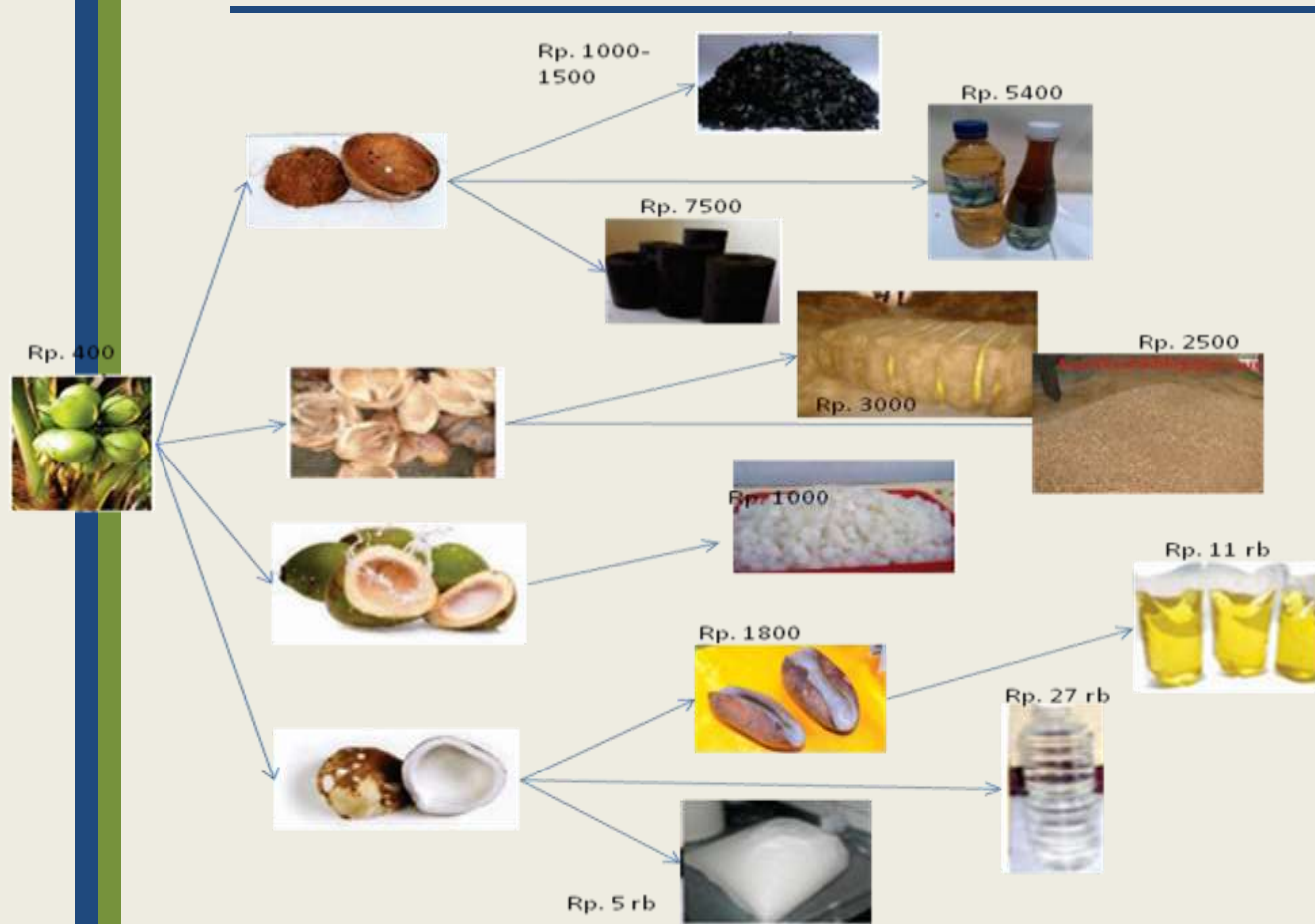


**Creating added value of local iron sand**



# BAGAIMANA IPTEK MEMBERI NILAI TAMBAH PADA SUMBER DAYA ALAM ?

## Studi Kasus Komoditi Kelapa

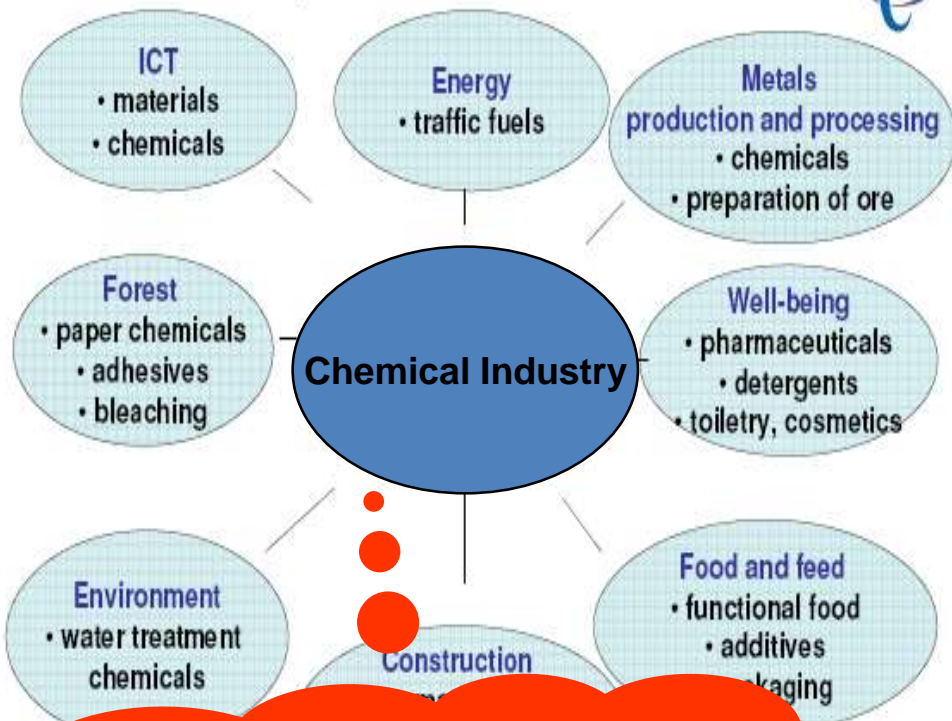




# INDUSTRI PENGOLAHAN BAHAN BAKU: PARA PEMAIN DALAM KANCAH GLOBAL

COMPANY, HEADQUARTERS	Chemical Sales, billions	Rank	Country
BASF SE, Ludwigshafen, Germany	\$65.30	1	Germany
Dow Chemical, Midland, Michigan, United States	\$53.50	2	United States
INEOS, Lyndhurst, UK	\$43.60	3	United Kingdom
LyondellBasell, Houston, Texas, United States	\$42.80	4	United States
Formosa Plastics, Taiwan	\$31.90	5	Taiwan
DuPont, Wilmington, Delaware, United States	\$28.50	6	United States
Saudi Basic Industries Corporation, Riyadh, Saudi Arabia	\$26.40	7	Saudi Arabia
Bayer, AG, Leverkusen, Germany	\$24.20	9	Germany
Mitsubishi Chemical, Tokyo, Japan	\$22.20	9	Japan
Akzo Nobel/Imperial Chemical Industries (ICI), Amsterdam/London	\$19.90	10	Netherlands/United Kingdom
Air Liquide, Paris, France	\$16.30	11	France
Sumitomo Chemical, Tokyo, Japan	\$15.20	12	Japan
Evonik Industries, AG, Essen, Germany	\$14.30	13	Germany
Mitsui Chemicals, Tokyo, Japan	\$14.30	14	Japan
Asahi Kasei, Tokyo, Japan	\$13.80	15	Japan
Toray Industries, Tokyo, Japan	\$13.10	16	Japan
Chevron Phillips, The Woodlands, Texas, United States	\$12.50	17	United States
DSM NV, Heerlen, Netherlands			
PPG Industries			
Shin-Etsu			

## Chemical Industry in Industrial Clusters



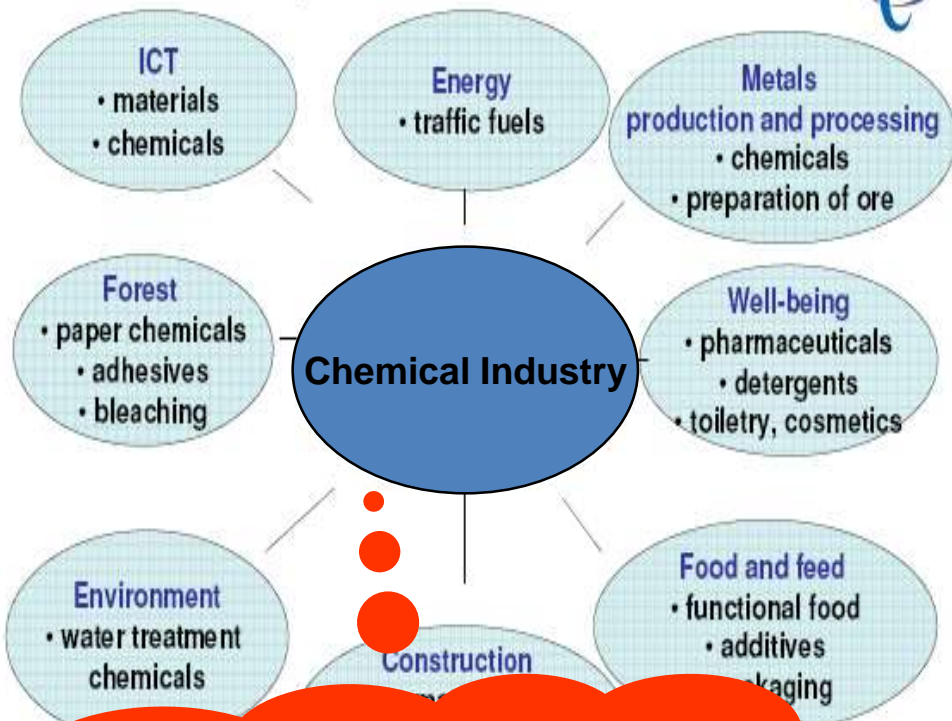
**Dominasi oleh Eropa, Amirika, Jepang**

**Bernilai lebih dari 30,000 triliun rupiah pertahun**

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Chevron Phillips, The Woodlands, Texas, United States	\$12.50	17	United States
DSM NV, Heerlen, Netherlands		18	Netherlands
PPG Industries, Allentown, Pennsylvania, United States		19	United States
Shin-Etsu, Tokyo, Japan		20	Japan

## Chemical Industry in Industrial Clusters



**Dominasi oleh Eropa, Amirika, Jepang**

**Bernilai lebih dari 30,000 triliun rupiah pertahun**



Kalimantan timur

Freeport

**FAKTA**

**Pertambangan asing  
di seluruh pelosok  
Daerah di Indonesia**

Kapal keruk pasir emas di  
sungai Batang Hari



Tambang bijih besi, Kalsel





# Produk pertanian kita

Penanganan pasca panen masih lemah dan tidak berteknologi

- ❑ Mutu rendah
- ❑ Harga murah
- ❑ Tidak tahan lama
- ❑ Rantai pemasaran tidak jelas
- ❑ dlsb

**FAKTA**



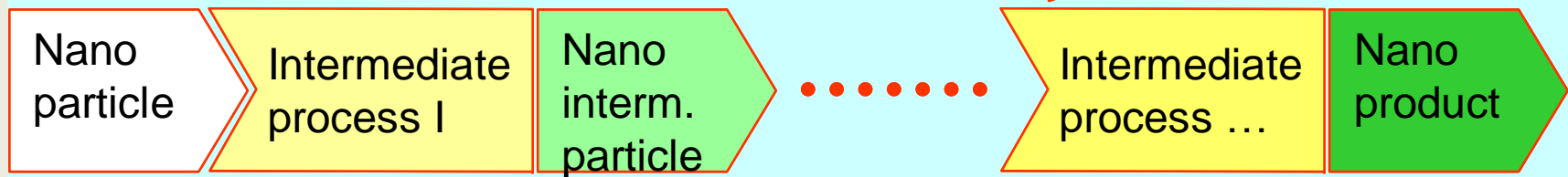
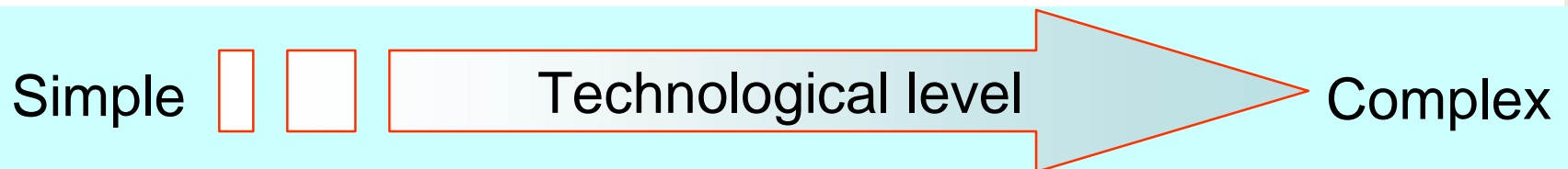
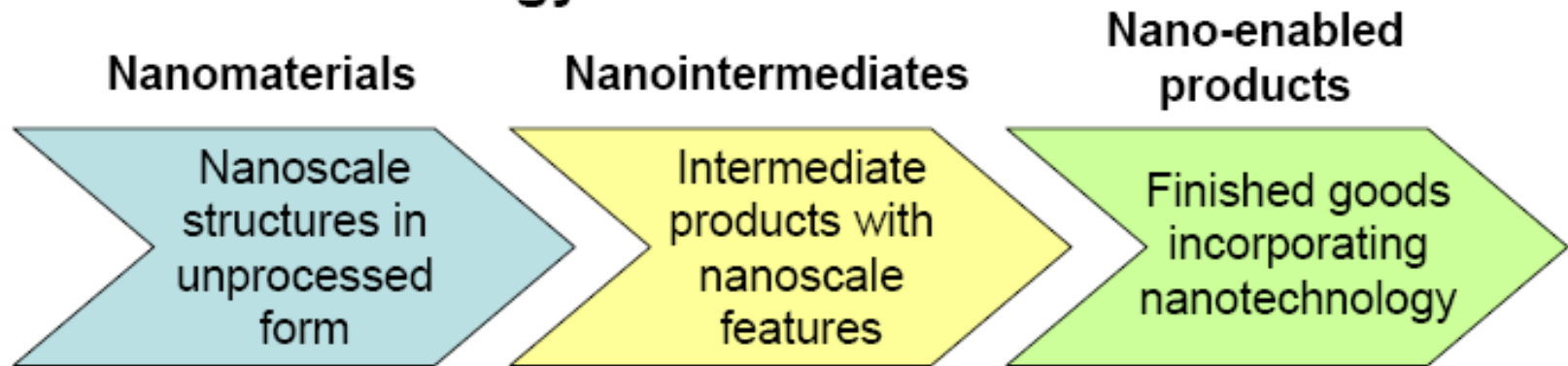


# Kondisi Petani Kita? Petani masih belum banyak perubahan! Pendapatan kecil, SDM rendah, termarginalkan!



Foto: Pesisirselatan.go.id

# The nanotechnology value chain

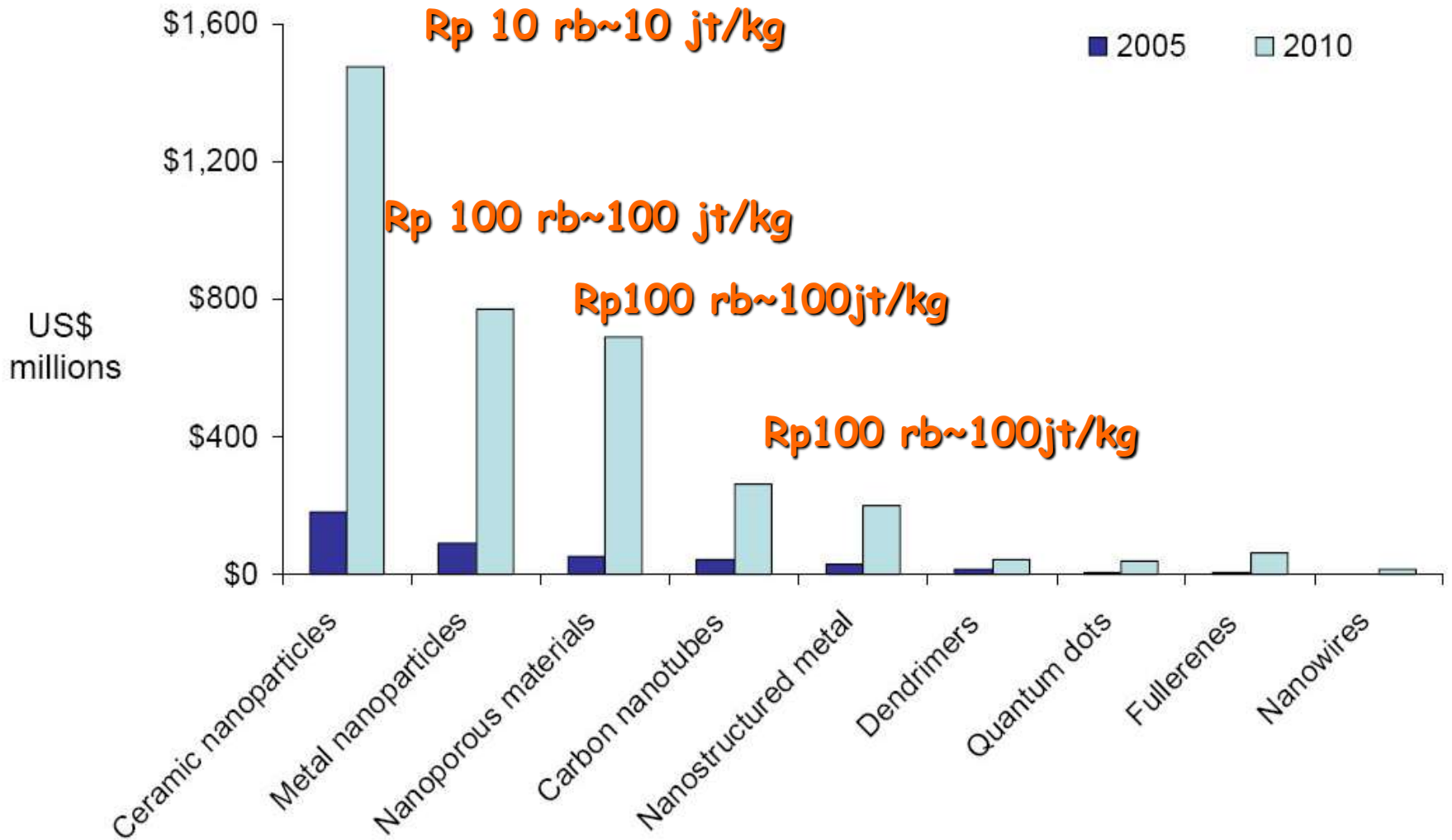


Capital equipment and software used to visualize, manipulate, and model matter at the nanoscale

Atomic force microscopes, nanoimprint lithography equipment, nanomanipulators...

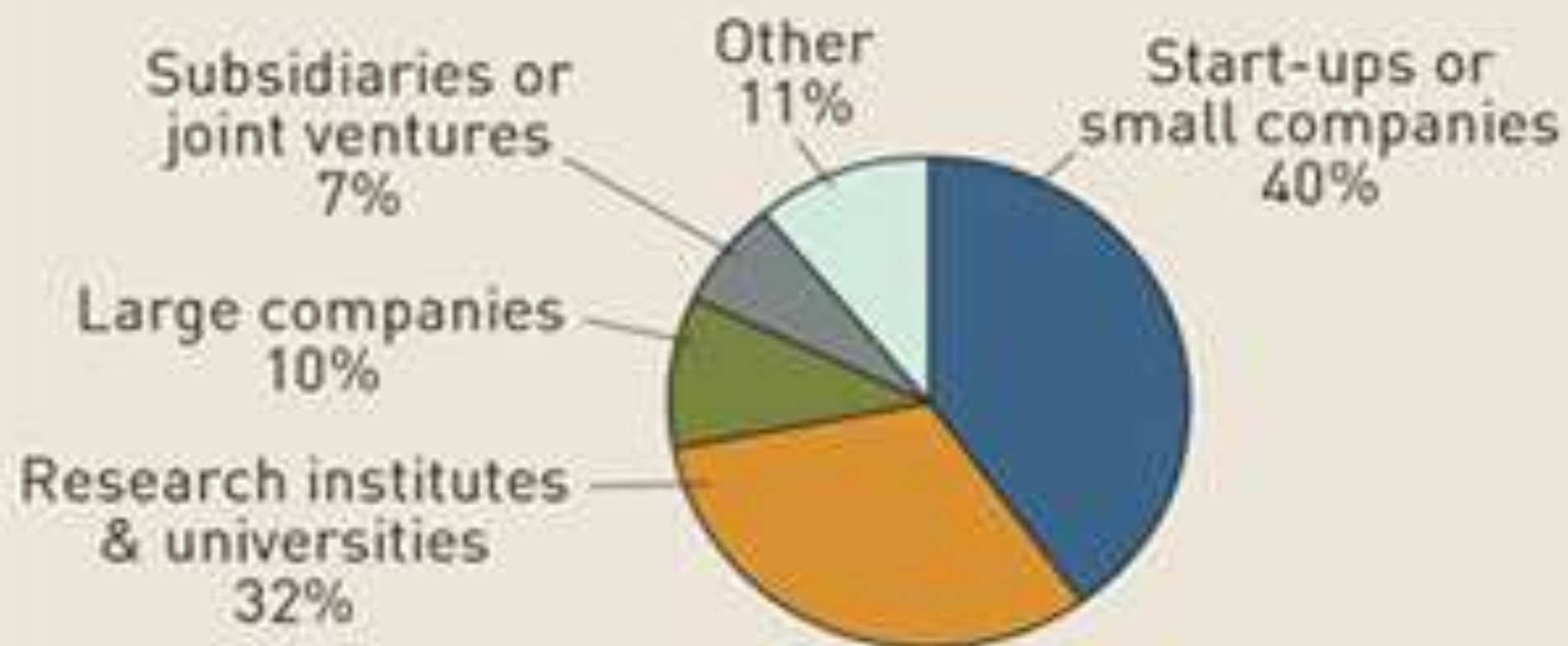


# Peningkatan tren pemakaian nanopartikel selama periode 2005 - 2010



# PLAYERS

Many small firms and universities dabble in nanotech



Worldwide nanotech organizations in 2002 = 1,250

SOURCES: Cientifica, Jaakko Pöyry Consulting

# Sumber bahan baku untuk nanopartikel dari tanaman herbal

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- Nanopartikel dapat dibuat dengan berbagai ukuran dengan fungsi tertentu dari bagian-bagian tanaman seperti:
  - *Pohon, Tangkai daun,*
  - *Akar,*
  - *daun,*
  - *buah,*
  - *Bijih dlsb*



SL No.	Nanoparticle Name	Functionalization	Uses	Method of synthesis
1	Curcumin	Anticancer	Potent Anticancer and Antitumor.	Wet-milling technique.
2	Paclitaxel	Antineoplastic	Acts against several tumours, ovarian and breast cancers.	Nanoprecipitation.
3	Berberin	Anticancer	Inflammation and several cancers.	Emulsion, Ionic gelation.
4	Camptothecin	anticancer	Potent anticancer	Encapsulated with hydrophobically modified glycol.
5	Ginkgo biloba	Alzheimer's dementia	Acts against loss of memory, thinking, language, behaviour.	Combination of Dry and wet process. (Gas-phase and liquid-phase grinding)
6	Triptolide	Anti-arthritis	Inflammatory and autoimmune diseases, especially for rheumatoid arthritis.	Nano encapsulation
7	Salvia miltiorrhiza	Anti-hyperlipidaemia	Cerebrovascular diseases, improve blood stasis.	Phospholipid complex loaded.
8	Quercetin	Anti-oxidant	Potent anticancer	Gelatin and chitosan loaded.
9	Breviscapine	Anti-cardiovascular	Cerebrovascular and cardiovascular diseases also against pulmonary fibrosis.	Lipid encapsulation.
10	Naringenin	Antioxidant, Anti-inflammatory.	Acts against several tumours and hepatoprotective.	Nano precipitation.
11	Dodder	Antioxidant	Acts against carcinogenesis and ageing also used as hepatoprotective.	Nano precipitation.
12	Silymarins	Hepatoprotective	Several liver diseases, breast cancer.	Cold homogenization.
13	Genistein	Antioxidant	Used in cardiovascular diseases, breast and uterine cancer also in osteoporosis.	Nano emulsion and chitosan microsphere.
14	Centella asiatica	Anxiolytic	Acts as anti-anxiety, also used in leprosy, cancer, syphilis and allergy.	Ionic gelation.
15	Annual mugwort	Antimalarial	Also used for Asthma	Hydrophilic encapsulation.

IMPAK NANO

KUNYIT

Nanopartikel  
Kunyit

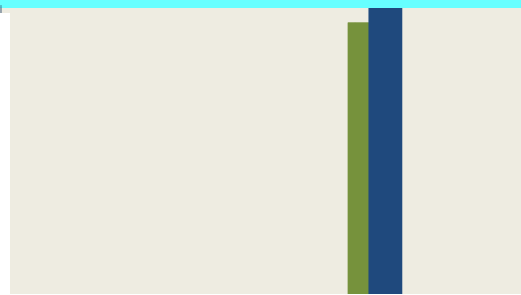




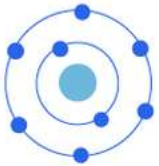
# IMPAK NANO

## Kulit Manggis

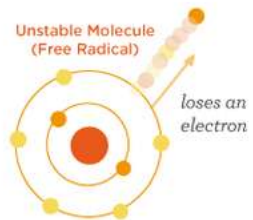
# Nanopartikel kulit manggis



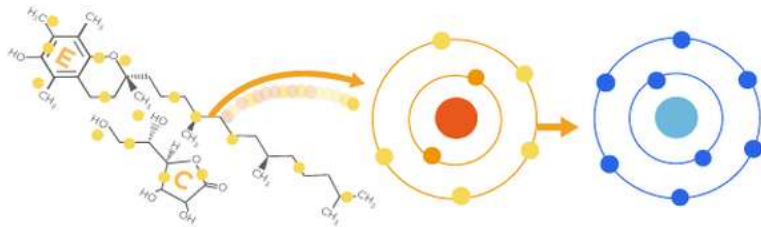
Stable Molecule



Unstable Molecule (Free Radical)



## ANTIOXIDANTS



Antioxidants, like Vitamin C and E, stabilize free radicals by sharing electrons to unstable compounds.



# Nanopartikel Kitosan dari limbah cangkang udang

crustaceans

- Cosmetics (anti aging, etc)
- Wound Healing
- Drug Delivery
- Anti bacteria



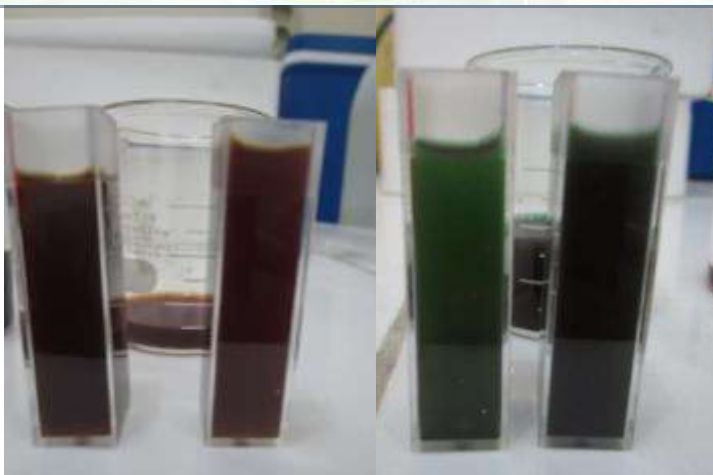
Hydration ↓

Cell Proliferation ↓



# Development and production of nanoherbal materials

Nano-propolis, nano-spirulina, nano-ginseng, nano-curcumin, nanotongkat ali, etc.





# RICE NANOPARTICLE



- ❑ Special order from Gizi Indonesia, Ltd
- ❑ As active ingredient, UV protection, and opacity agent

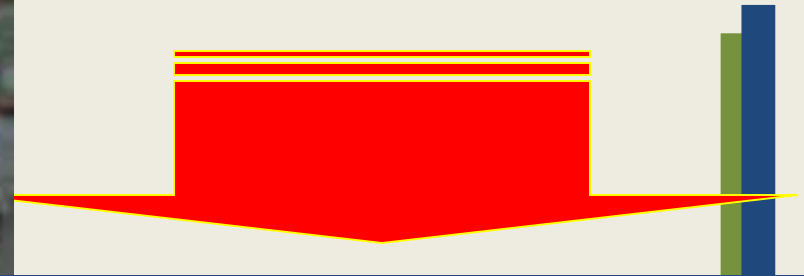






Dominasi supply kebutuhan dunia





Bahan baku  
Nanokalsium organik





**TONER LASER PRINTER**

**IMPAK NANO**

**PASIR BESI**





# NANOTECH IMPACT

# Red Oxide Nanoparticle for Coating anti-corrosion



**Black Oxide Nanoparticle for Toner**



**IRON SAND**



# IMPAK NANO

## Pasir kuarsa

# Nanopartikel Silika





Dengan Nanoteknologi SDA kita dapat ditingkatkan nilai tambahnya secara signifikan

# NANOTECHNOLOGY





5 ton kunyit: Rp 10,000,000,-



Nilai tambah  
nanoteknologi



Super slim Laptop  
Rp. 10.000.000,-

5 kg kunyit nanopartikel  
Rp 10,000,000,-

# Laptop slim super canggih

Keuntungan  
Rp.?



# Nilai tambah nanoteknologi



**HP Canggih  
Rp. 2,000,000,-**



**Nanopartikel Kulit manggis  
1 kg: Rp. 2,000,000,-**





# HP mungil super canggih



Keuntungan  
Rp.?



***“The (nano) tsunami is gaining height “,***  
*Tim Harper, Cientifica*



**NANOTEKNOLOGI:  
KERETA TERAKHIR INDONESIA!!!**

*Technology Train*





WHAT WE ARE DOING?

*Democratize Nanotechnology*



<http://center.nano.or.id>

# HOW TO START A START-UP

by Anna Vital

# Make a Business???



Inspired by eponymous essay by Paul Graham

**F03** Funders and Founders

# NCI Platform



## Technopreneur

- ✓ Ingin berbisnis
- ✗ Tidak memiliki produk yang unggul



## We Provide

- Seed Capital
- Co-Working Space
- Business Coaching
- Investors and Strategic Partners



## Peneliti

- Memiliki invensi ✓
- Awam mengenai bisnis ✗



Supported by 300 Scientists in Indonesian Society for Nano



# Our Start-ups

## PT Gizi Indonesia



PT Gizi Indonesia (est. 1972) is an adapter of our technology through licensing scheme. Their most sold products is Gizi super cream distributed in retail shop, such as Alfa Mart.

"Nano Processing Method"  
Patent no: 500200700086



Provides unique and innovative natural-based beauty and health products enriched with nanotechnology materials.

**PT Nanotech  
Natura  
Indonesia**



**Aulia Rifada (CEO)**  
"...Let's spread nanotechnology in every beauty.."

"Nanoparticle Synthesis Machine"  
Patent no: P00200700207



## PT Nanotech Herbal Indonesia



Focuses on improving value-added of herbal products with nanotechnology. Current products: nano propolis, nano chitosan, collagen-spirulina mask, etc.

"Chitosan processing method"  
Patent no: P00201200297



## PT Sinergi Nanotech Indonesia

Provides services to industries in form of: failure analysis, remaining life assessment, non-destructive testing, corrosion prevention, etc.



**Sulthoni Akbar, M. Si (CEO)**  
"Your partner to ensure your machineries work well."

**nanobubble**<sup>®</sup>  
*is the first & largest Nanotechnology Implementation start-up to increase productivity in shrimp and fish cultivation in Indonesia.*



**Hardi Junaedi**  
 CEO (+CTO)  
 2 Years in Nanopreneur

**Prof. Nurul Taufiq R.**  
 Advisor  
 Nanotech Expert, +20 Patents in Nanotechnology




**Pre Money Valuation**  
**\$3,45m USD**

**Post Money Valuation:**  
**\$10m USD**

**nano**  
**PROPERTY**

**Our Start-ups**



**COATING REPUBLIC**

Adalah Startup bidang manufaktur yang fokus pada spesial pelapisan dan cat berbasis teknologi.



**Founder**  
Nanda

**Co-Founder**  
Suthon

**Technology Advisor**  
Dedi Hermawan

**Layanan Kami**

- Formulasi
- Produk Cat Inovatif
- Sertifikasi dan Pengujian

**Produk Kami**

- Underwater Coating
- Wet Coating
- Fire Retardant Coating

**Portofolio Kami**

- Wet Coating  
PT. Muara Karang
- Underwater Coating  
Tiang Pancana Dermaga  
PT. Pupuk Kaltim
- Chemical Resist Coating  
PT. Coca Cola
- Anti Fouling Coating  
Kapal Kartini Nuh
- Anti Abrasive Coating  
Kapal Keruk PT. Temah

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Tanya Dr. Vanessa





Home > Fintech > Berita Fintech

# Ini Alasan Bos Tokopedia Hanya Danai Satu Startup Thinkubator

Rahajeng Kusumo Hastuti, CNBC Indonesia  
 FINTECH - 29 March 2019 22:02



thinkubator x Grab

nanobubble

Dedi Cahyadi CEO  
 Hardi Junaedi CEO  
 Rizki Nugraha S. CPO

LIVE 20.00 - 21.00  
**TRANSTV**

Home / Style / Berita Style

# Nano Bubble Keluar Sebagai Pemenang dalam Ajang Thinkubator

Sabtu, 30 Mar 2019 11:15 WIB  
 Edi Santoso, INSERTLIVE



Home > Fintech > Berita Fintech

# Startup Ini Raup Rp825 Juta dari CT Sampai Bos Tokopedia

Rahajeng Kusumohastuti & Yuni Astutik, CNBC Indonesia  
 FINTECH - 29 March 2019 21:23





# ■ NANOBUBBLE RESULT



non Nanobubble

DoC: 53 days  
Weight: 5 - 6 gr/shrimp  
Length: 10 cm



Nanobubble

DoC: 53 days  
Weight: 9 - 10 gr/shrimp  
Length: 11,5 cm

# PENERAPAN TEKNOLOGI NANOBUBBLE UNTUK BUDIDAYA UDANG VANAME

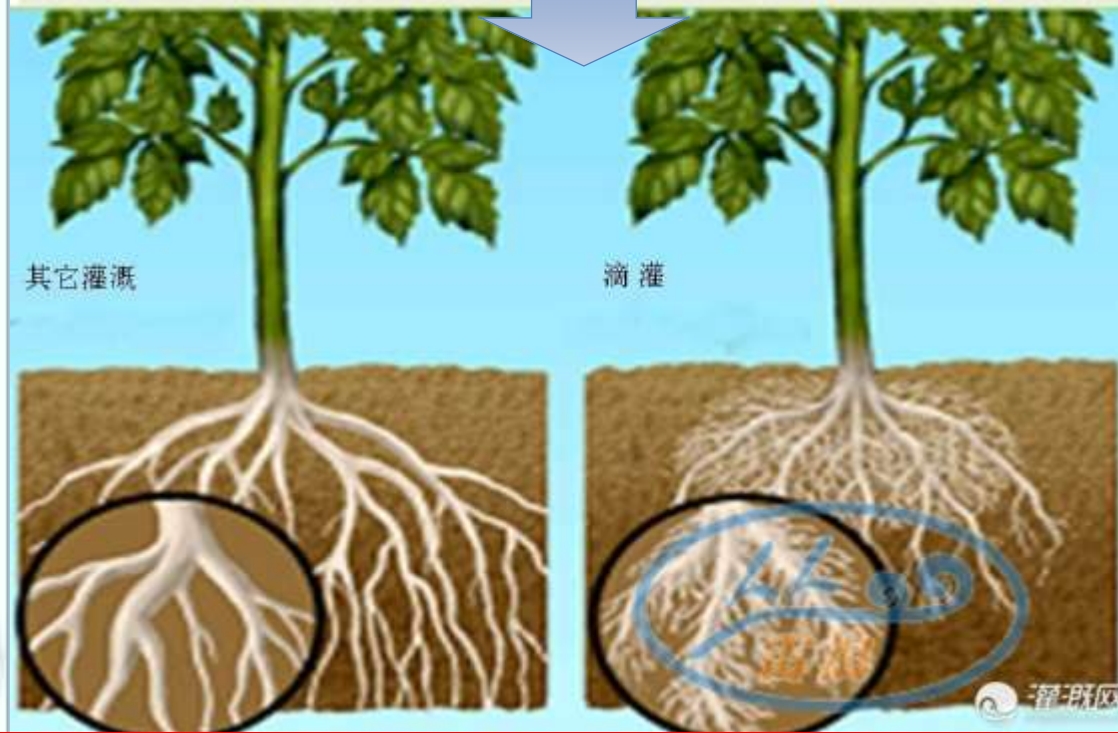
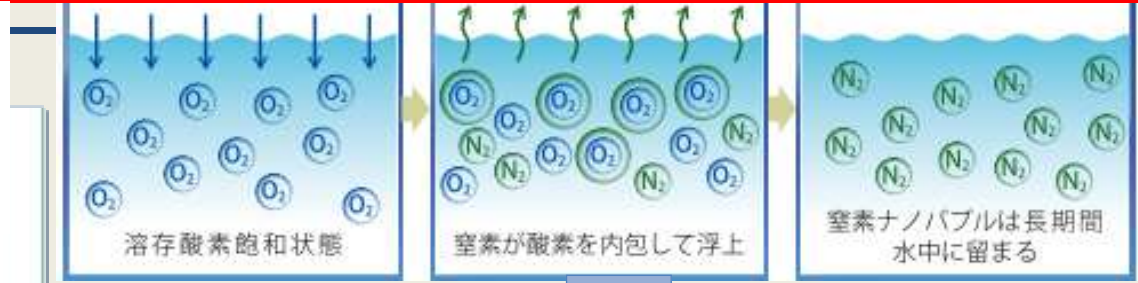


**Panen Udang Vaname dengan Teknologi Nanobubble bisa 4 kali lipat....**



# REVOLUTION in AGRICULTURE INDUSTRY!!!

To produce *nano air*  $N_2$  and  $O_2$  in water in high concentrate



**Nano air-water mix for Replace Urea Fertilizer**



# REVOLUTION in AGRICULTURE INDUSTRY!!!



Urea Fertilizer Factory  
is replaced by Nano  
air-water mix  
machine!!!

Urea	1,15 million tons/year	Gas	2400
Cost	± Rp.6,15 Trillion	Consumption	MMSCFY
		Land Area	7.1 ha



Adalah Startup pendidikan yang berfokus untuk membantu peserta didik menumbuhkan minat dan bakat di bidang penelitian dan kewirausahaan. Saat ini NanoEdu aktif bekerjasama dengan Kementerian Pendidikan dan Kebudayaan guna mewujudkan layanan- layanan pendidikan dengan menciptakan learning path baru yang tidak sebatas KBM biasa.



Produk & Layanan

**Rp.200 Juta** Akhir Tahun 2018  
**Rp.175 Juta** Kuartal II 2019 (Juni)

Nilai di Akhir 2019  
**Rp. 5 Milyar**



**MISI**

Menyediakan layanan pendidikan berbasis teknologi yang inovatif, kreatif, dan inspiratif untuk meningkatkan kualitas pembelajaran dan penelitian di bidang sains, teknologi, dan kewirausahaan.

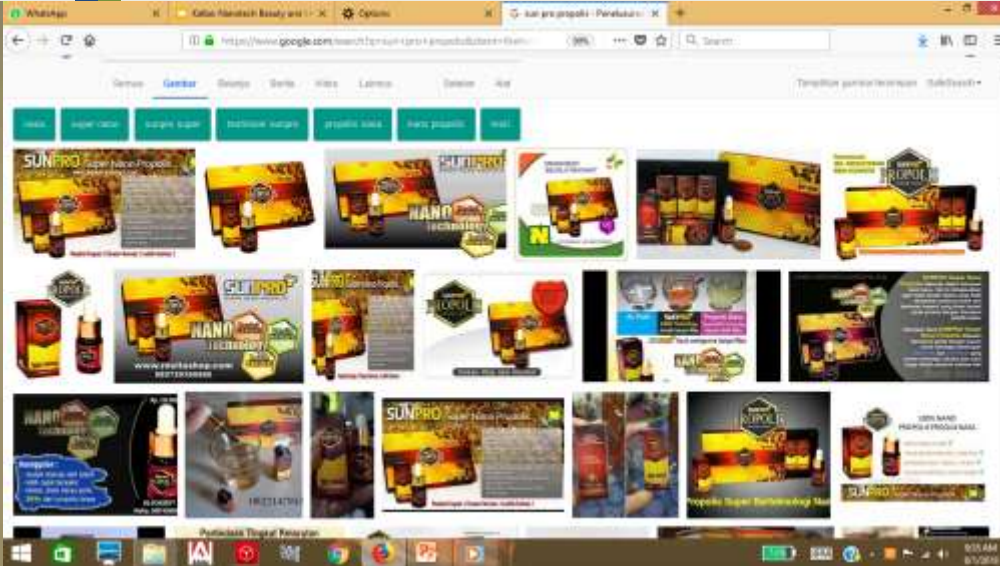


Punya karya inovasi yang keren?  
 Pengen supaya karyamu dikenal luas masyarakat Indonesia?

**CALL FOR INNOVATION**

Hari ini, Rizka Fajriana peserta High School Research Camp 2018 berangkat menuju Jepang untuk mempresentasikan hasil penelitiannya di acara **THE 6TH INTERNATIONAL CONFERENCE ON SMART SYSTEMS ENGINEERING 2018 (SmaSys 2018)**.





# Sunpro Propolis

- ✓ Sebagai stimulator sistem kekebalan tubuh (Imuno Stimulator)
- ✓ Sebagai anti jamur, bakteri dan virus
- ✓ Anti Oksidan
- ✓ Anti Tumor
- ✓ Membantu Proses Regenerasi Sel Hati
- ✓ Membantu penyembuhan Diabetes Melitus (kencing manis)
- ✓ Membantu mengatasi gangguan pencernaan dan pernafasan
- ✓ Membantu mengatasi Penyakit jantung dan Pembuluh Darah
- ✓ Membantu penyembuhan luka dengan kemampuannya meredakan inflamasi (radang)







## REAKSI CEPAT : 2 jam setelah konsumsi

### JAMKHO Jamu Kolesterol



Ekstrak nano

- Mahkota Dewa (Phaleria Macrocarpa)
- Pegagan (Centela asiatica)
- Mengkudu (Morinda)
- Temulawak (Curcuma xanthoriza)
- Kayu manis (Cinnamon)

### JAMSI Jamu Diabetes



Ekstrak nano

- Andrographis Paniculata
- Curcuma Xanthorrhiza
- Angelica Keiskei
- Phaleria Macrocarpa

### MadeDem Jamu Diabetes





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Scholarship Platform





**Nano Center HQ**  
**Ready by Q4 2019**



**NANO CENTER INDONESIA**

**📍 Serpong, TangSel**