# EDUCATING THE FUTURE ENGINEERS

## Vision 2030

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26 Oct. 2016

# AGENDA

- The World in the Future (in 2030)
- Major Economic, Social, Cultural Challenges
- New Engineering Areas and Jobs
- The Engineering Perspective for 2030’s
- How Different Nations Prepare for the Future
- Where Do We Stand and What Can We Do?

# WHAT IS ENGINEERING?

IS A PROFESSION OF SATISFYING OUR UNLIMITED DEMANDS W/ LIMITED RESOURCES USING TECH. TOOLS AND TECHNIQUES

LIMITED RESOURCES

TECHNOLOGY, TOOLS AND TECHNIQUES

UNLIMITED DEMANDS



# THE WORLD IN 2030

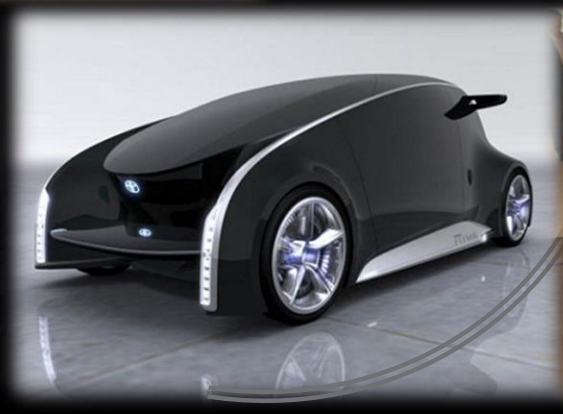
Source: cosmosmagazine.com

Source: luiswillumsen.com

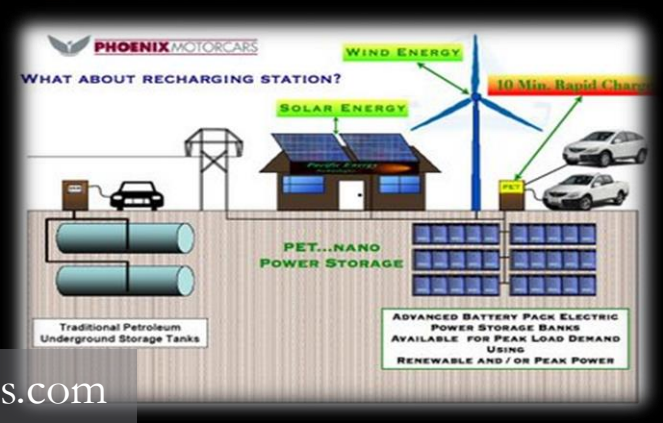
# THE WORLD IN 2030


Source: domusweb.it

# THE WORLD IN 2030

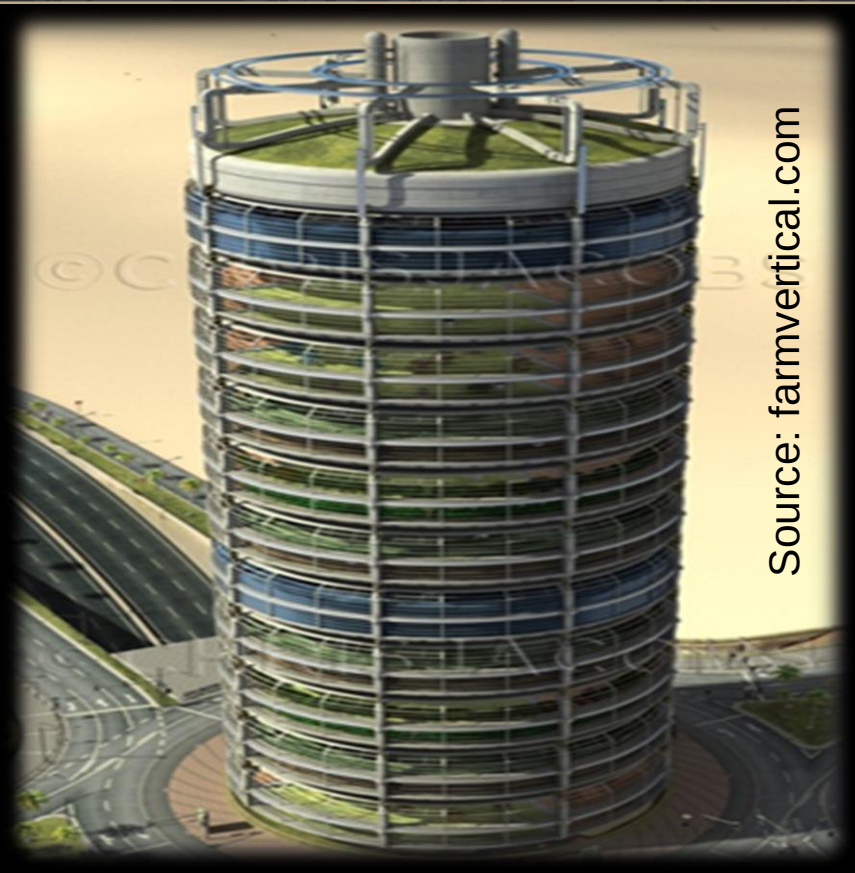
# THE WORLD IN 2030




Source: phoenixmotorcars.com

# THE WORLD IN 2030


Source: shutterstock.com



Source: farmvertical.com

# Key Global Trends in 2030's

## Technology, Environment, Economy, International Relations

- Robots physically and mentally superior to humans
- İntelligence, Biomedical/Genetic Enhancement by external means
- Learning superseded by transparent interface to smart computers
- 80% of world population living in cities (50% today)
- More Than 83% of World Will Have Electricity (50% today)

Ref: OUTLOOK 2009 report by World Future Society

# Key Global Trends in 2030's

## Technology, Environment, Economy, International Relations

- Everything you say and do will be recorded ( !!! )
- Space solar power stations, wave energy provide 50% of UK en.
- Carbon dioxide fixation technolgy for environment protection
- Artificial precipitation induction and control
- Nanotechnology plants & bacteria enhancement to fertilization

Ref: OUTLOOK 2009 report by World Future Society

# Major Challenges for 2030…

## Economic, Social, Cultural Issues

- Population Growth and Demographic Shift (7.1 to 8.3 billion)
- Coping with Increasing Life Span ( 80 to 85 years old)
- Increasing Needs & Economic Turbulence ( food, energy … )
- Diversity of Life Styles and Generation Crossroads ( … )
- Societies in Transition and Complex Politics ( local, global…)

Source: www.fastfuture.com

# Major Challenges for 2030…

## Economic, Social, Cultural Issues

- Changing Modes Of Transportation ( drive, fly, tele… )
- Global Expansion of Electronic Media (virtual reality + reality)
- Reshaping education and training ( new skills required ? )
- Challenges on Natural Resources ( energy, water… )

Source: www.fastfuture.com

# Engineering Issues for 2030's

- Nano-medicine, Quarantine Experts, Cloning & Ethics, Old Age Wellness (Equipment Producers),
- Human Body Enhancement, Cloning, Synthetic Life Engineers
- Artificial Climate Regulators, Quarantine Enforcers
- Space Pilots, Space Engineers/Architects
- Intelligent Materials/Equipment, Memory Materials, Robotics

# Engineering Issues for 2030’s

- Product/Food Design: Genetically Modified Crops & Livestock Eng.'s
- Enhanced Virtual Life: Virtual Polis & Lawyers
- Social Net Advisors, Personal Brand Makers, Social Eng.'s
- QUANTUM Computing Engineers, Waste Data Processors
- Energy, Multimode Communication, Leisure Engineers

# Educational Issues in 2030's

- Professional Knowledge Become Obsolete Rapidly: Retraining
- Carriers & Univ. Majors will be more specialized
- Students will explore niche majors such as
  - sustainable business, strategic intelligence, entrepreneurship
- In Engineering, Specialization in
  - Biomedical Eng, Biomechanics, Biotechnology
  - New Houses & Work Environment, security, sustainability,
  - neuroscience, nanotechnology, computer,
  - digital applications in forensics & legal issues

Ref: World Trends & Forecasts, Sep-Oct 2008

European Way Of Looking To The Future of Engineering Education

# Areas Of Advance (By EEDC)

- Energy
- Built Environment
- ICT

} Self-Sufficient House Design and Construction

- Transportation
- Nano Science
- Material Science
- Production
- Life Sciences

{ Sports Materials, Health Materials, Future Materials

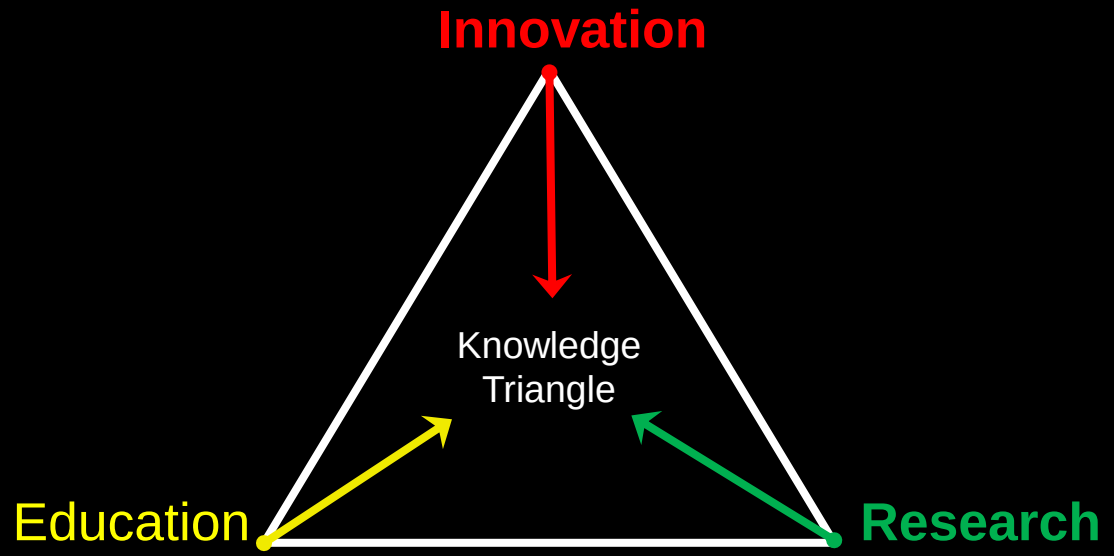
European Way Of Looking To The Future of Engineering Education

# DRIVING FORCES OF THE KNOWLEDGE TRIANGLE

Entrepreneurship Innovation Sustainable Future

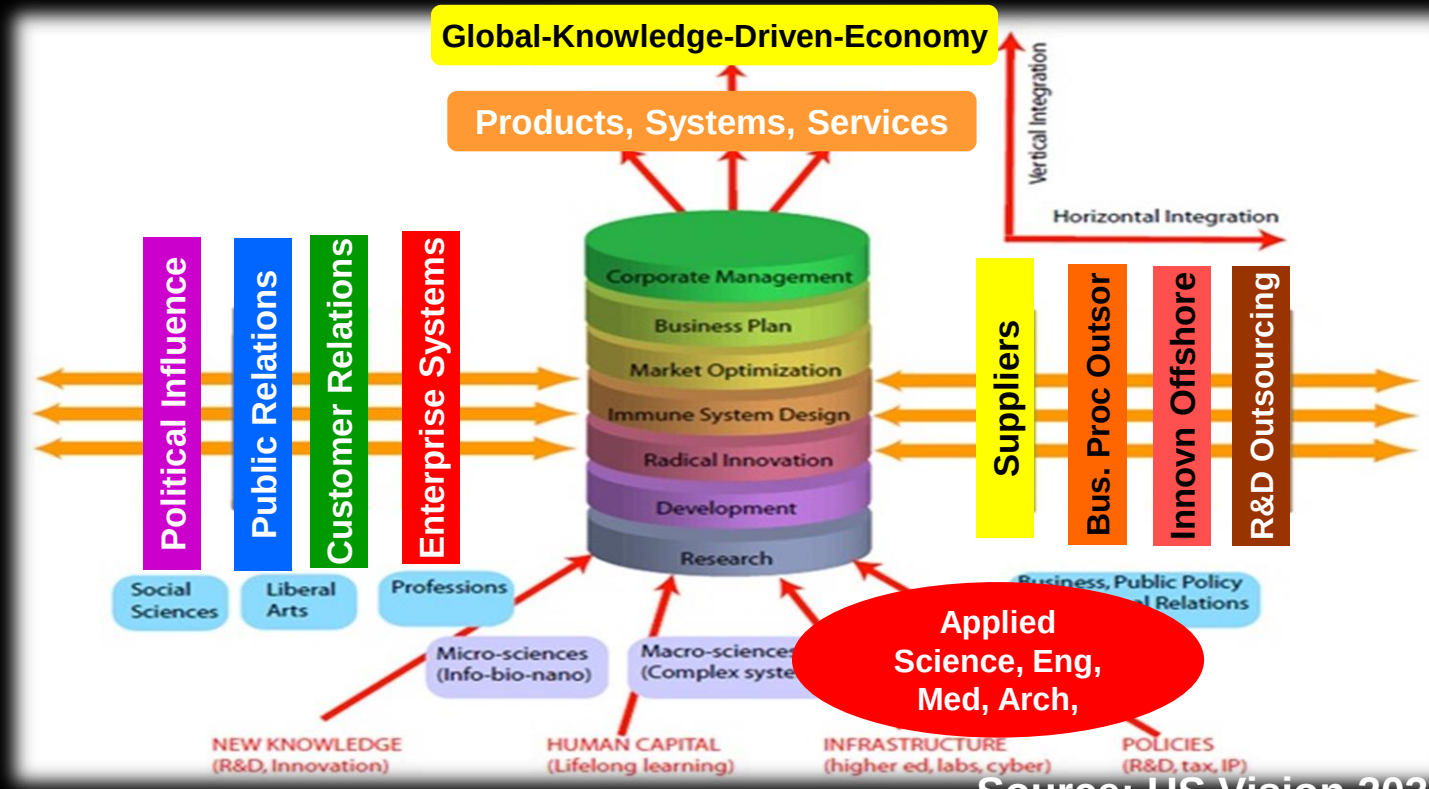
**EU R&D Perspective: Support any investment if it will result in economic growth and new job opportunities**

## INTERACTION AROUND THE KNOWLEDGE TRIANGLE



# American Way Of Looking To The Future of Engineering Education

## US LOOK AT ENGINEERING PRACTICE, RESEARCH AND EDUCATION AS PART OF A MORE COMPLICATED SYSTEM

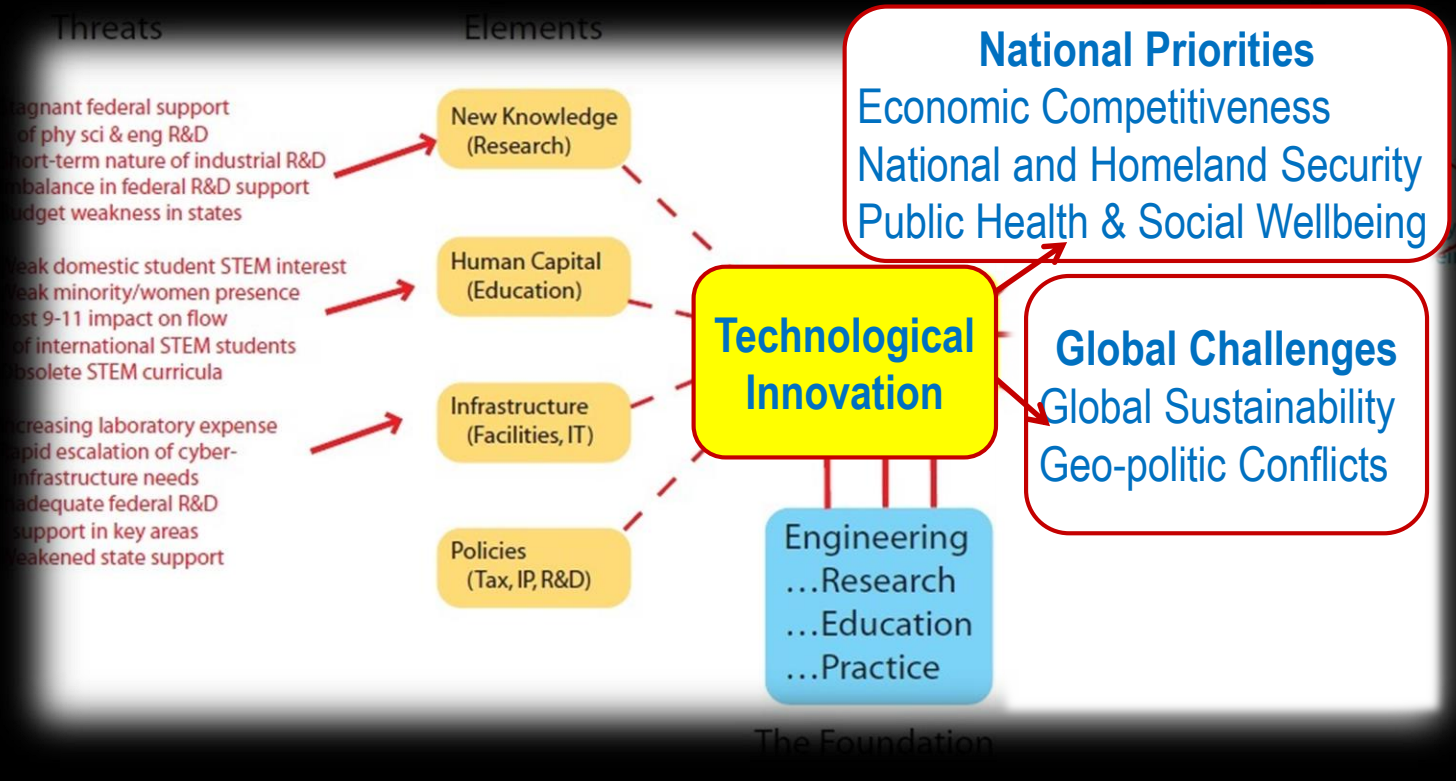



Source: US Vision 2030

# American Way Of Looking To The Future of Engineering Education

## ROADMAP TO FUTURE ENGINEERING PRACTICE RESEARCH AND EDUCATION

**Security** **Environment** **Sustainability**




Source: US Vision 2030

# CHINA 2030: BUILDING A MODERN, HARMONIOUS, CREATIVE HIGH-INCOME SOCIETY

Source: China 2030

## CHINA 2030 VISION MILESTONES

1) **Implement Structural Reforms to Strengthen the Foundations for a Market Based Economy**
2) **Accelerate pace of innovation & create an open innovation system**
   - competitive pressures to encourage Chinese firms to engage in product and process innovation
   - participate in global research and development networks
   - priority to increase both quality & quantity of R&D

Chinese Way Of Looking To The Future of Engineering Education

# CHINA 2030 VISION MILESTONES

3) Seize The Opportunity To "Go Green"
4) Expand Opportunities And Promote Social Security For All
5) Strengthen The Fiscal System
6) Seek Mutually Beneficial Relations With The World

Russian Way Of Looking To The Future of Engineering Education

## STRATEGY 2030: A NEW ECONOMIC VISION FOR RUSSIA

http://www.russia-direct.org/analysis/strategy-2030-new-economic-vision-russia

Our aim is to remove barriers that prevent private money from entering the market

*Dmitry Medvedev*

*at* Sochi-2015 Forum, Sochi, Russia

Russian Way Of Looking To The Future of Engineering Education

# STRATEGY 2030 AGENDA

**Strategy 2030 concentrate on four priorities**

- investment activity: Fulfilling Russia's export potential (gas…)
- implementing import substitution programs,
- the quality of state governance: developing Russia's financial markets and
- budgetary policy: transforming structure of the Russian economy

Russian Way Of Looking To The Future of Engineering Education

# STRATEGY 2030: LONG-TERM SCIENCE AND TECHNOLOGY POLICY

## 7 Science & Technology Areas

- ICT
- Biotechnology
- Nano-Technology and New Materials
- Energy Efficiency and Energy Saving
- Medicine and Health
- Transportation and Space Systems
- Rational Use of Nature

**Source:** sec.europa.eu/jrc/sites/jrcsh/files/fta2014-t1Practice_177.pdf, www.hse.ru/data/2013/10/09/1280362700/19STI2013.pdf

The Future of Engineering Education

# WHERE DO YOU STAND?