

Óbuda University

Pro Scientia et Futuro September 2nd, 2015



Hans J Hoyer, Ph.D.

Secretary General, IFEES
Executive Secretary, GEDC
Resident Scholar in Global Engineering
Marquette University
Opus College of Engineering











Overview of IFEES / GEDC

- Vision: IFEES is an important catalyst to the global community of engineering education in building towards engineering excellence.
- Mission: IFEES will provide a global network of engineering education stakeholders, which leverages the collective resources of its members to fulfill their missions by identifying, discussing, and advancing common objectives of the engineering education community to meet the global challenges.

IFEES Values

IFEES will promote the following core values among its members in all of its activities:

- Excellence in engineering education globally and in IFEES members
- Sensitivity to issues regarding our communities and environment
- A culture of community building and collaboration among all stake holders
- An engineering education profession which displays integrity, honesty, work ethic, cultural awareness, diversity, and social responsibility
- Capacity building in engineering education
- Contributing to the socio-economic development of developing communities
- Integrity, transparency, and respect in all dealings

Strategic Thrust Areas

IFEES will use it's activities to address the following four thrust areas of interest:

- 1. Engineering Education Infrastructure
- 2. R&D and Entrepreneurship
- 3. Student Attraction and Success
- 4. Lifelong Learning

Global Engineering Deans Council

Why

Globalization and rapid technological advancements are compelling engineering colleges to help their local economies grow to sustain their society.

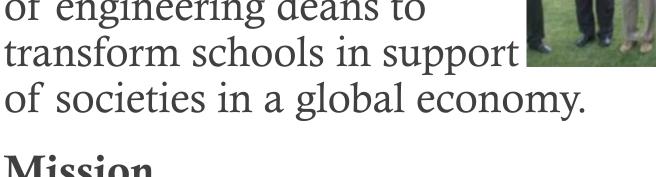
What

An international forum to discuss the varied challenges and opportunities faced by engineering colleges around the world and to network and forge collaboration.



Vision

To enhance the capabilities of engineering deans to



Mission

To serve as a global network of engineering deans, and to leverage on the collective strengths for the advancement of engineering education and research.

GEDC Strategic Plan

Objective 1: Institutional Leadership

Provide a world wide forum for exchanging information, discussing experiences and challenges, and sharing best practices in leading an engineering school.

Objective 2: Curriculum Leadership

Provide a means for engineering deans to partner with one another in curriculum development and innovation, and to collaborate with industry and other stakeholders. Help to drive needed transformation of engineering education globally.

GEDC Strategic Plan

Objective 3: Policy Leadership

Build a network that would support engineering deans to play a leadership role in the development of regional, national, and international policies to advance societies.

Objective 4: Accreditation Leadership

Actively participate in the development and maintenance of a global system of quality standards for engineering education.

International Institute for Developing Engineering Academies

Co-Director: Jennifer DeBoer (deboerj@purdue.edu) Co-Director: Erik de Graaff (degraaff@plan.aau.dk)

Workshop Topics Include:

- Curriculum development and innovation
- Strategy, metrics, and accreditation
- Innovative teaching and learning
- New technologies and pedagogies

Who We Are:

- Global leadership training institute
- Faculty development to transform EE IFEES/SEFI collaboration
- Choose workshop, tailor to local needs

Contact Information:

- IIDEA: Educating the Ideal Engineering Professor
- www.iideainstitute.org
- Secretariats: IFEES (Hans J Hoyer) and SEFI (Françoise Côme)



Student Platform for Engineering Education Development

SPEED is a global, non-profit student organization that functions as an interdisciplinary network of engineering students, who aspire to provide opinion and create an impact on future development of engineering education and its effect on society and environment.



Mission

Through engineering education initiatives and collaboration with academia, industry, society and government, SPEED is committed to improving the future of engineering education whilst embracing the considerable engineering challenges being faced in the 21st century.

Student Platform for Engineering Education Development

Vision

SPEED strives to empower students to become a factor of change in EE by providing them with the skills, knowledge and resources necessary to become a global engineer and show them how they can think globally and act locally.

SPEED was founded by student participants of the 1st Global Student Forum (GSF) in October 2006 during the 5th Global Colloquium on Engineering Education (GCEE), organized by the American Society for Engineering Education (ASEE), in Rio de Janeiro, Brazil. The following years, SPEED coorganized the GSF with ASEE in Istanbul, Turkey and Cape Town, South

Africa, and in cooperation with IFEES the 4th GSF in Bhubaneswar, India, Hungary, Singapore, Lisbon, Argentina and Colombia. SPEED hopes to expand the Global Student Forum initiative significantly in the coming years through global cooperation and feedback from students and through other activities to further enrich engineering education curricula worldwide.



Why are we doing it?

Dialogue and partnership



Learn new concepts



Future engineering students



Think outside the box





Why are we doing it?

To develop global engineers so that they can learn from other's experiences and improve their own education through the process.







How Can SPEED Help?

Peers

With our network of students (300 members) from 41 countries, our network can be leveraged for connections in universities and countries around the world

Societies

As the student arm of IFEES we have plenty of exposure to connect students with a society within the group

Resources

SPEED being an international organization has many contacts in universities and industries across the globe and can help you connect with them.

Events

SPEED conducts many events across the globe which includes the global student Forum and also national events such as Indian Student Forum.

Guidance



Workshops

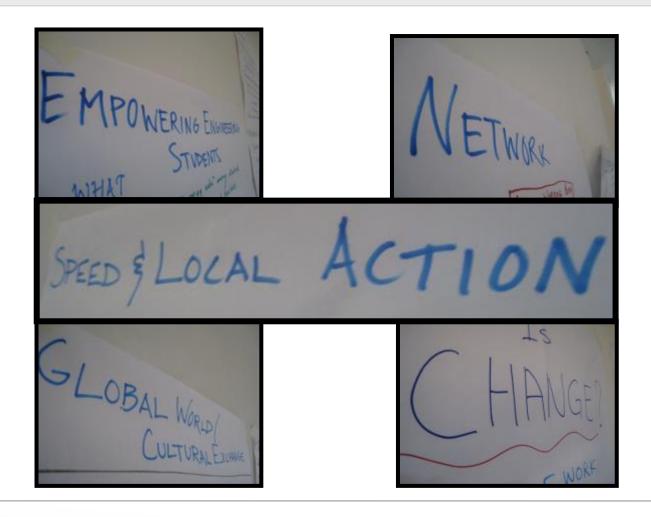
Workshops can be conducted in various engineering college which would be facilitated by SPEED leaders from across the globe to help the students develop effective action plan to counter the issue.







How do we do it?

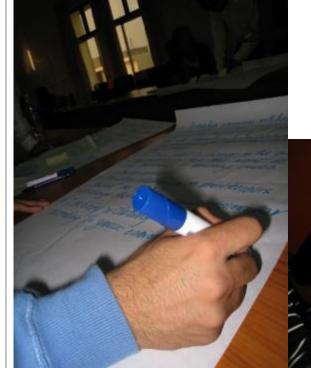




What are the results?



- Outreach programs
- USA, South Africa, Latin America, India and Europe







What are the results?

Regional Student Forums

Indian Student Forum (India)

Foro Argentino De Estudiantes De Ingeniería (FAEI)

FLEEI (Domican Republic)

Colombia Student Forum (Colombia)

Austrian Student Forum (Austria)



Student Scholarships

- IGIP SPEED Young Scientist Award
- SPEED Research Scholarship Program



Partner Organizations













Indo-US Collaboration for Engineering Education





Latin American and Caribbean Consortium of Engineering Institutions







Industry Sponsors













Join SPEED, Make a Difference

Empower more engineering students like yourself!

Make a difference by:

- Participating in international discussions
- Planning future GSFs.
- Starting or building relationships with student initiatives
- Sharing what you learn with other students



Connecting Students through:

facebook.

www.worldspeed.org



















Join SPEED

To join SPEED, Visit

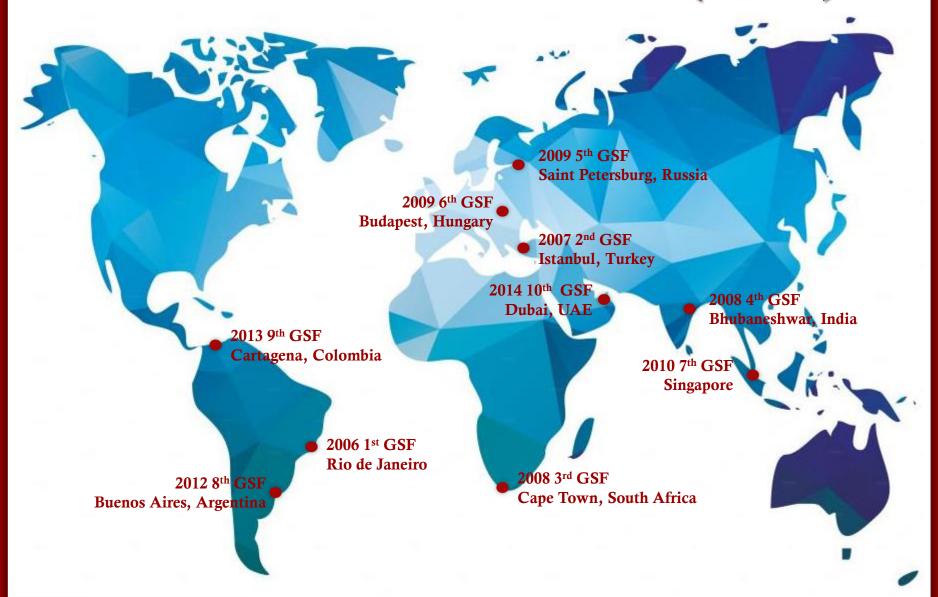
www.worldspeed.org/portal

For any queries, contact:

Rohit Kandakatla – SPEED President

rohit.kandakatla@worldspeed.org

Global Student Forum (GSF)



Sign Up!

ACTION STEPS

For more information: www.worldspeed.org or email at info@worldspeed.org



Florence, Italy
11° Global Student Forum
September 17th - 20th - 2015
EE for Multifaceted Engineers

"WE ARE A STUDENT PLATFORM CREATED FOR STUDENTS"

Organized by SPEED

PARTICIPATION

Who should attend? Any student in any field interested in discussing engineering education should attend. We invite bachelors, masters, and PhD students from all areas of engineering as well as other subjects with interests in EE.

How do I get sponsorship? Your university may sponsor, you may contact a professional association in your country, or connect to a corporate sponsor through SPEED. We provide participants materials that are useful in approaching sponsors.

Where do I stay? Your accommodations, local transportation, food, and activities are planned and included in the registration.

ACTIVITIES

Get moving

ction plan development | Technical visits | Professional development workshops.

Get connected

Networking evening with professionals, academics | Intergenerational panel with important collocated events | Collaboration with international student leaders.

Get inspired

Motivational speakers | Community service | Cultural events

Tracks this year: Track 1: Entrepreneurship in EE | Track 2: STE 'A' M: Art in EE | Track 3: Resiliency In EE

Contact usl

SPEED President: rohit kandakatla@worldspeed.org 11th GSF International Chair: estefania.trujillo@worldspeed.org 11th GSF Local Chair: matteo.lenzi@worldspeed.org



SPEED

In collaboration with



Hosted by:





How will it go in the future?

11th GSF: Florence, Italy

17th – 24th September, 2015

• 12th GSF: Seoul, South Korea





GLOBAL STUDENT FORUM 2015 TRACK 1 ENTREPRENEURSHIP





abilities giventure business & money ∃ leadership ≌ The action reported to leadership to the leaders orise successful 3 risk solutions



- **Entrepreneurship** is the process of starting a business, a start-up company or other organization.
- The **entrepreneur** develops a business plan, acquires the human and other required resources, and is fully responsible for its success or failure. **Entrepreneurship** operates within an **entrepreneurship** ecosystem.

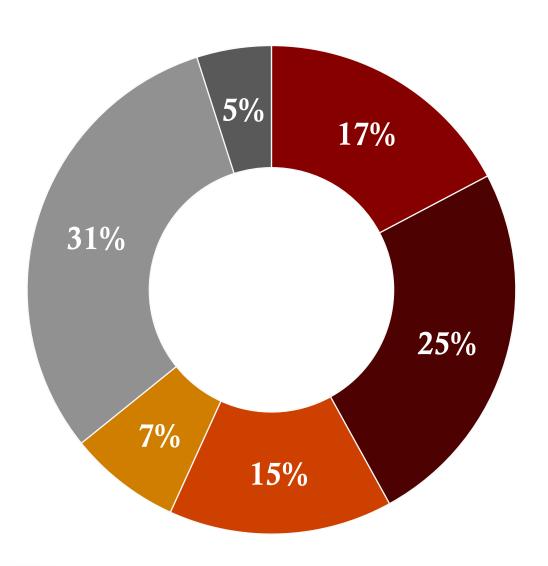


A 10-Point Checklist to Confirm You Can Be an Entrepreneur

1. You are overflowing with confidence

- Don't get this confused with being cocky, because there is a huge difference. Becoming an entrepreneur comes with a lot of risks, but successful entrepreneurs have confidence in their idea as well as their ability to reach their goals.
- An entrepreneur goes into every situation with an abundance of confidence.
- Think outside the box

Reasons for Entrepreneurship (%)



- Had an idea that needed to be taken to the market
- Preferred to be my own boss
- Desire for better workpersonal balance
- Felt entrepreneurship would be more financially rewarding
- Scope to work in a more creative/innovative manner
- Other

2. You are competitive at everything.

- Entrepreneurs are extremely competitive when it comes to everything.
- An entrepreneur has the same competitive spirit whether they are working on their business or racing the individual on the treadmill next to them at the gym. There is a burning desire inside to be the best and win at everything.



3. You have a hard time turning work mode off.

• Being an entrepreneur takes an enormous amount of time and energy. There is never a time that you have nothing to do. While many people turn work mode off at 5 p.m., entrepreneurs are constantly game planning and envisioning what needs to get done and how they will accomplish it.



4. You are extremely focused.

• Starting a business involves many ups and downs that not everyone can handle. It can take several years for a business to flourish and get to a point that allows you to step back and catch your breath. Staying 100 percent focused on the end goal regardless of what obstacles get in the way is mandatory.

DREAM BIG. WORK SMART. STAY FOCUSED.

— @yfsmagazine / yfsmagazine.com —

5. You are independent and self-motivated.

- Not everyone is cut out to be an entrepreneur simply because they lack direction.
- Some people need to be told what to do and while that is fine, it just doesn't fly when it comes to creating a business.
- Entrepreneurs welcome challenges and set out to accomplish their mission independently, knowing that they will be successful.

6. You are a natural-born leader.

- Entrepreneurs are leaders that earn respect by providing a positive example for their team to follow.
- Leaders have strong communication skills and the ability to get an entire organization to work towards the same vision.

7. You love to create new things.

- Remember when <u>Snapchat turned down a \$3 billion purchase</u> <u>offer from Facebook</u>? You probably heard someone say, "If that was me, I would have sold it and never worked another day in my life." That just isn't the mentality that entrepreneurs possess.
- The Snapchat founders were not finished building and no amount of money was going to prevent them from finishing what they started. Creating a successful brand and spawning additional projects fuel the entrepreneurial fire.

8. You are willing to fail.

- Entrepreneurs have to be willing to fail in order to succeed, as there is no reward without risk.
- Some of the most successful entrepreneurs failed on their path to success, but instead of giving up they learned from their mistakes and made it.

9. You are a creative thinker.

• Taking an idea or vision and turning it into a real business takes a creative mind. Often times thinking up the idea is the easiest part it is the follow through and obstacles that will get in your way that require the real creative thinking.

10. You are an advocate for your brand 24/7.

- There is nobody more passionate or knowledgeable about a company than its creator.
- Entrepreneurs will naturally talk about and be excited about what they do around the clock. Entrepreneurship is contagious, and once you get the bug there is no turning back.

FIGURE 1. TYPES OF ENTREPRENEURS

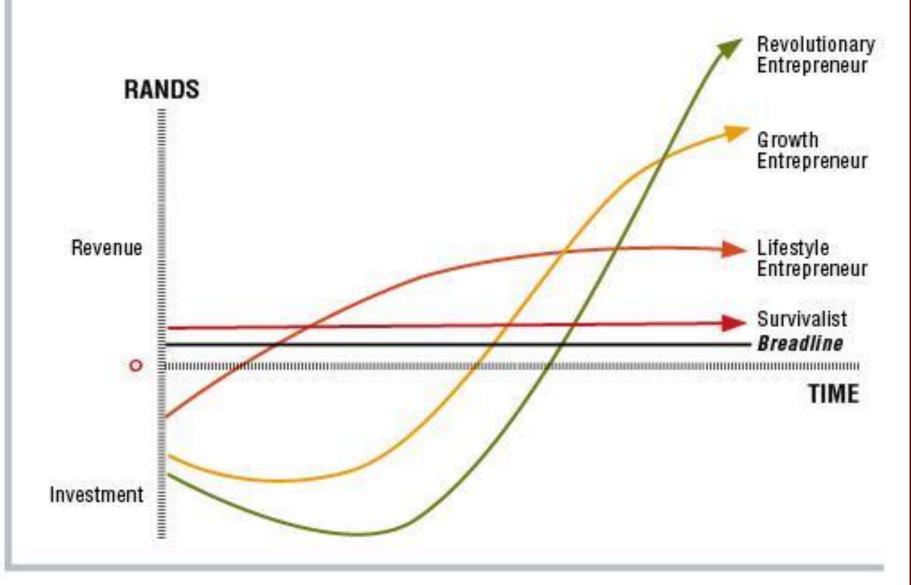


TABLE 1. THE REALITIES OF EACH ENTREPRENEURIAL PATH FOR THE ENTREPRENEUR AND THE BUSINESS

TRAJECTORY	Lifestyle Entrepreneur	Growth Entrepreneur	Revolutionary Entrepreneur
Organisational size	• Limited	Variable, growing	Becomes large if successful
Team	Small Centred around the entrepreneur	Expanding team as the business grows Challenge to create the right team for the venture at a particular time	Requires a strong team Diverse skills Specialists in a particular area
Structure	• Simple	Fluctuating Can be chaotic Seeking structure	Over time a professional structure with strong accountability and reporting lines needs to emerge
Risk	Limited Controllable Higher chance of success	Risk varies High risk at certain times Entrepreneur tries to control risk on a decision-by-decision basis	High risk Very few entrepreneurs succeed in this space
Stress	• Limited	• High	Very high
Return	Delivers a good salary for the entrepreneur if successful Returns available while venture keeps operating	Attractive returns for entrepreneur on exit if successful	Significant returns for entrepreneur on exit if the venture is successful
Control	Entrepreneur retains control	Entrepreneur retains control but often needs to factor in other perspectives	Entrepreneur hands over equity and ultimate decision-making power to external investors
Exit	Very limited opportunity to exit Hard to sell the business	Opportunity to sell the business if successful	Possible listing (IPO)



SPEED & ISTE Activities Inauguration

August 3rd, 2015 | Arakkunnam, India









The Attributes of a Global Engineer Project





The Attributes of a Global Engineer Project

• Project Goals:

- Provide resources for academicians and/or corporate representatives to enhance an on-going dialogue and engagements resulting in:
 - Increased numbers of globally competent engineers, allowing work and employees to be more transportable
 - Enhanced employability of engineering global graduates

• The Deliverables:

- The attributes framework, competencies, and resources for:
 - Preparing a globally-oriented engineer capable of effectively living, working, or performing in a global setting
 - Targeting appropriate interventions at various stages of a global engineer's educational and professional development (Secondary, Postsecondary, Professional)

Key Corporate and Other Stakeholders Involved

- The Boeing Company
- Dupont
- MathWorks
- Rolls-Royce
- Dassault Systems
- Quanser
- John S. Wiley and Sons
- National Academy of Engineering
- International Federation of Engineering Education Societies (IFEES)
- Global Engineering Deans Council

Project Phases

- 2008: CMC establishes SIG on International Engineering Education
- 2009-10: Attributes of a Global Engineer Project commences
 - Informed from the work of John McMasters (The Boeing Company)
 - Literature review and content analysis of CMC organizations' job descriptions
- 2010-11: Refinement of Attributes and Survey
 - 48 initial Attributes refined/vetted to a list of 20, organized in 5 broad categories
 - Survey development, translation, and global deployment through IFEES
 - Initial analysis / interpretation and Outcomes-per-Attribute statements developed
- 2012-15: Focus groups / workshops held for additional input into Project:
 - Argentina; Australia; Belgium; Canada; Colombia; Finland; India; Japan;
 Thailand; United Arab Emirates; United Kingdom; and throughout the United States

Attributes of a Global Engineer Survey

- Survey developed to ask for perceptions about the most important attributes needed for engineers at various stages of their development
- Translated into 13 different languages and launched through IFEES
- 1,027 "useable case" respondents:
 - 70% English; 30% non-English; responses received from all languages except French
 - 80% Male; 20% Female
 - 50% between ages of 40-60; balance over other age ranges
 - 46% Academicians; 40% Practitioners; 10% Students; balance preferred not to answer
 - Aerospace (17%); Computer Science (13%); and Electrical/Computer (13%) are largest engineering discipline response categories
 - 64% reported having graduate-level *engineering* degree

Overall, the 8 most Important Attributes Identified

- Communicates effectively in a variety of different ways, methods, and media
- 2. Possesses the ability to think both critically and creatively
- 3. Shows initiative and demonstrates a willingness to learn
- 4. Functions effectively on a team
- 5. Possesses the ability to think both individually and cooperatively
- Demonstrates an understanding of engineering, science, and mathematics fundamentals
- 7. Demonstrates an understanding of information technology, digital competency, and information literacy
- 8. Maintains a positive self-image and possesses positive self-confidence

Focus Group Feedback on Attributes of a Global Engineer

- Attributes that need to be emphasized (or, in some cases, added):
 - Cultural sensitivity
 - Tolerance to other people and perspectives
 - Open-minded and ability to adapt
 - Ability to behave ethically across cultures
 - Social responsibility
 - Research and analytical thinking
 - Problem-solving and improvement capabilities
 - Entrepreneurship
- Uses of Attributes project:
 - Teaching / learning processes and student preparation for the workplace
 - Industry involvement as vocal advocate for attributes
 - Linkages to other initiatives (global / national / local)

What are the global attributes of engineers?

- a) ability to apply knowledge of math, science & engineering
- b) ability to design & conduct experiments, analyze data
- c) ability to design a system component or process
- d) ability to function in multi-disciplinary teams (leadership/management skills)
- e) ability to identify, solve & formulate engineering problems
- f) understanding of professional & ethical responsibilities
- g) ability to communicate effectively (open forums)
- h) understand the impact of engineering solutions in a global & societal context
- i) life-long learning (a self-learning curve)
- j) knowledge of contemporary issues (general awareness)
- k) ability to use techniques, skills & engineering tools necessary for engineering practice (digital touch)
- 1) Entrepreneurship skills

Is the Z Generation (Net Generation) different from us? In what ways?

A generation growing up in a technological, social and economical environment different from ours with more options

☑ Tech savvy (omnipotent smart phone)

Interpretation, who?

- ☑ Multitasks; Speaks in rapid fire
- ☑ Plugged into social networks
- ☑ Open to diverse cultures
- ☑ Concerned about society and sustainability issues
- ☑ Open to entrepreneurial pursuits



Microsoft:

• 29% of employees are women

17% of those work in technical positions are women

Apple:

• 20% of those work in technical positions are women

Facebook:

Women make up about 31% of workforce

Google:

• 30% of workforce are women



Changing Students

20th Century

- ☐ Job seekers
- ☐ Lifers in a job
 - Localized

21st Century

- Open to new ideas & less defined future
 - ☐ Globalized Workplace
 - ☐ Aspire to change the world



The work place, social, economic, political, innovation and technological environment of Z generation is different from ours.

In what ways?



A 21st Century World

Information Explosion

Global Economy

Cognitive Revolution

Diverse Workforce

Defense Reinvestment



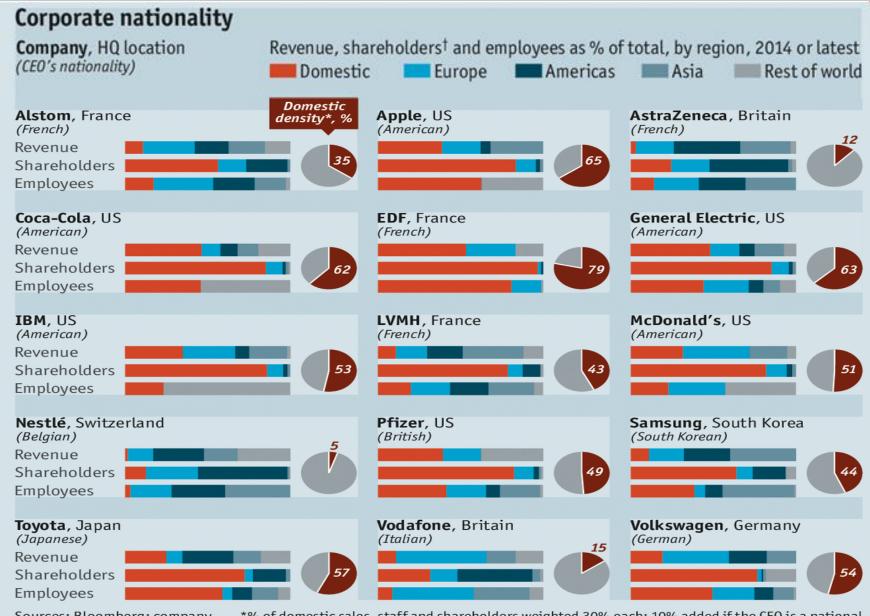
International Competition

Finite Resources

Environmental Sustainability

Shared Wealth

Dual Use Demographic Shifts



Sources: Bloomberg; company *% of domestic sales, staff and shareholders weighted 30% each; 10% added if the CEO is a national accounts; *The Economist* estimates †Based on domicile of publicly reported holdings

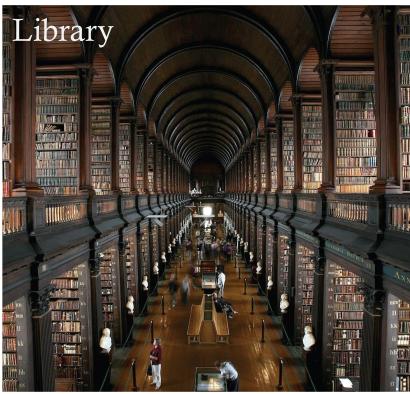
Innovation 3.0

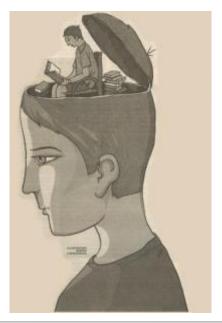
(Information Rich, Smart Economy)



Learning Resources Center









A white room at SMU-X, where the walls and floor are for scribbling ideas. There are also rooms for students to catch power naps and for small groups to meet.



Conclusions

- ☐ Engineering education to nurture T-engineers suitable for changing world of work. Less emphasis on testing of knowledge acquisition (measurement) and focus on developing core competencies (assessment). Leverage technology enhanced learning.
- ☐ Merge academic excellence with industry needs. Customized innovations for diverse income, age and culture groups to revitalize the existing businesses and spawn new

"Strategies for Engineering Education in India Towards 2025" January 9, 2015 at Infosys, Bangalore

Governance and Leadership of Engineering Institutions

India had 25 universities in 1956 (regulatory authority was set-up). Now over 650 universities and several thousands of affiliated colleges. Higher degree of autonomy is needed to spur innovation in teaching and learning. Streamline UGC and AICTE to help institutions to grow and meet the quality standards. Substantial investments to improve the infrastructure and research facilities to match global standards.

Teaching, Learning and Research

HEIs have 30-50% faculty vacancies. Recruiting and retaining quality academics should be a priority. Upgrade teacher training systems and invest in ICT enabled teaching and learning.

Industry/Institute Collaboration

Joint facilities to train students with advanced and relevant skills

Innovation and Entrepreneurship in Engineering Education

Modernize the curriculum and pedagogical tools to enhance the employability of graduates and actively facilitate students to pursue creative innovations and entrepreneurship

Upcoming Events





Scientific, Technical, Engineering & Agronomy Conference 2015 (CONTECC) Fortaleza, Brazil

15 - 18 September

Innovation & Entrepreneurship for Sustainability in Brazil: Water, Energy, Open and Distance Education in Engineering and Agronomy

The organizer, Conselho Federal de Engenharia e Agronomia (CONFEA), is inviting international experts in the following topics:

- 1. Distance quality education in engineering
- 2. Sustainability: focusing on water and energy





ACOFI 2015 Cartagena, Colombia

15—18 September

The 40th annual meeting of the Colombian Association of Engineering Schools (ACOFI) will focus on "Quality training in engineering for the future"

Early registration deadline is 31 July. Visit http://acofi.edu.co/eiei2015 for more details & registration



African Engineering Dean's Summit 2015

September 17th through September 18th Elily International Hotel | Addis Ababa, Ethiopia

Visit www.aedcouncil.org for registration and summit details











Sign Up!

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SPEED

In collaboration with



Hosted by:





Florence, Italy 20-24, 09, 2015

WEEF 2015 World Engineering Education Forum

Engineering Education for a Resilient Society

WEEF 2015 will bring together leading global engineering education associations, executive leaders, and students for the fourth annual forum hosted by the *Università Degli Studi Firenze*. Key topics of discussion for WEEF 2015 include:

- Climate Change Adaptation
- Natural Disasters
- Growing Population & Urbanization
- Energy Transition
- Biotechnologies
- Water Crisis
- Food Crisis

More details available at http://www.weef2015.eu

Finally, the 11th annual Global Student Forum, organized by SPEED, will bring together academics, government representatives, non-profits, industry, and engineering students from all over the world to discuss vital issues concerning engineering education.

Latin American Engineering Deans Council La Paz, Bolivia

1—3 October







The 2015 Conference in Adelaide will be a GEDC stand-alone conference building upon themes developed from the 2014 Dubai and 2013 Chicago conferences:

Blended Learning
Diversity and Inclusion
Education in Resource-Constrained Environments

The GEDC Conference provides an opportunity for both deans and industry to come together and engage in thoughtful dialog concerning the future of engineering education around the world. Participants can become part of long-term initiatives to help foster the meaningful adaptation of engineering education worldwide in the era of globalization.



Conference & registration information is available at http://www.aomevents.com/gedc2015

World Engineering Education Forum 2016 Global Engineering Dean's Council Conference 2016 Seoul, South Korea



7—11 November 2016 COEX Conference Center

KSEE

Korean Society for Engineering Education Korea
Engineering
Deans
Council

Main Topics Include:

Engineering Education and Industry

Pedagogy of Engineering Education for Hard & Soft Skills

Quality in Engineering Education

Expansion of Engineering Education

Diversity in Engineering

Engineering Education in Advanced Manufacturing Innovation

Capstone Design Competition for Students

Engineering for Society

Convergence in Engineering Education

Resilience for Engineers: Leadership & Communication





Thank You



