Engineer Mobility and FEIAP Engineering Education Guideline

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Summary of the Presentation

- Introduction
- Mobility of Engineers and Mutual Recognition of Engineering Degrees
- International Accords:
  - Washington Accord
  - Sydney Accord
  - Dublin Accord
- Mobility of Engineers & Technologists
  - ASEAN Engineers
  - APEC Engineers
  - EMF
  - ETMF
- FEIAP Education Guideline for APEC Engineers
- Concluding Remarks

Global Mobility of Engineers

- Movement of Global Engineering Professionals who are capable of Independent Practices
- Examples of Understanding/Agreements for Mobility of Engineering Professionals:

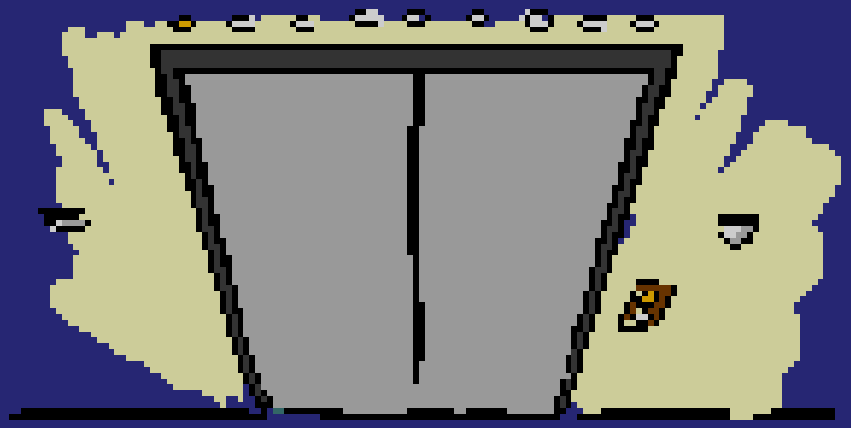
❖ ASEAN Chartered Professional Engineers Register

❖ EMF

❖ APEC Engineers Register

Engineer Register

Your gateway to trade liberalisation and professional services



Mobility Forums

The ***Engineers Mobility Forum*** agreement (commenced 2001) is a multi-national agreement between engineering organisations in the member jurisdictions which creates the framework for the establishment of an international standard of competence for professional engineering, and then empowers each member organization to establish a section of the International Professional Engineers Register.

Mobility Forums

The ***APEC Engineer Agreement*** is an agreement in place between a number of APEC countries for the purposes of recognising "substantial equivalence" of professional competence in engineering. APEC economies can apply to become members of the agreement by demonstrating that they have in place systems which allow the competence of engineers to be assessed to the agreed international standard set by the APEC Engineer agreement.

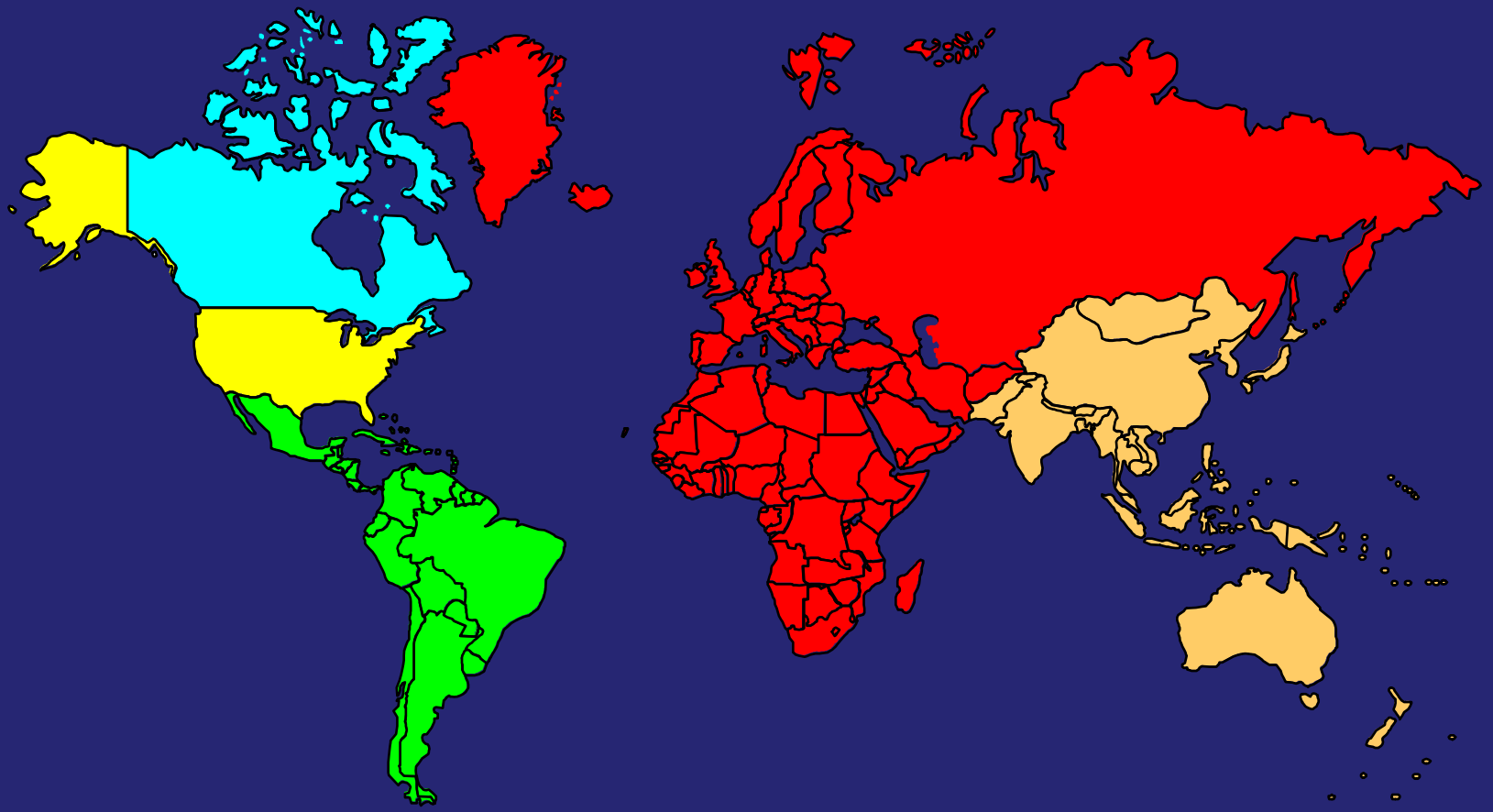
Mobility Forums

The ***Engineering Technologist Mobility Forum*** (commenced 2001) establishes and maintains an ETMF International Register of Engineering Technologists, and is intended to provide a framework for the recognition of experienced practising engineering technologists by the responsible bodies in each of the signatory economies.

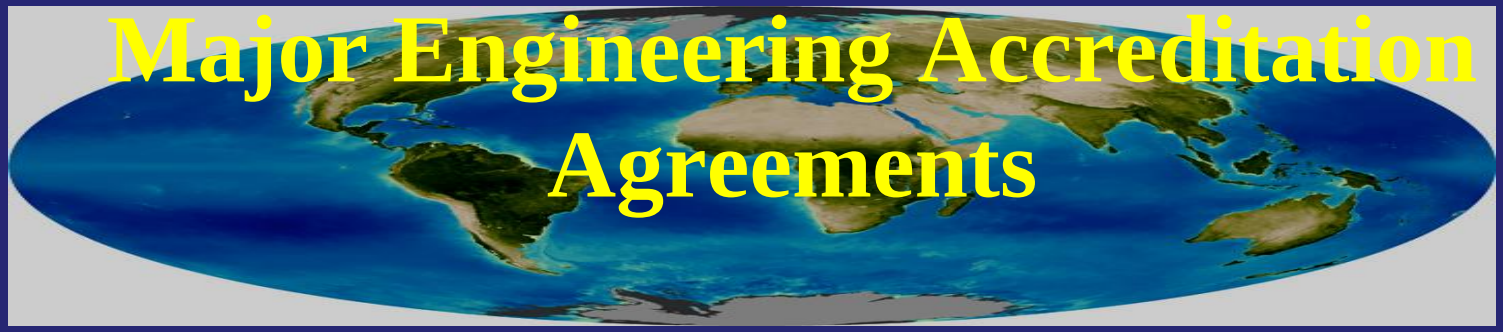
For Mobility, We need Mutual Recognition and thus Accreditation

- International Benchmarking and
  External Recognition of Quality
- For Further Improvement by Faculty
- Give Assurance and Confidence to:
  - Prospective students
  - Graduates
  - Prospective employers
  - Graduate schools
  - Licensing agencies
  - Governments

Global Development: Different Systems & Different Needs Around the World



Major Engineering Accreditation Agreements



- Washington Accord (1989)
- European Network for Accreditation of Engineering Education (ENAEE)
- Regional Accreditation Activities:

  Union Panamericana de Associaciones de Ingenieros (UPADI)

  Federation of Engineering Institutions of Asia and the Pacific (FEIAP)

  Caribbean Accreditation Council for Engineering Technology (CACET)

International Agreements

Other agreements covering mutual recognition in respect of tertiary-level qualifications in engineering:

- *The **Sydney Accord*** commenced in 2001 and recognises substantial equivalence in the accreditation of qualifications in engineering technology, normally of three years duration

- *The **Dublin Accord*** commenced in 2002 is an agreement for substantial equivalence in the accreditation of tertiary qualifications in technician engineering, normally of two years duration. It commenced in 2002.

FEIAP Engineering Education Guideline

1. Glossary
2. Accreditation Criteria Template for Accreditation Agencies
3. The Accreditation System Model Framework
4. Mentoring System
5. Evaluation of Accreditation Agency
6. Periodic Monitoring of Accreditation Agency

Accreditation Agency

- Representatives of engineering community
- Statutory Power or Recognised Professional Authority
- Independent for Autonomous Responsibility for its Operation and Accreditation Decisions
- Accreditation Criteria
- Training of Assessors
- Internal Quality Assurance Procedures
- Mandatory Cyclical External Review (5-6 years)

Accreditation Criteria

(a) Education Environment

- Organisational and Management Structure
- Faculty and Support Staff Profile
- Academic Leadership and Education Culture
- Curriculum (content, coverage of core material etc)
- Facilities and Physical Resources
- Funding Model
- Strategic Management of Student Profile

Accreditation Criteria

(b) Programme Design, Structure, Content and Assessment Processes

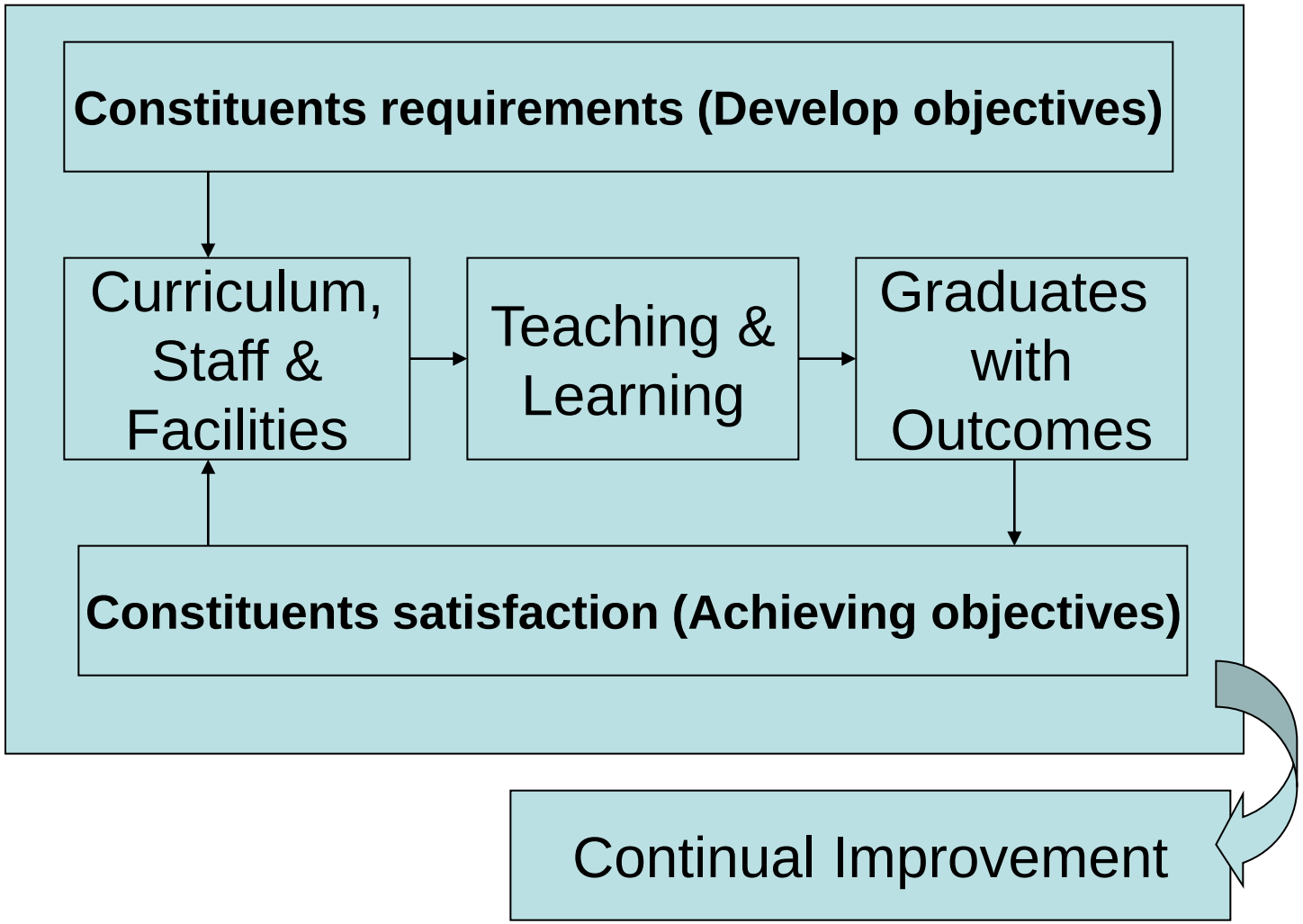
- Programme Objectives
- Educational Outcomes
- Mapping of Learning Design and Assessment Processes
- Compliance with Structural or Discipline Requirements
- Tracking Individual Student Performance against Graduate Outcomes
- Exposure of Students to Professional Engineering Practices

Accreditation Criteria

(c) Quality Systems

- Quality Policy
- Engagement with External Constituencies
- Feedback and Stakeholder Input for Continuous Improvement
- Processes for Setting and Reviewing of Objectives and Outcomes
- Approach to Education Design and Review
- Approach to Assessment
- Benchmarking Practices
- Governance Processes and Structure
- Student Administration System

Process Map


Constituents requirements (Develop objectives)
Curriculum, Staff & Facilities
Teaching & Learning
Graduates with Outcomes
Constituents satisfaction (Achieving objectives)
Continual Improvement

Examples of Programme Outcomes Expected by FEIAP 1/3

- Apply knowledge of mathematics, science, engineering fundamentals to solve complex engineering problems
- Identify, formulate, do research and analyse complex engineering problems reaching conclusions based on principles of engineering sciences
- Design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, and in harmony with environment

Examples of Programme Outcomes 2/3

- Conduct investigations of complex problems using scientific approach such as design of experiments, analysis and interpretation of data, and synthesis of information to provide sound conclusions

- Create, select and apply appropriate techniques, resources, and modern engineering and IT tools to complex engineering activities, with an understanding of the limitations

- Apply reasoning and logics to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice

- Uphold professional ethics and responsibilities and norms of engineering practice

Examples of Programme Outcomes Expected 3/3

- Understand the impact of engineering solutions in societal and environmental contexts and demonstrate knowledge of and need for sustainable development

- Communicate effectively on engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations

- Demonstrate knowledge and understanding of engineering and management principles and apply these to manage projects in multidisciplinary environment

- Engage in independent and life-long learning for professional development

Mentoring System of FEIAP

More established Member Economies are appointed as Mentors to help to:

- **Set up Accreditation System for Mentee Economy including Accreditation Agency**
- **Train Assessors**
- **Observers in Accreditation**
- **Advice on Improvement for Full Compliance**

Examples: Papua New Guinea and Myanmar

SETI Education for Public Good

- What is good for the Development of the Country?
- What is good for the Industry in the Country?
- What is good for one country/region may not be suitable for another country/region in terms of human resource requirement.
- It is important that the Scientists, Engineers and Technologists must contribute towards economic growth of the country and be able to support the industry.

Be Trend Setters, Be Catalysts of Change

SETI Education Philosophy

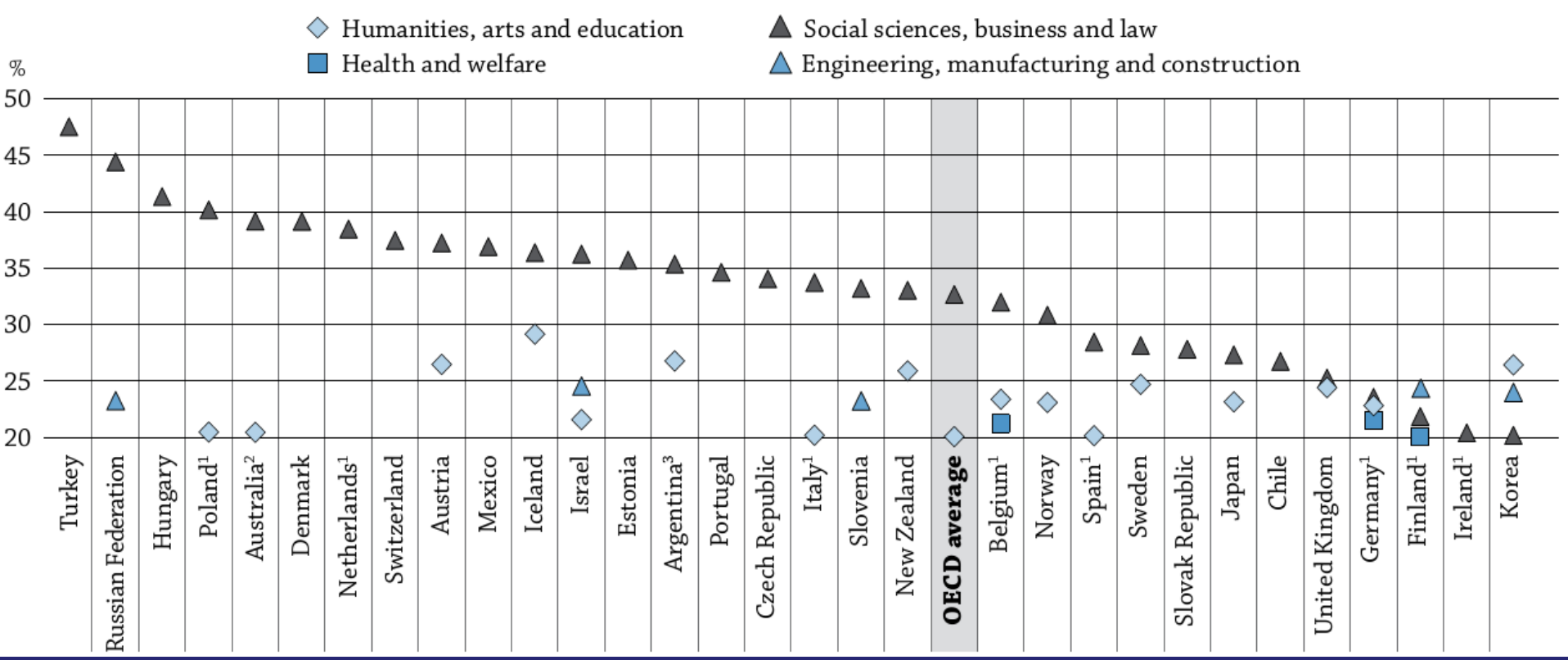
- Morality & Professionalism
- Knowledge and Intellect
- Physical and Mental Health
- Sociality and Humanitarianism
- Aesthetics and Harmony
- Creativity and Innovation

Nurturing Competitive Human Resource

Low Interest in S&T Education

Chart A4.3. Distribution of new entrants into tertiary programmes, by field of education (2009)

Only those fields in which more than 20% of students entered a tertiary programme in 2009 are shown in the graph below



1. Excludes advanced research programmes.
2. Excludes tertiary-type B programmes.
3. Year of reference 2008.

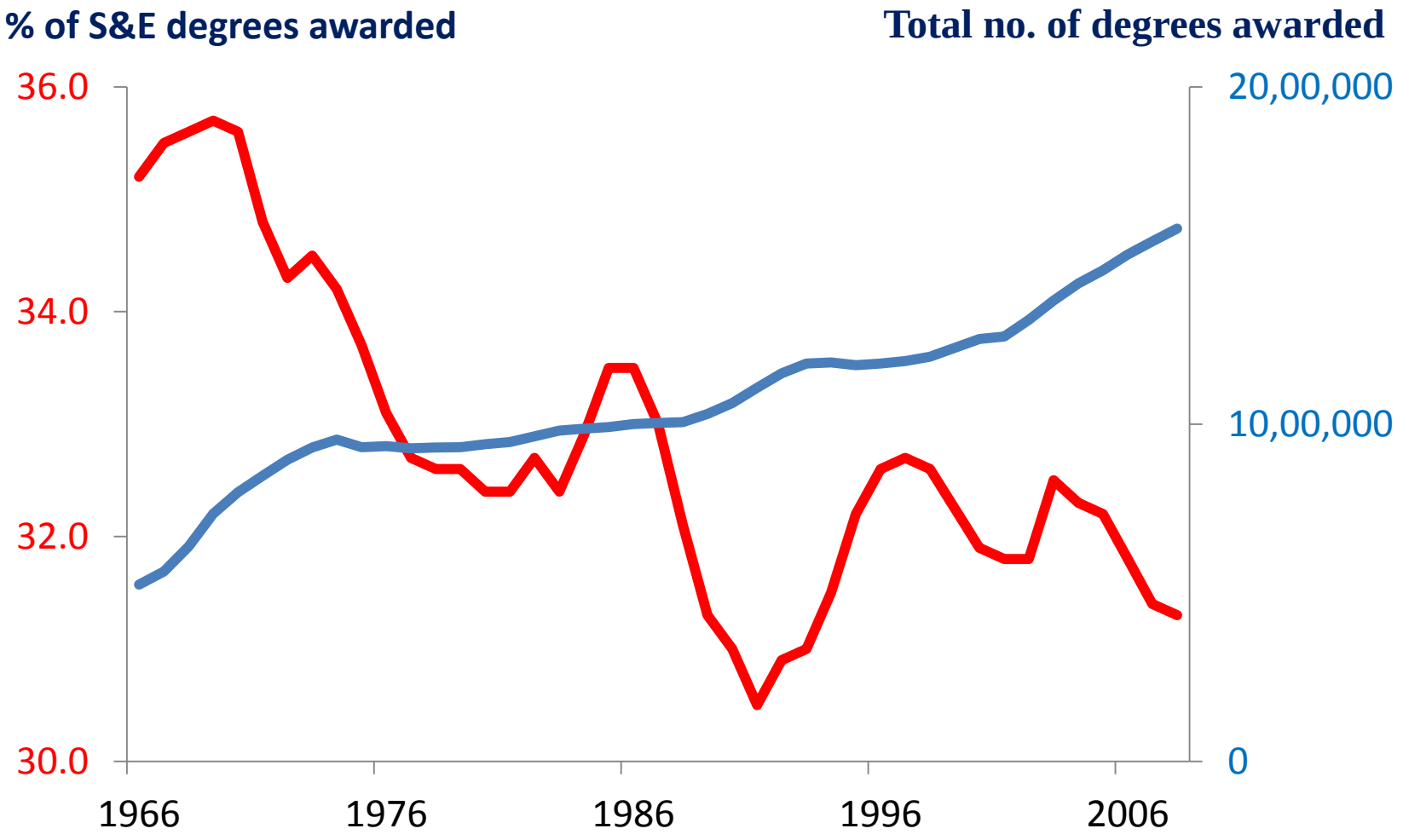
Countries are ranked in descending order of new entrants in social sciences, business and law programmes in 2009.

Source: OECD. Argentina: UNESCO Institute for Statistics (World Education Indicators Programme). Table A4.2a. See Annex 3 for notes (*www.oecd.org/edu/eag2011*).

StatLink http://dx.doi.org/10.1787/888932460135

http://www.oecd.org/edu/skills-beyond-school/48630719.pdf

Interest in Science & Engineering is Declining (US)



Source: NSF, US.

What We could DO Collectively:

- Back-to-School
- Allow Creativity and Innovativeness
- Focus on Basic Concepts and Applications
- Improve Image of SETI Knowledge Workers
- Speak Up – Be Trend Setters
- Go Global – Human Networking

Concluding Remarks 1/3

ACCREDITATION is for continuous IMPROVEMENT of DELIVERY of Education for producing HUMAN RESOURCE needed for national development

Concluding Remarks 2/3

Challenges

- Buy-in by University and all Stakeholders
- International Collaboration
- Fair Play and Not dominated by a few Economies
- Recognition by Licencing Board and Industry
- Assisting Up-and-Coming Economies
- South-south Cooperation

Concluding Remarks 3/3

Challenges

- The Process may appear to be Tedious, but certainly Rewarding
- Continuous Improvement
- Giving Confidence to the Education System
- Up-lifting of Engineering Profession
- Increase Student No. in SETI Career Path

The Hare and the Tortoise

Episode 1:

Slow and Steady Wins the Race

The Hare and the Tortoise

Episode 2:

Fast and Consistency will always beat Slow and Steady

The Hare and the Tortoise

Episode 3:

Identify our Core Competency or Strength and then Change the Playing Field to suit our core competency

The Hare and the Tortoise

Episode 4:

Even though we are Individually Brilliant and have our own Core Competencies, we would achieve Greater Performance if we are able to Pool Resources, Work in a Team and harness each other's core competencies.

THANK YOU

FOR LISTENING