

“ The role of University as a
catalyst for science,
technology and society:
the Trieste science system ”

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Globalisation: effects



- People mobility
 - Increasing migration
 - Increasing **highly skilled migration**
 - Student and academic mobility
- Liberalization and competition
 - Privatization in higher education
 - Trade in higher education, **GATS**
 - Economic **competition for students** and for first mover advantage
- Global area of higher education
 - International **rankings**
 - International actors: EU, WTO, etc.
 - University **networks**
 - Research **networks**

More mobility...

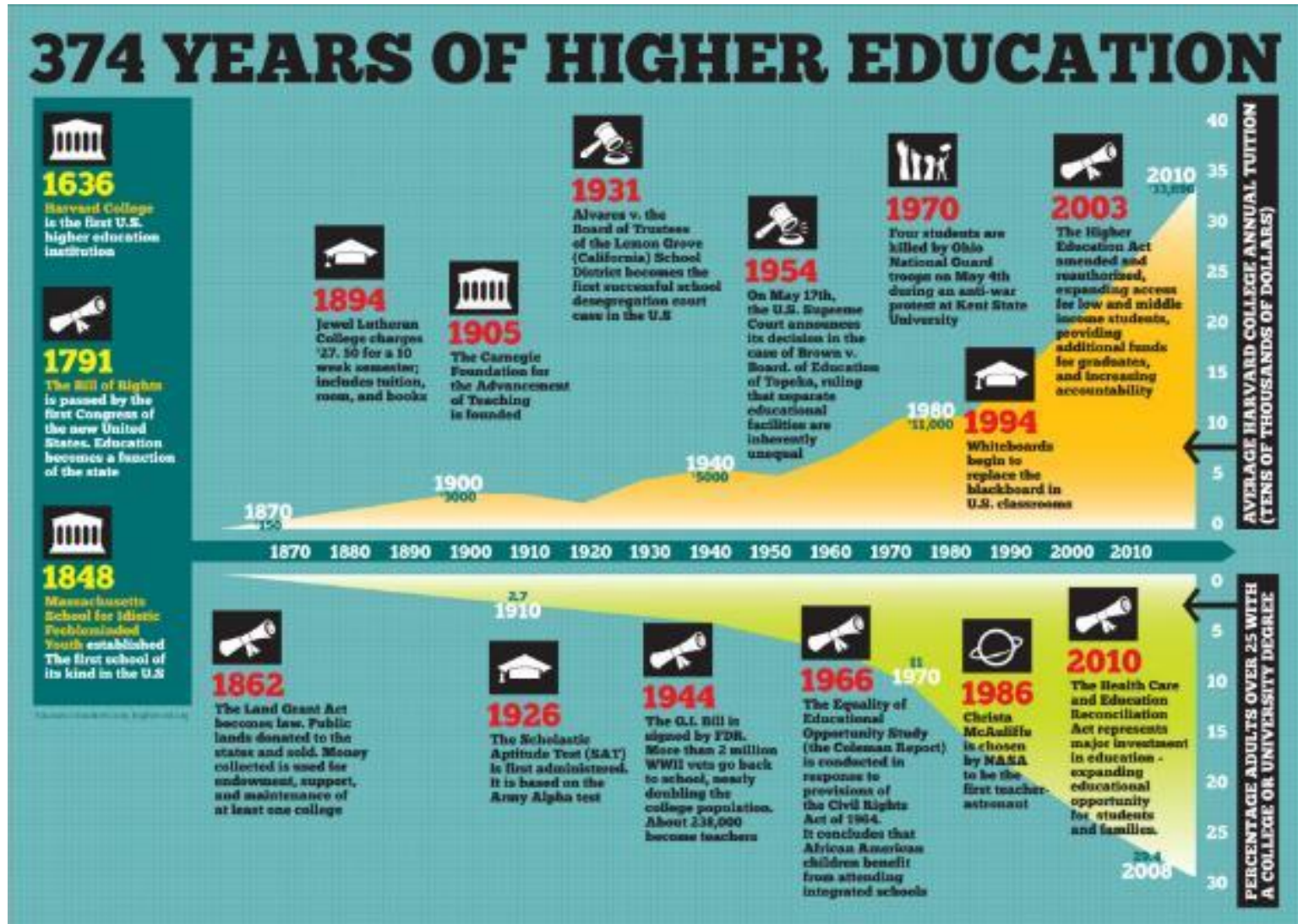
Mobility levels have increased by 25% over the last decade and we predict a further 50% growth by 2020



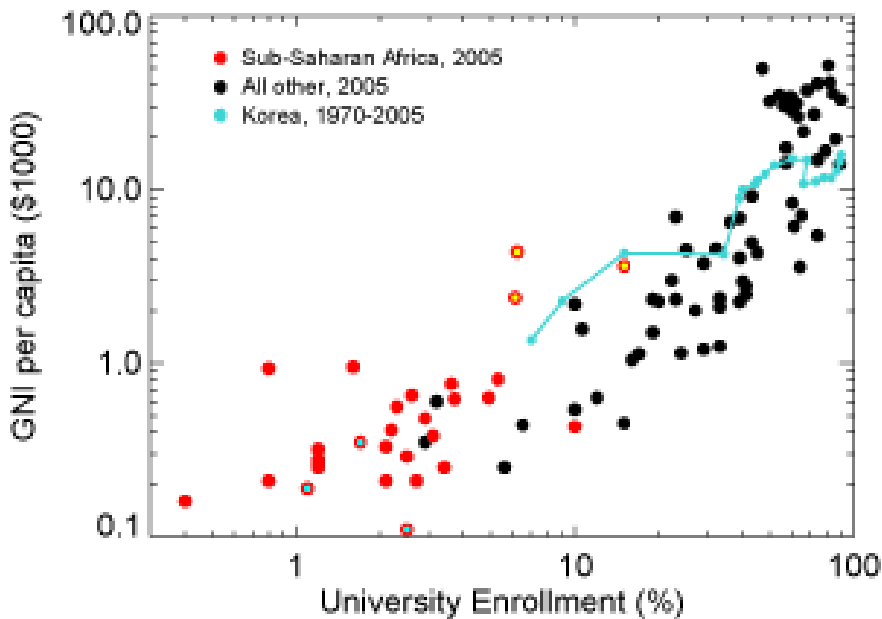
...but not as we know it



Global expansion of HE will continue (+15% by 2025 in OECD)



It is proven that GDP scales with the University enrolment

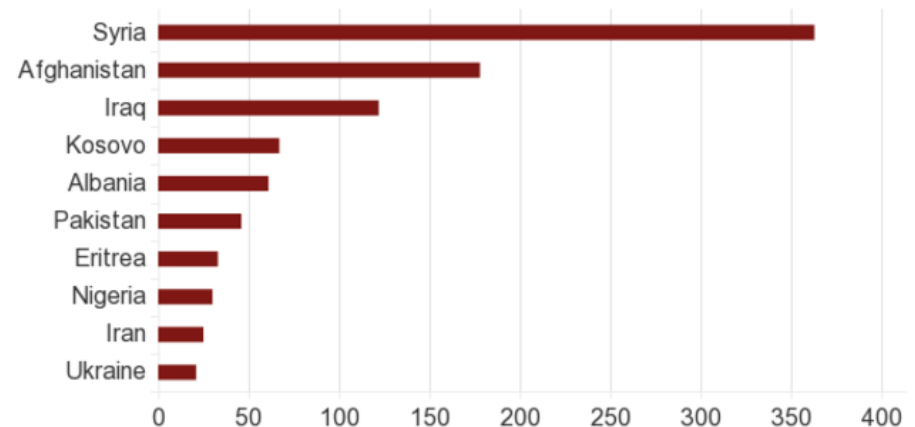


Migration: the Fort Apache logic does not work



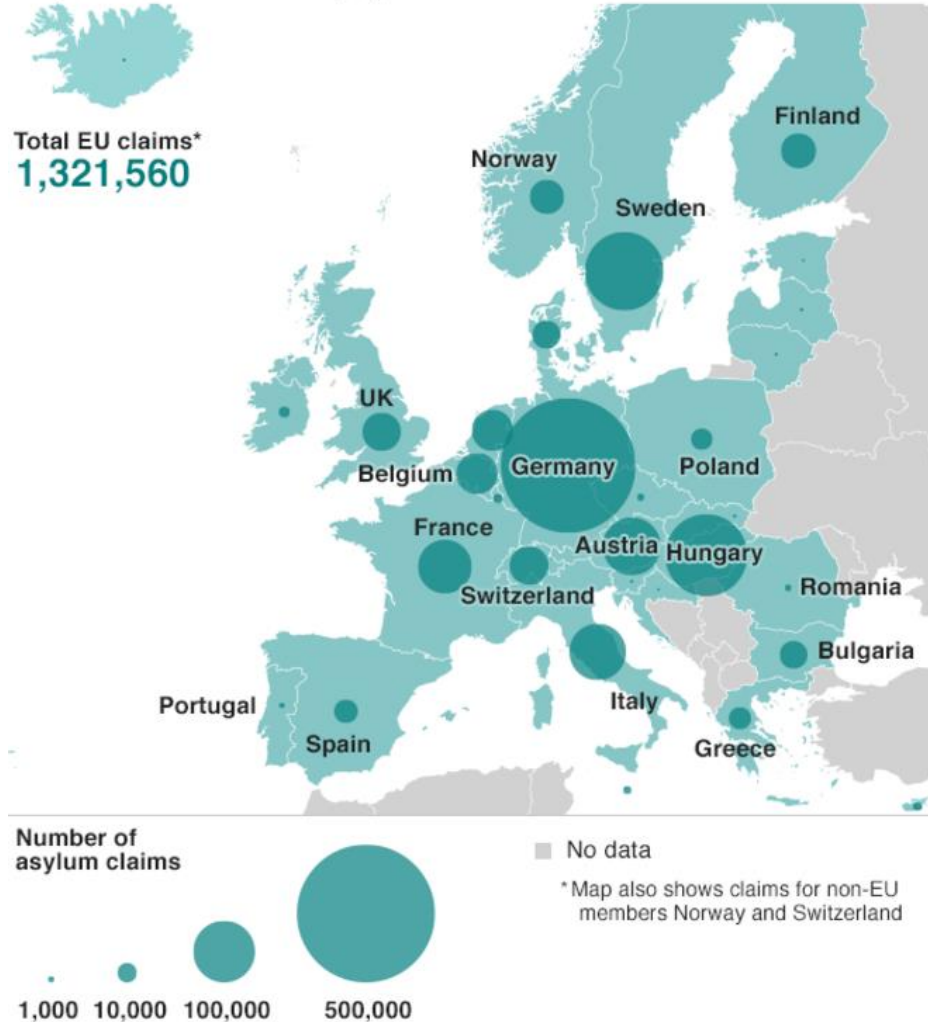
Top 10 origins of people applying for asylum in the EU

First-time applications in 2015, in thousands



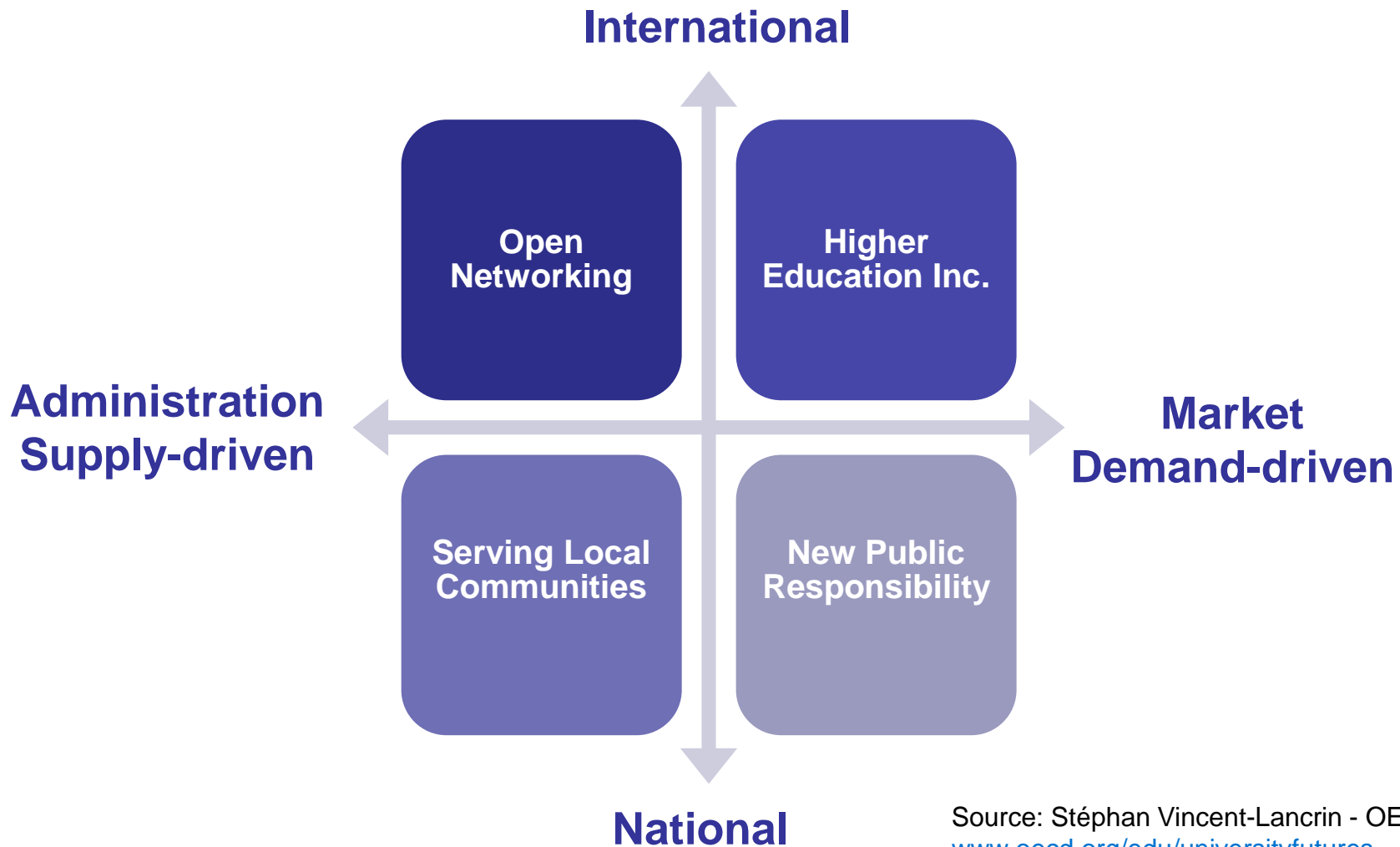
Source: Eurostat

Asylum claims in Europe, 2015



Source: Eurostat

Scenarios for higher education systems

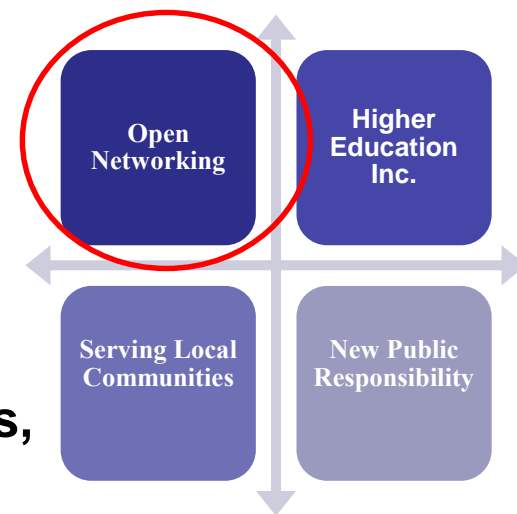


Source: Stéphan Vincent-Lancrin - OECD - www.oecd.org/edu/universityfutures

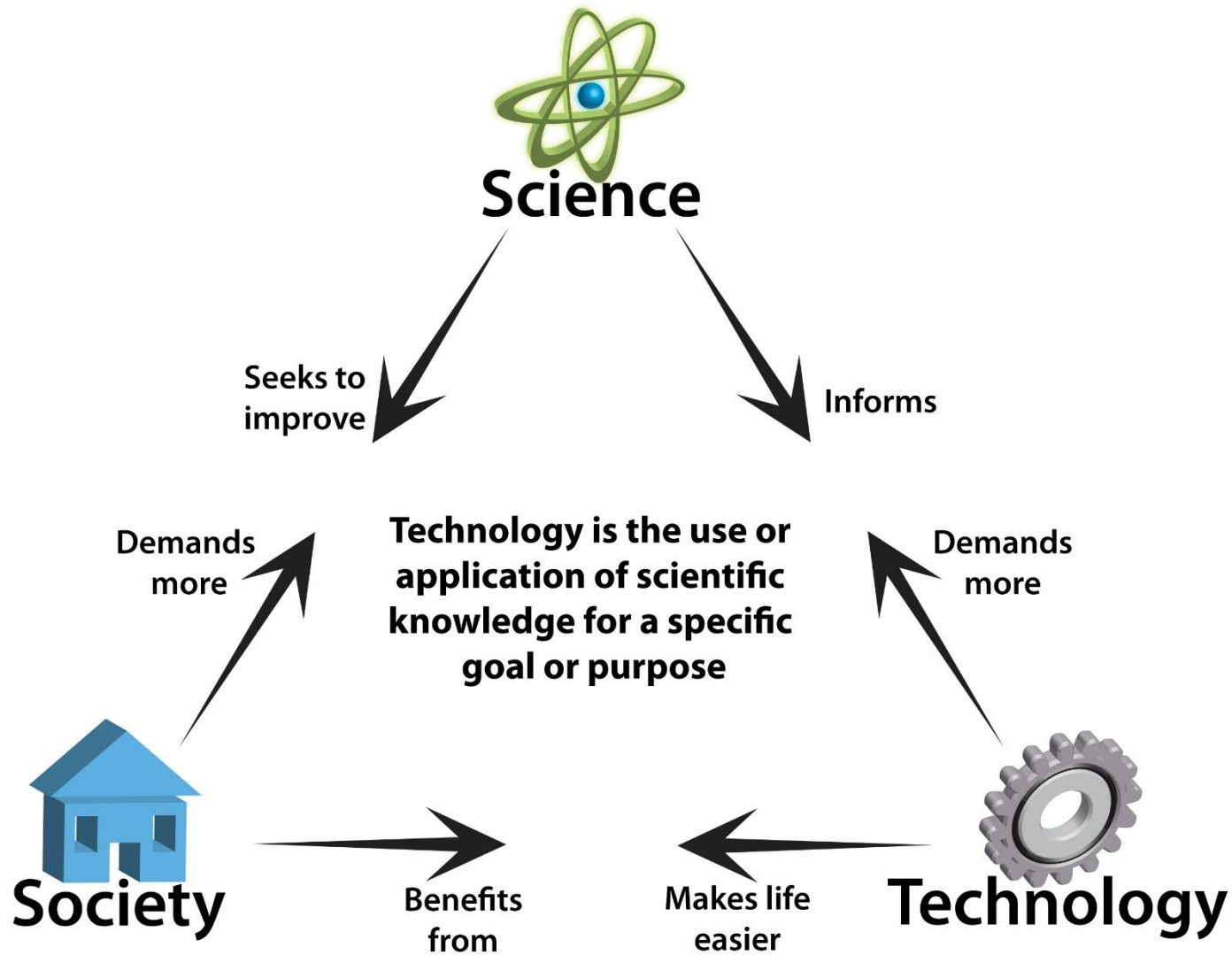
Scenario 4: Open Networking



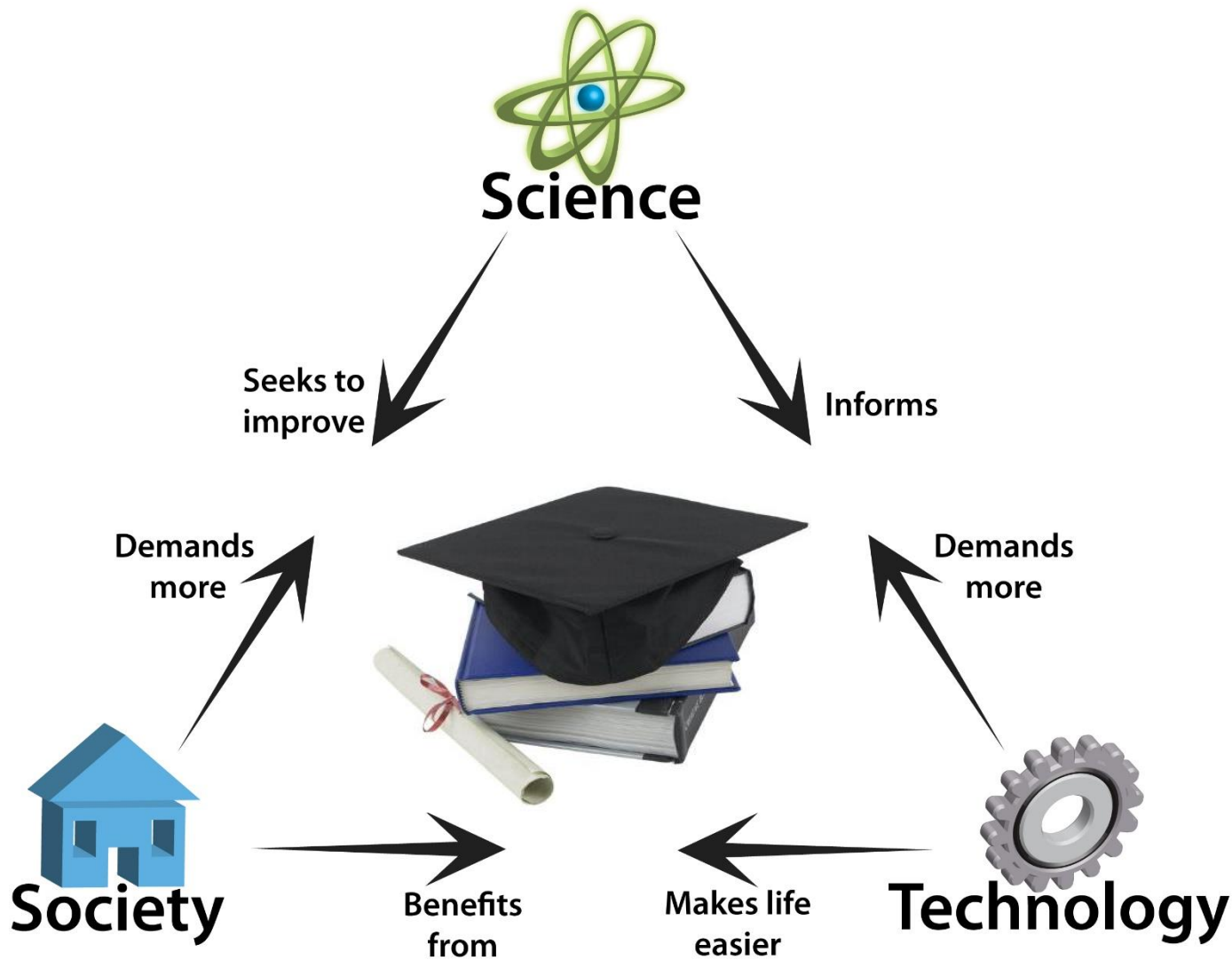
- Drivers
 - **International cooperation & harmonization** of systems
 - **Technology**
 - Ideal of **open knowledge**
- Features
 - Intensive **networking among institutions, scholars, students (& industry)**
 - Modularization of studies under academics' control
 - **International collaborative research**
 - Strong hierarchy between networks but quick spillovers
 - **Lifelong learning** outside the HE sector
- Related developments
 - Bologna process, international academic partnerships and consortia,
 - Increasing computing power and culture of openness challenging traditional intellectual property rights



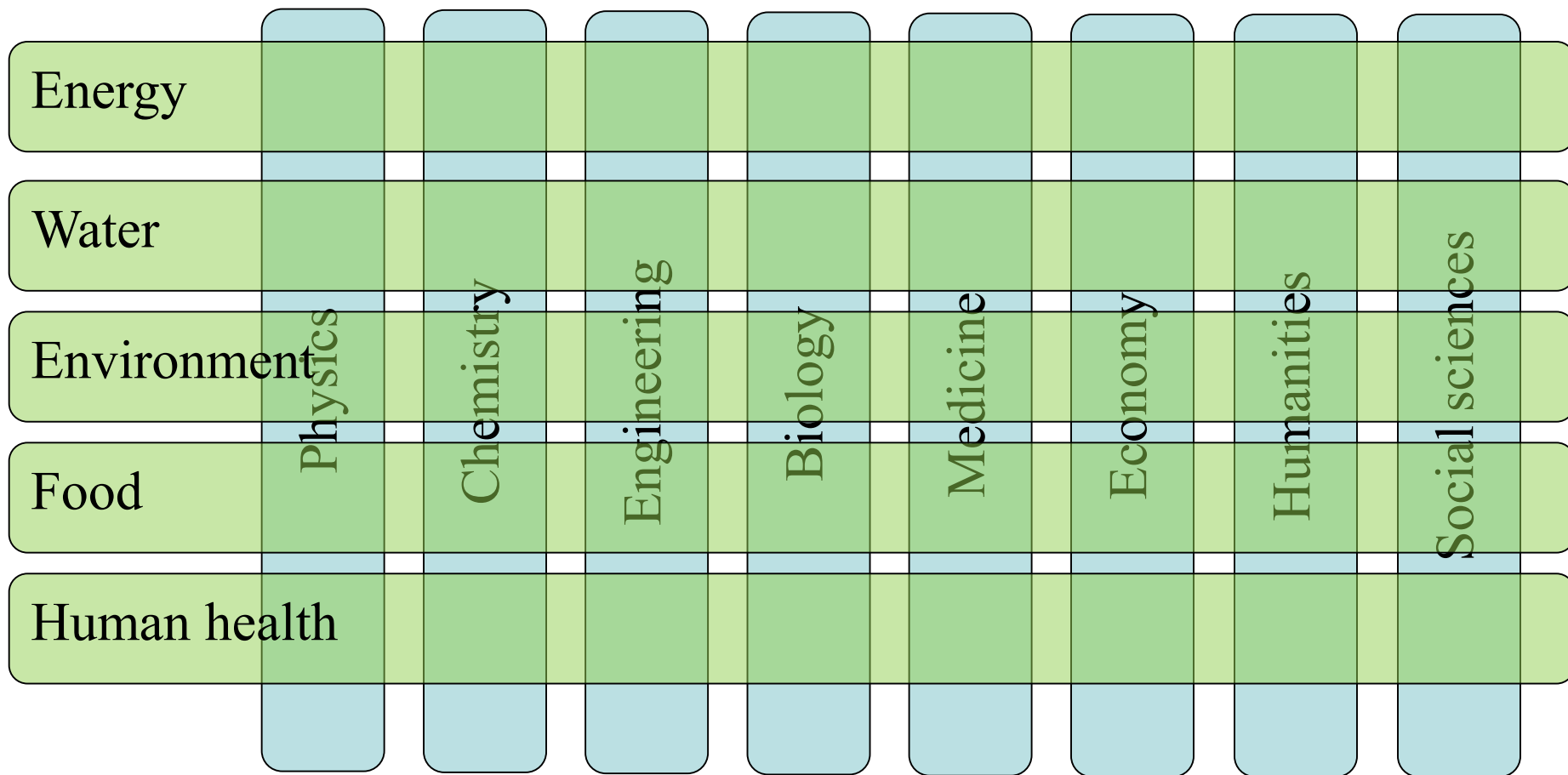
Science, technology & society



Science, technology & society



Disciplines and challenges



Horizon2020 Structure



Societal Challenges

- Health, demographic change and wellbeing
- Food security, sustainable agriculture and bio-economy
- Secure, clean and efficient energy
- Smart, green and integrated transport
- Climate action, efficiency and raw materials
- Inclusive, innovative and secure societies

Industrial Leadership

leadership in enabling and industrial technologies

KET

facilitate access to risk finance

support for innovation in SMEs

ICT

Advanced materials

Biotechnologies

Advanced Manufacturing

Space

Nanotechnologies

support for cross-cutting actions combining several Key Enabling Technologies

Horizon 2020

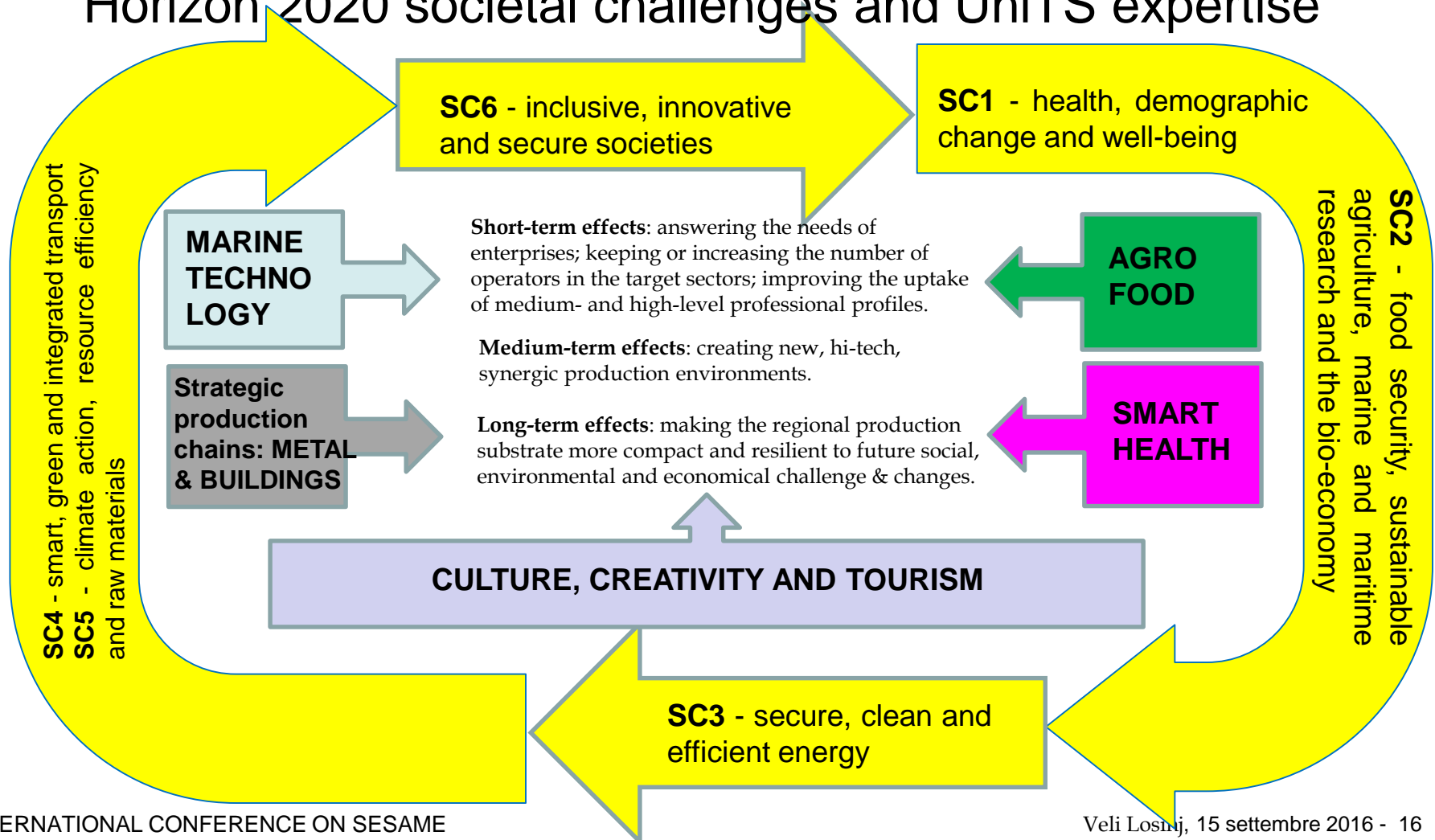
Excellence Science

- Marie Curie actions
- Support for Future and Emerging Technologies
- Research infrastructures (including e- infrastructures) accessible to all researchers in Europe
- Support the individuals and their teams to carry out frontier research by building on the success of the European Research Council

EU – smart specialisation strategy



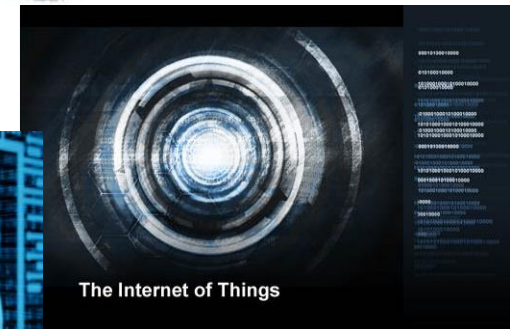
- Correlations between FVG regional strategy strands, Horizon 2020 societal challenges and UniTS expertise



12 Disruptive technologies

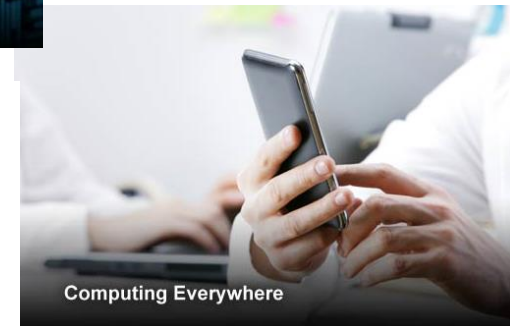


1. Mobile Internet
2. Automation of knowledge work
3. Internet of Things
4. Advanced robotics
5. Cloud
6. Autonomous or Near-Autonomous Vehicles
7. Next-generation Genomics
8. Next generation Storage
9. 3D Printing
10. Advanced Materials
11. Advanced Oil and Gas Exploration and Recovery
12. Renewable Electricity

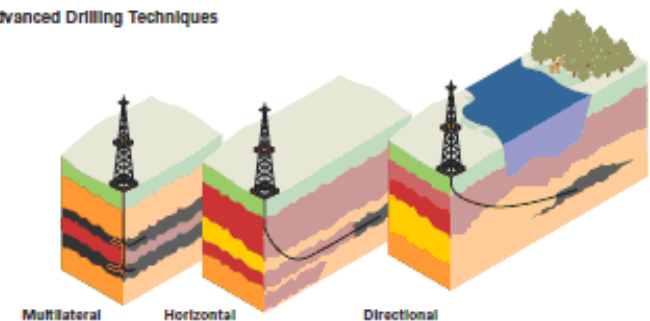


2015 CHEVROLET COLORADO
STEEL STRUCTURE

- PRESS HARDENED STEEL
- ULTRA HIGH-STRENGTH STEEL
- ADVANCED HIGH-STRENGTH STEEL
- HIGH-STRENGTH STEEL



Advanced Drilling Techniques



Fonte: IntelligentHQ, Fonseca, 2014

Top 10 Strategic Technology Trends

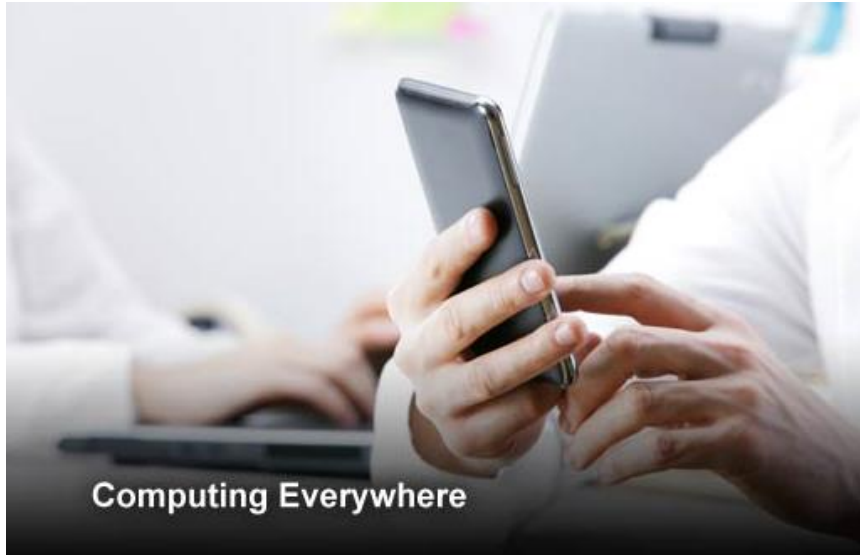


Merging the Real World and the Virtual World	1	Computing Everywhere
	2	The Internet of Things
	3	3D Printing
Intelligence Everywhere	4	Advanced, Pervasive and Invisible Analytics
	5	Context-Rich Systems
	6	Smart Machines
The New IT Reality Emerges	7	Cloud/Client Computing
	8	Software-Defined Applications and Infrastructure
	9	Web-Scale IT
	10	Risk-Based Security and Self-protection

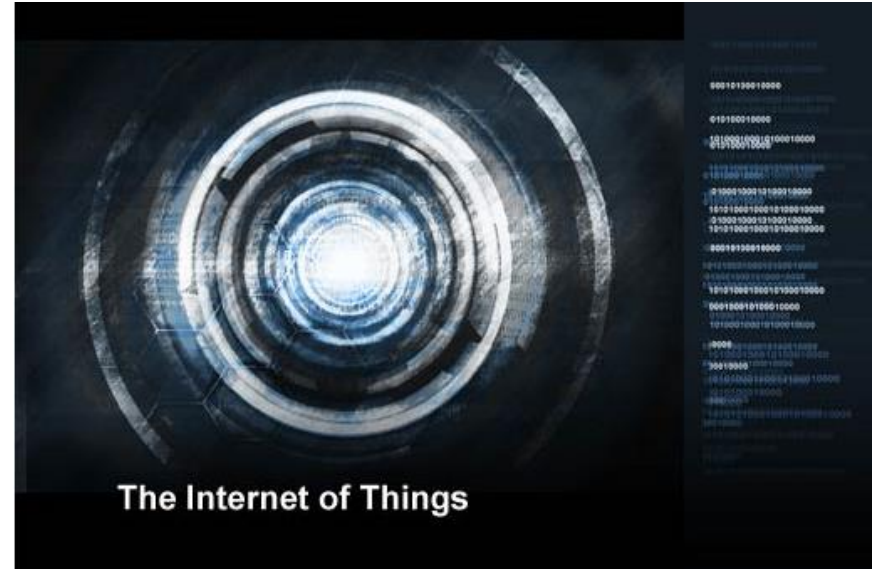
Merging the real world and the virtual world



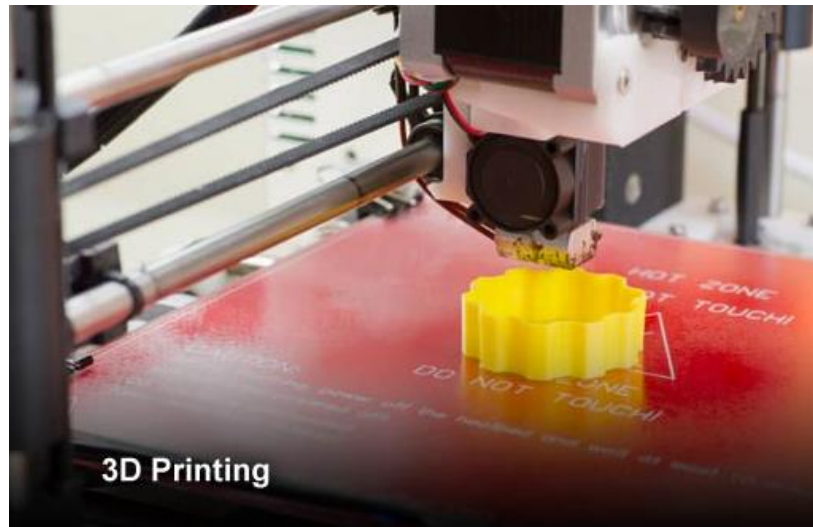
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Computing Everywhere



The Internet of Things



3D Printing

Intelligence everywhere



What is Watson?

From hospitals to kitchens, Watson has clocked in to work and is already taking impressive strides across industries. But to understand the power of Watson, we must first understand cognitive computing and how it enhances, scales, and accelerates human expertise.

Smart Machines

Bob Dylan's bizarre new commercial with IBM's Watson



The new IT reality emerges



Social, Mobility, Analytics, Cloud



- Internet of things

Latest Thinking > SMAC

SMAC ▾ CONTACT

SOCIAL
MOBILE
ANALYTICS
CLOUD

SMAC:

The New Enterprise IT Model

Overview Perspective The SMAC Effect Cognizant Approach Our Latest Thinking

OVERVIEW

While social, mobile, analytics and cloud technologies add a new dimension to your business model, to fully maximize their value consider the sum is greater than its parts. The formula for the Future of Work is called SMAC - social, mobile, analytics and cloud on one integrated stack, where each function

SMAC

Investments priorities in ICT

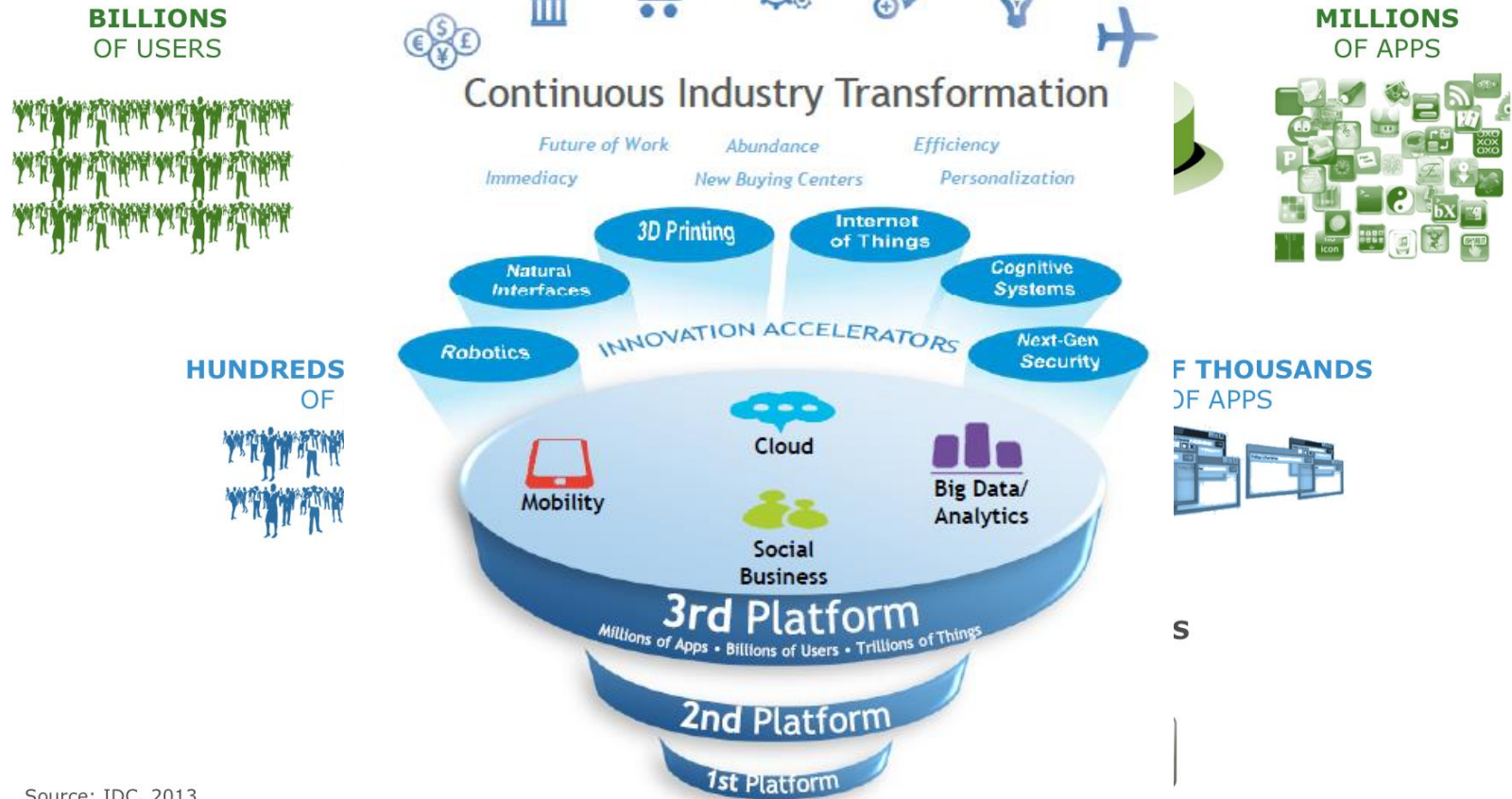


Rank	Investment priority	2014	2015
1	BI/analytics	41%	50%
2	Infrastructure and data center	31%	37%
3	Cloud	27%	32%
4	ERP	26%	34%
5	Moblie	24%	36%
6	Digitalization/digital marketing	17%	11%
7	Security	13%	11%
8	Networking, voice and data comms	12%	12%
9	Customer relationship/experience	11%	8%
10	Industry-specific applications	9%	10%
11	Legacy modernization	7%	7%
12	Enterprise applications	6%	2%

Trasformazione continua dell'industria



3rd Platform Drives Digital Transformation



Source: IDC, 2013

Source: IDC, 2015

EMC²

Industry 4.0



The 4th Industrial Revolution - „Industry 4.0“

Drivers
Quality of life
Engineering Sciences

Mobility

μelectronics

ICT

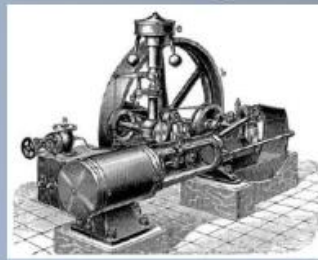
1st

2nd

3rd

4th

Cyber Physical Systems



steam engine

GB

1782

Power generation
Mechanical automation



conveyor belt

US

1913

Industrialization



Computer, NC, PLC

1954

Electronic Automation



2015

Smart Automation





Materials Genome Initiative (MGI)

Materials Genome Initiative

Publications | Subject Areas | Products/Services | NIST Organization | News | Programs & Projects | User Facilities | Work with NIST

NIST Home > Materials Genome Initiative

Materials Innovation Infrastructure

NIST is working to build the materials innovation infrastructure in support of the Administration's Materials Genome Initiative.

On July 15, 2013, NIST held a webinar about the Center of Excellence Program.

Scanning tunneling microscope image shows ultrathin film layer of platinum deposited on gold.

The Materials Genome Initiative at NIST

Related Projects

- Advanced Integrated Data Management for Materials Discovery
- Atomistic Potentials and the Future of Nanomaterials Metrology
- Center for Theoretical and Computational Materials Science
- Density Functional Theory Informatics and Repositories
- Multiscale MD-FEM Methodology
- Validation of Density Functional Theory for Materials
- Web Force-Field (WebFF) - A Smart Force Field Repository for Soft Materials

see all projects>>

...technologies from the drawing board to the marketplace. We can do it faster.

- President Obama, June 2011 at Carnegie Mellon University

VERNMENT

Search

The future of employment



Occupation	Probability of massive reduction of occupation by 2030
Telemarketers	99%
Accountants & Auditors	94%
Retail Salespersons	92%
Real Estate Sales Agents	86%
Structural Iron and Steel Workers...	83%
...	...
Machinists	65%
Audio and Video Technicians	55%
Taxi drivers/drivers	55%
...	...
Firefighters	17%
Chemical Engineers	2%
Music Directors and Composers	1.6%
Marine Engineers - Naval	1.0%
Architects	0.8%
Clergy	0.8%
Athletic Trainers	0.7%
Dentists	0.4%
...	...



Source: Bureau of labor statistics, the Future of Employment (Frey & Osborne, 2013)

The Future of Jobs and Skills



Top 10 skills

in 2020

1. Complex Problem Solving
2. Critical Thinking
3. Creativity
4. People Management
5. Coordinating with Others
6. Emotional Intelligence
7. Judgment and Decision Making
8. Service Orientation
9. Negotiation
10. Cognitive Flexibility

in 2015

1. Complex Problem Solving
2. Coordinating with Others
3. People Management
4. Critical Thinking
5. Negotiation
6. Quality Control
7. Service Orientation
8. Judgment and Decision Making
9. Active Listening
10. Creativity



COMMITTED TO
IMPROVING THE STATE
OF THE WORLD

- New **categories of jobs will emerge**, partly or wholly displacing others
- 65% of children entering primary school today will ultimately end up working in completely **new job types that don't yet exist.**

Where everything started



Venerdì, 7 giugno 1968

CRONACA

TRECENTOCINQUANTA SCIENZIATI FRA I QUALI DIECI PREMI NOBEL

Protagonisti dell'era atomica in assise mondiale a Miramare

Conferita dal congresso eccezionale solennità all'inaugurazione della nuova sede del Centro internazionale di fisica teorica - Previste quattro settimane di lavori

«Un evento di interesse storico e di enorme prestigio per Trieste»: così il direttore del Centro internazionale di fisica teorica, prof. Abdus Salam, ha definito nel corso di una conferenza stampa — presente anche il vicedirettore prof. Paolo Budini — il simposium mondiale della fisica contemporanea, che oggi vedrà la presenza a Trieste di 350 studiosi, fra i quali ben dieci Premi Nobel. L'apertura del congresso avrà luogo stamane, alle 12.15, nella nuova sede del Centro di Miramare (quasi all'imbocco della prima galleria), alla presenza del direttore generale dell'Agenda internazionale per l'energia atomica di Vienna, lo svedese Ekland.

L'idea della grande assise scorse tre anni fa e incontrò l'immediato favore di tutti i Paesi, in primo luogo del prof. Oppenheimer (il quadro della bomba atomica) che fu eletto presidente del comitato organizzatore. Si era constatato, infatti, che normalmente avvengono riunioni di scienziati di determinati gruppi di fisica, per cui si volle creare un simposium capace di riunire i vari campi della fisica teorica, per un opportuno e necessario scambio di informazioni.

Centro stesso. Al termine, naturalmente, sarà provveduto alla pubblicazione di una documentazione con la raccolta di tutti i dati.



I dirigenti del Centro: il prof. Salam e il prof. Budini

Inoltre che domenica, alle ore 16.45, si svolgerà la cerimonia per la consegna della nuova sede del Centro da parte del Comune di Trieste.

Il prof. Salam ha ricordato che domenica, alle ore 16.45, si svolgerà la cerimonia per la consegna della nuova sede del Centro da parte del Comune di Trieste.

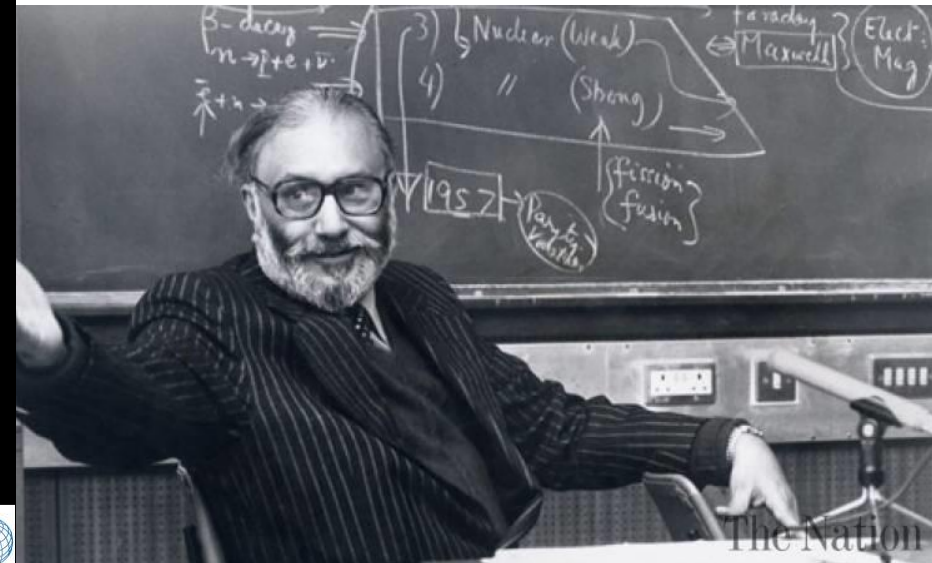
Un'assise scientifica di così rilevante importanza e di tanto largo respiro internazionale comporta, naturalmente, uno sforzo finanziario di notevole entità: si calcola, infatti, che la spesa complessiva per l'organizzazione del congresso ascenda a 125 milioni di lire.

Finché al 26 giugno, infatti, saranno esplorati i vari settori della materia, suddivisi nelle quattro settimane di durata del congresso: biofisica; fisica del...

Su questo avvenimento, il rappresentante del nostro Governo è questi, a sua volta, al direttore Ekland, con il simbolo dono di una copia in oro delle chiavi dell'edificio, che diverrà così proprietà dell'I.C.T.P. Da quel momento, accanito al tricolore, avventolerà l'azzurro vessillo dell'ONU.

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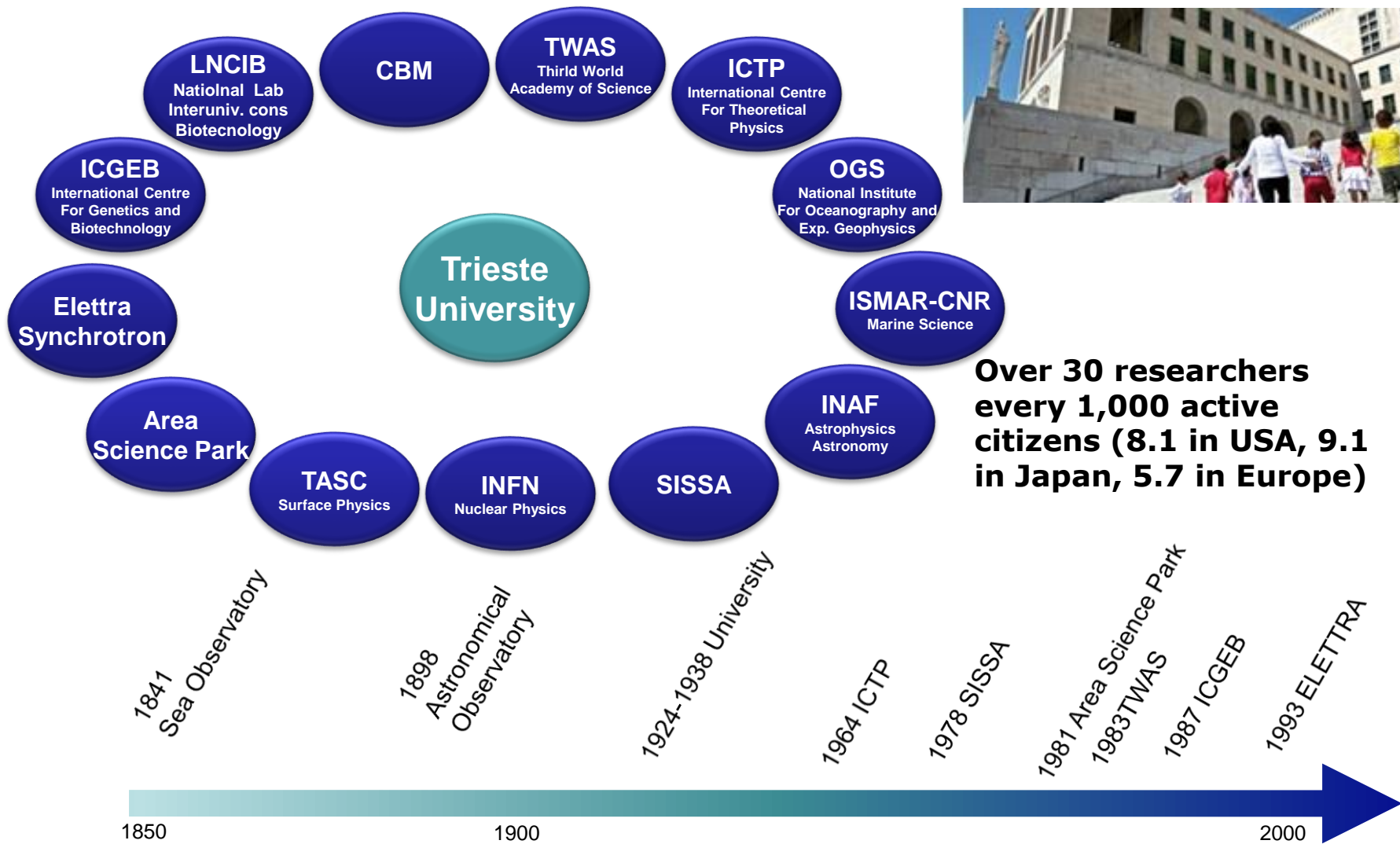
A network of scientific institutions



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The Trieste System



Over 30 researchers every 1,000 active citizens (8.1 in USA, 9.1 in Japan, 5.7 in Europe)

The United Universities of Friuli Venezia Giulia



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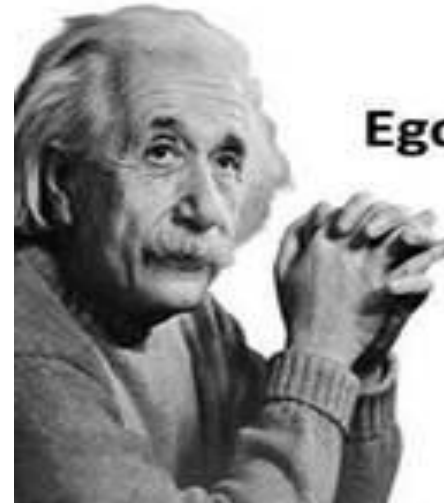
SCIENCE ACROSS THE WORLD



21st Century Learning Competencies



- “We are responsible for preparing our students to address problems we cannot foresee with knowledge that has not yet been developed using technology not yet invented.”
- “The problems we have cannot be solved at the same level of thinking at which we created them.”



$$\text{Ego} = \frac{1}{\text{Knowledge}}$$

*“More the Knowledge
Lesser the Ego,
Lesser the Knowledge
More the Ego...”*

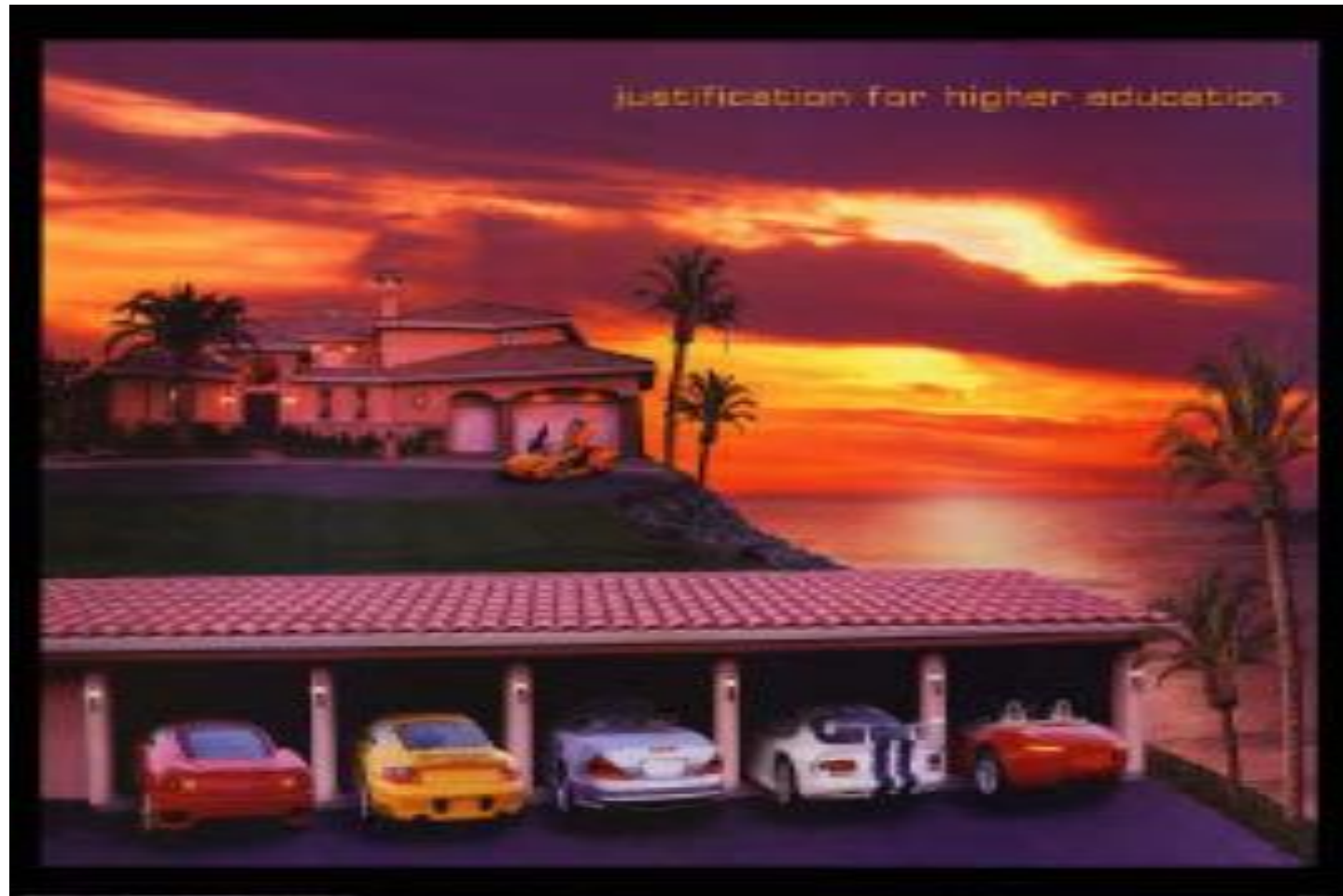
-Albert Einstein.

Albert Einstein

Is Higher Education Primarily for Economic Gain?



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Or Developing the Nation's Talent and Creativity?



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... anyway!!



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“If you think education is expensive,
try ignorance”

Derek Bok - Presidente of Harvard University
1971-1990

