" **The role of University as a catalyst for science, technology and society** "

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Globalisation: facilitators

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- Ease of **mobility**
- Fall of **transportation costs**
- **Information and Communication Technology**
- Role of **Multinational Enterprises** and emergence of a more global/ internationalized share of the **labor market**
- **English** as a lingua franca (probably more an outcome than a driver though

More interconnectedness, more visibility to and of the world
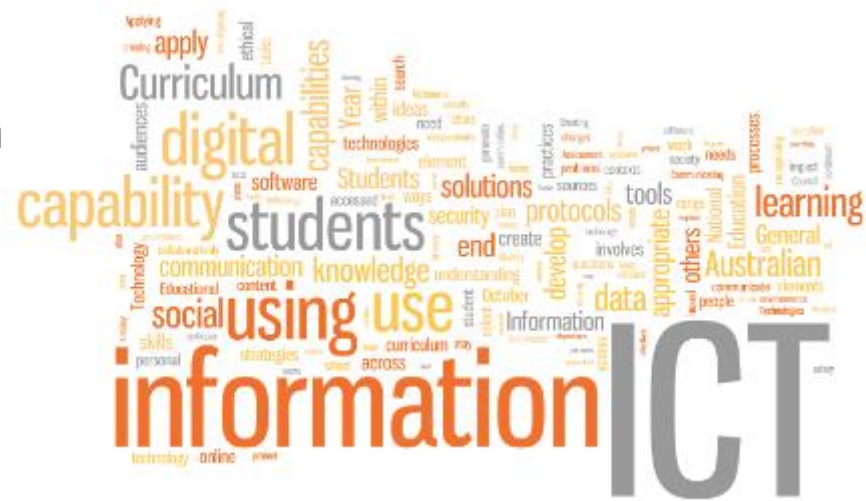
Globalisation: effects

- 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...

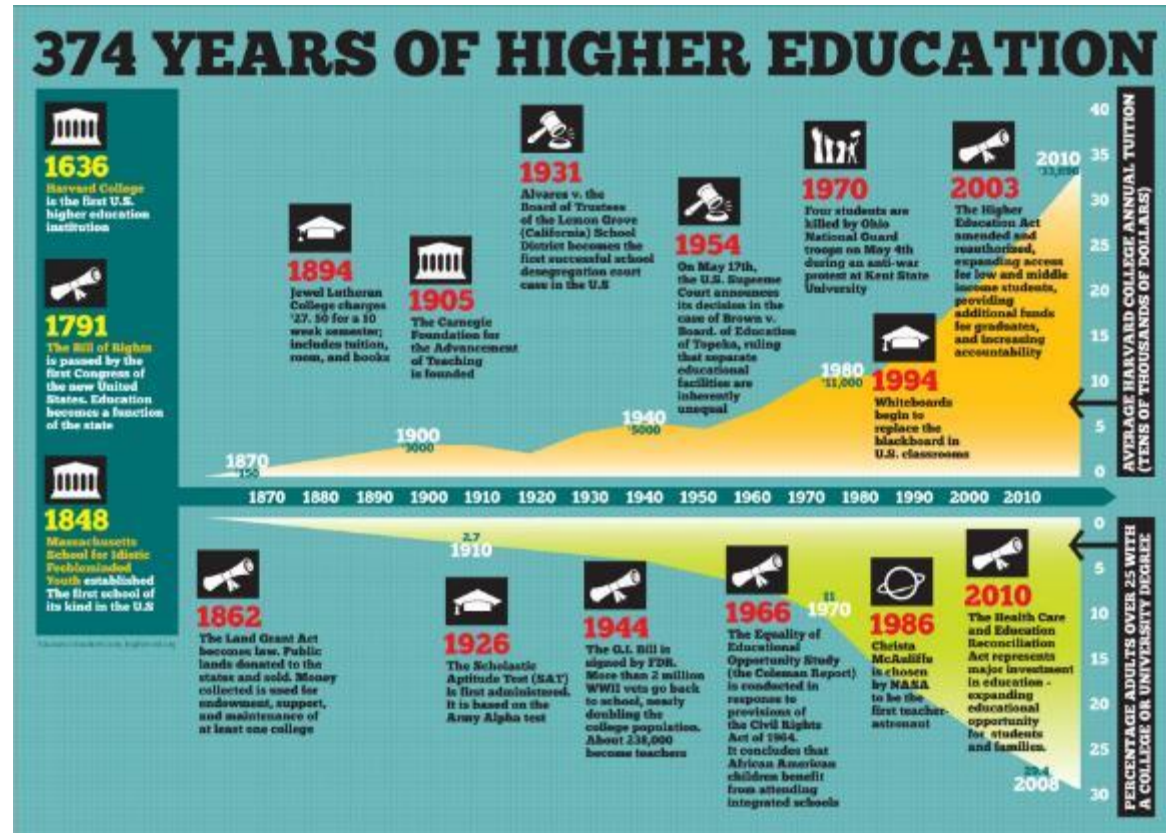Mobility levels have increased by 25% over the last decade and we predict a further 50% growth by 2020

50% growth by 2020

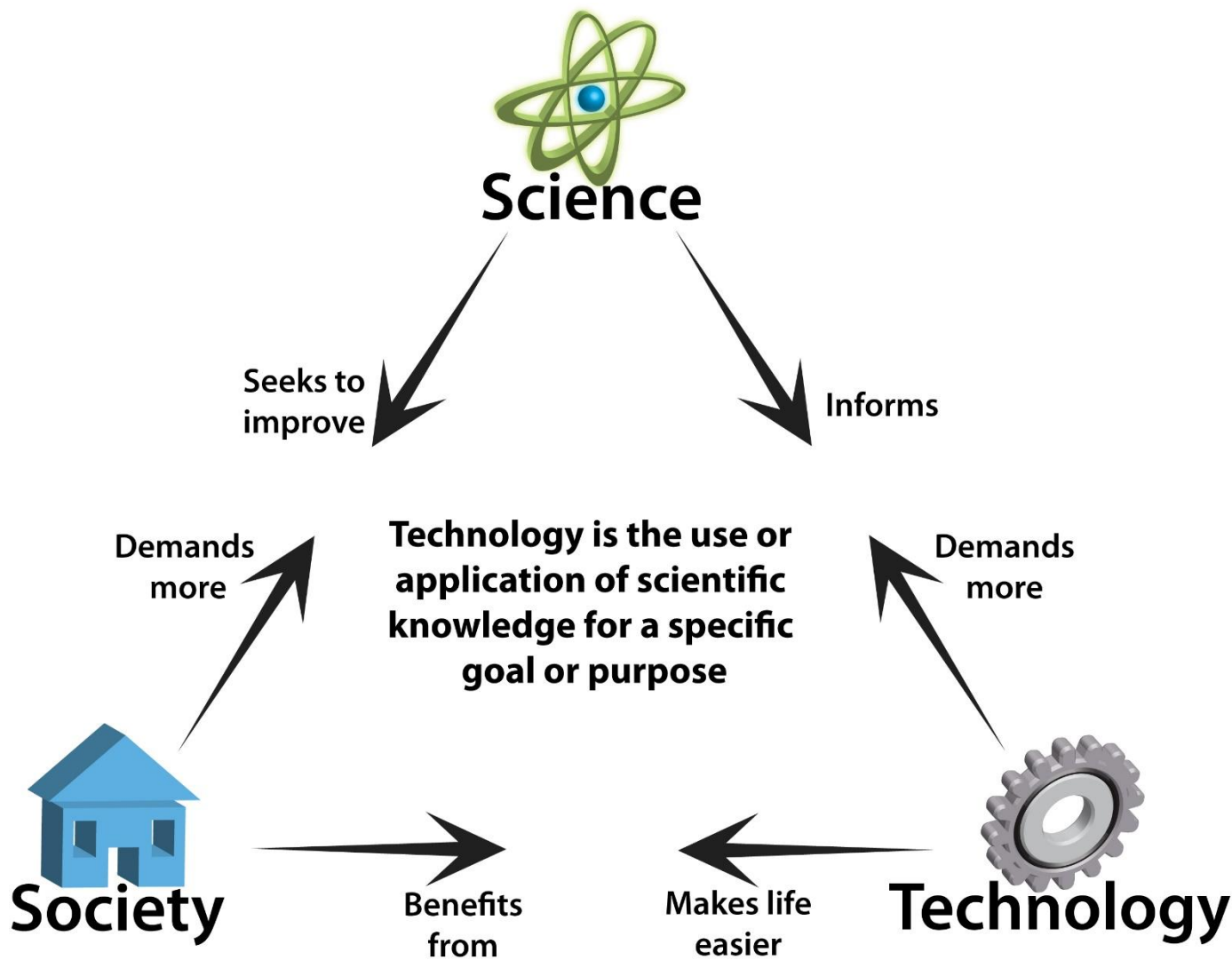...but not as we know it

Why Compete?

Demand for global universities?

- Expansion of HE will likely continue
  - **Political** factors
  - Demand of the **economy**
  - Projection: **+15% on average by 2025** in the OECD area
- Expansion of cross-border education
  - Student and programme **mobility** mainly
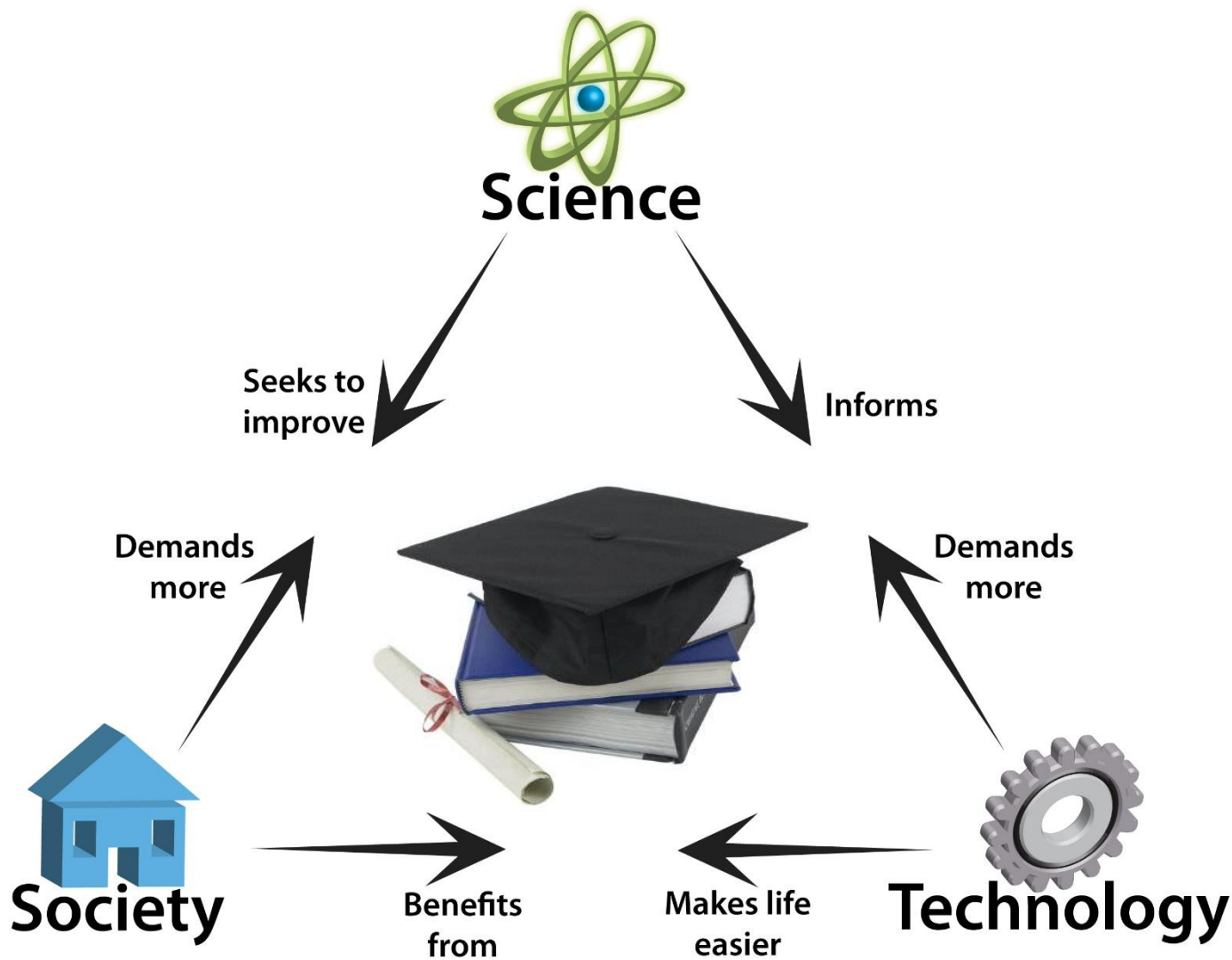 - Its nature may change over time

374 YEARS OF HIGHER EDUCATION

Does that imply a **market for global universities**?

Science, technology & society

Innovation

Culture

Curiosity

Creativity

An « investment for the future » should stress:

- ◉ Blue skies research

- ◉ A multidisciplinary advantage

- ◉ Research *and* education *and* culture

- ◉ Knowledge transfer for a competitive economy

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

Gartner
SYMPOSIUM ITXPO 2014

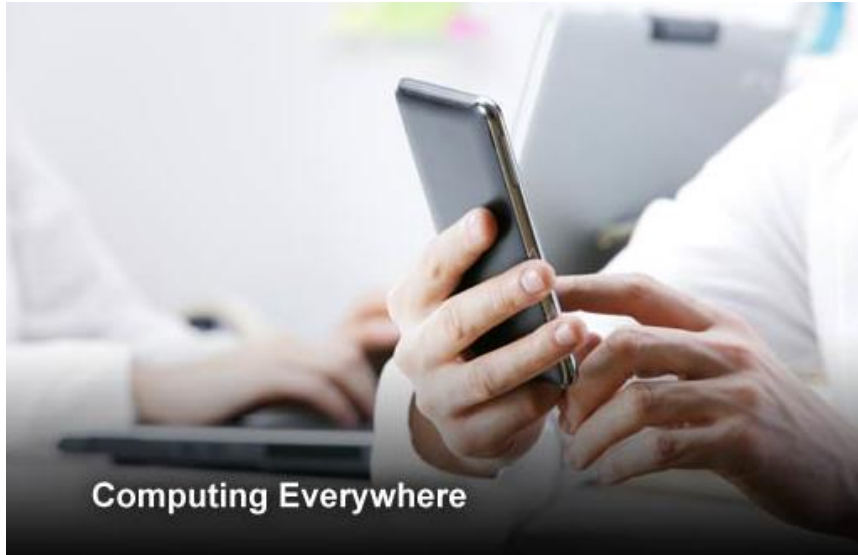# Merging the real world and the virtual world

Computing Everywhere
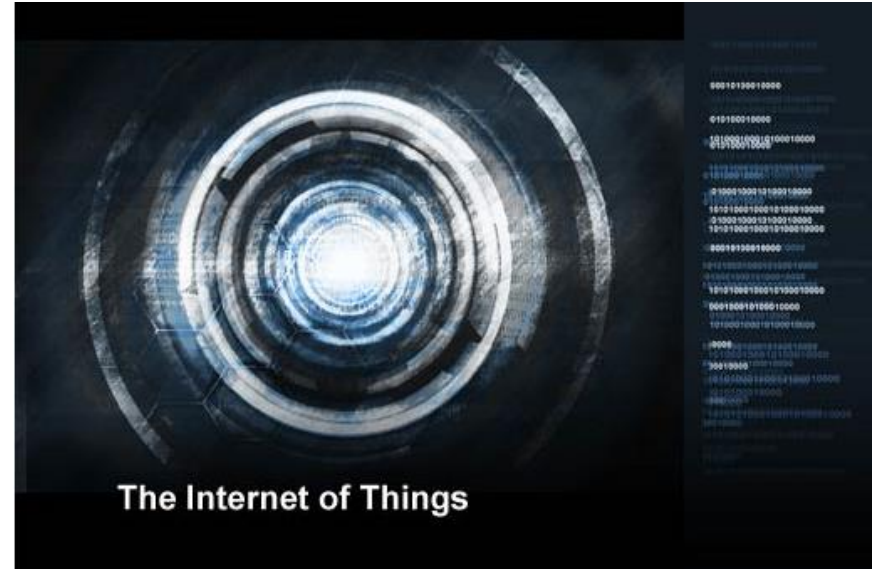
The Internet of Things
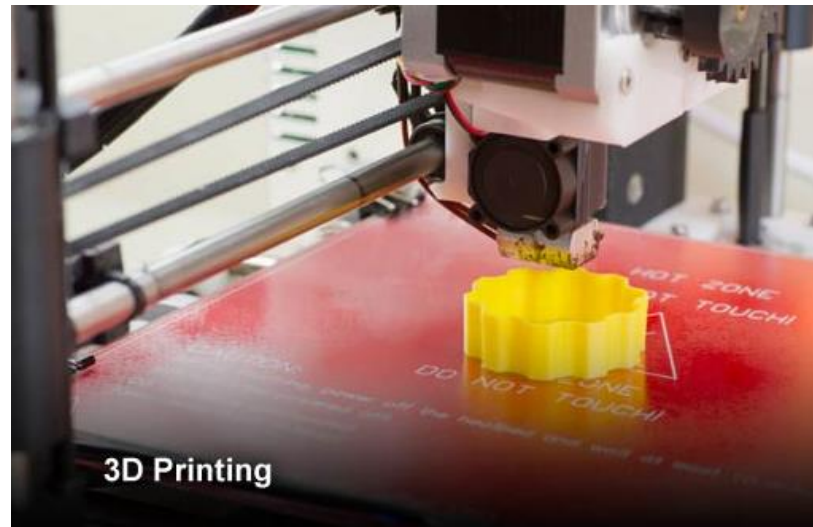
3D Printing

Intelligence everywhere

Advanced, Pervasive and Invisible Analytics

Context-Rich Systems

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

The new IT reality emerges

Cloud/Client Computing

Software-Defined Applications and Infrastructure


Web-Scale IT

Risk-Based Security and Self-Protection

- Internet of things

Investments priorities

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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%

ICT in higher education 2014 survey

Applications in cloud

Email	87%
Social networking	40%
Course/Learning Management (LMS or CMS)	50%
Data Storage	34%
Library applications	38%
Business continuity/disaster recovery	25%
CRM	29%
Desktop tools (i.e. MS Office)	33%
Portal	20%
Data Center	13%
Student applications (registration, enrollment...)	15%
Financial application	15%
Other (please specify)	8%

Emerging technologies

Security	20%
Analytics and Big Data	10%
Mobile/BYOD	10%
Wireless	9%
Network and bandwidth issues	6%
Cloud	6%
Adaptive Learning/MOOCs	5%
Data management and storage	5%
Virtualization	4%
Business intelligence and CRM	4%
SaaS/PaaS	2%
Other	11%

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%
	…

Home Carer

Memory Surgeon

Body Part Maker

Digital Architect

3D-printing expert

Traceability Manager

Energy Manager

Personal Brander

Geomicro Biologist

SEO Manager

Online Community Manager

Broadband Architect

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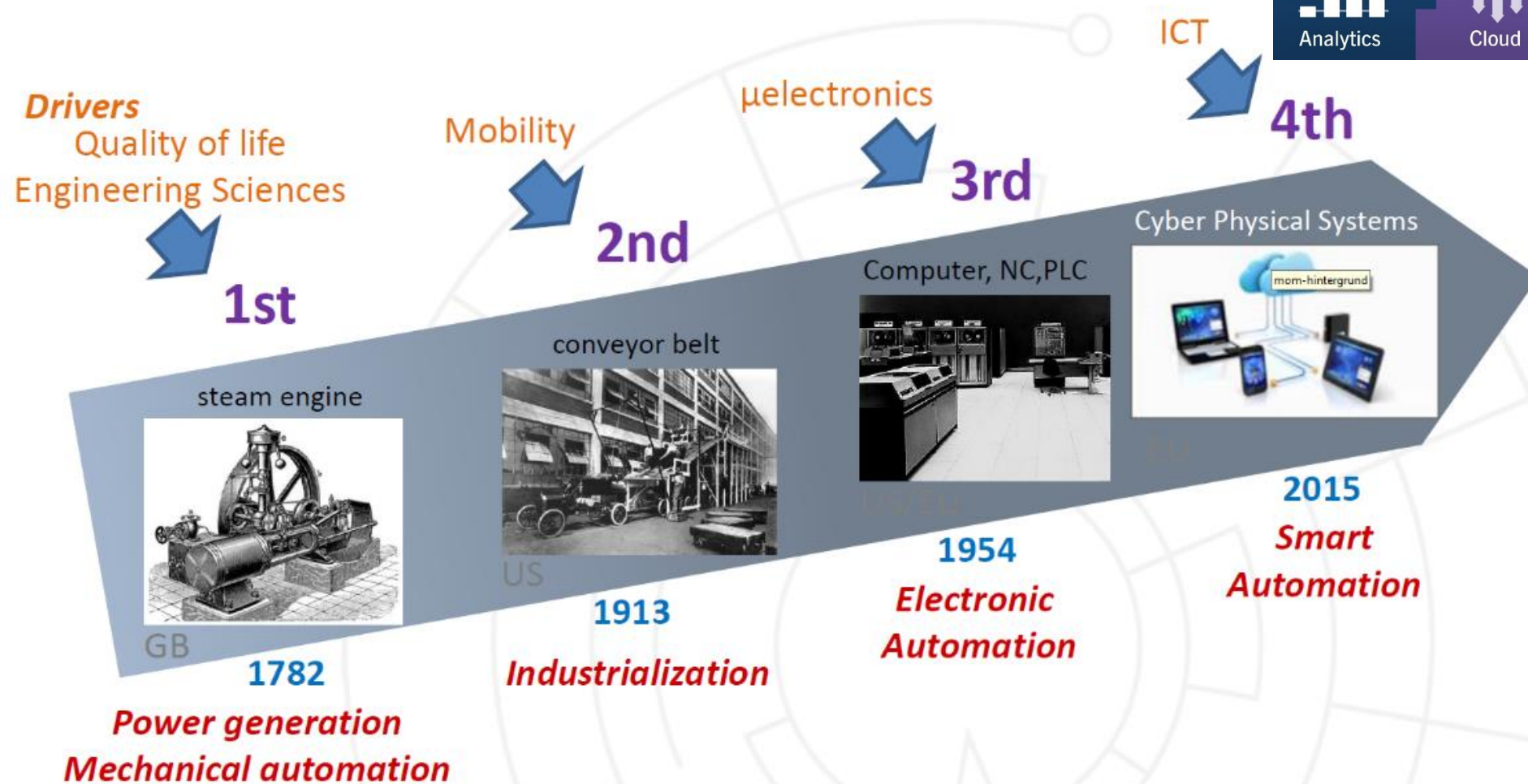
Source: Bureau of labor statistics, the Future of Employment (Frey & Osborne, 2013)

Industry 4.0

The 4th Industrial Revolution - „Industry 4.0"

Scenarios for higher education systems

International

Administration Supply-driven

Market Demand-driven

Open Networking

Higher Education Inc.

Serving Local Communities

New Public Responsibility
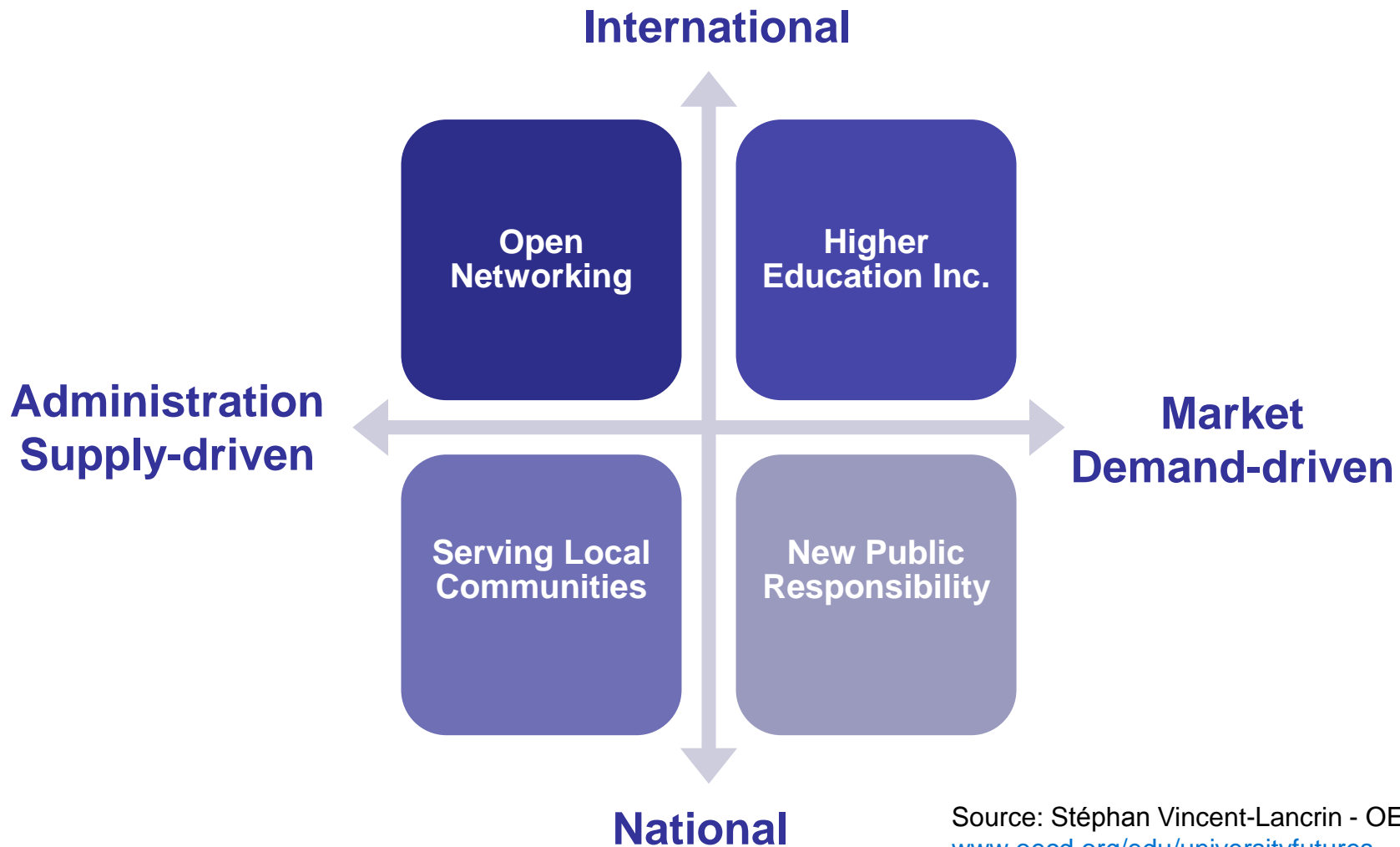
National

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

Scenario 1: Serving local communities

- Drivers
  - **Backlash against globalization**
  - More geo-strategic sensitivity in research
- Features
  - (Re)focus on national and local missions
  - Public funding and control of the academic profession
  - Convergence between universities and polytechnics
  - Elite universities **struggle to stay more internationalized**
  - **Less research**, mainly on humanities
  - Big science relocated to government sector (more secretive and less internationalized)
- Related developments
  - Highlight of regional missions
 - Anti- globalization movements

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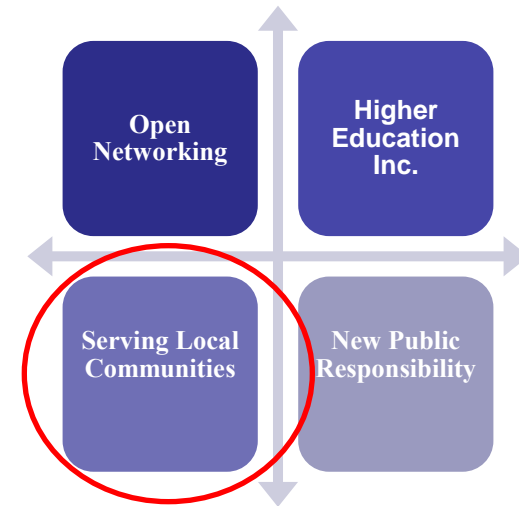
Source: Stéphan Vincent-Lancrin - OECD - www.oecd.org/edu/universityfutures

Scenario 2: New public responsibility

- Drivers
  - **Pressure on public budget** (ageing, public debt, etc.)
  - Diffusion of governance structures based on new public management
- Features
  - Mainly public funding but autonomous institutions controlled at arm's length (incentives + accountability)
  - **Mixed funding**: new markets + more tuition fees (income contingent loans)
  - **Demand-driven system** with more marked division of labor (specialization but most HEIs continue to do some research)
  - Research funds allocated through **domestic competitive process**
- Related developments
  - Autonomy given to HEIs (sometimes legally privatized)
  - Debates on cost sharing
 - Encouragement of competition between HEIs

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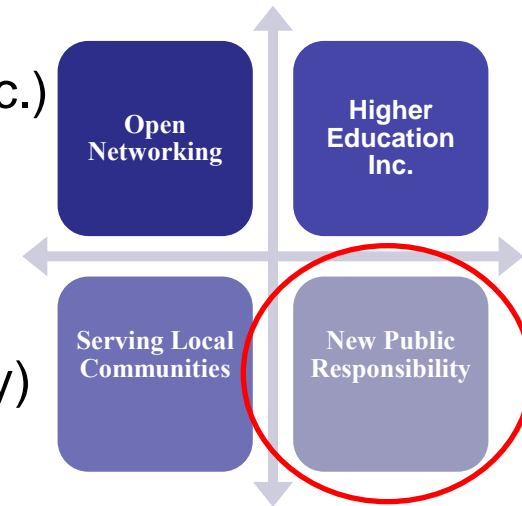
Source: Stéphan Vincent-Lancrin - OECD - www.oecd.org/edu/universityfutures

Scenario 3: Higher education, Inc.

- Drivers
  - **Trade liberalization in education** (GATS, bilateral)
- Features
  - **Global competition** for education & research services
  - Public funding for non-commercially viable disciplines exclusively
  - **Segmentation** of the education and research market
  - Vocational higher education is an important share of the market
  - Strong (international) division of labor according to competitive advantage
  - Concentration of research and worldwide competition for funding
  - **English as main language** of study
- Related developments
  - Rise of trade in HE & inclusion of education in trade negotiations
  - International competition for students
 - Increase of cross-border funding of research

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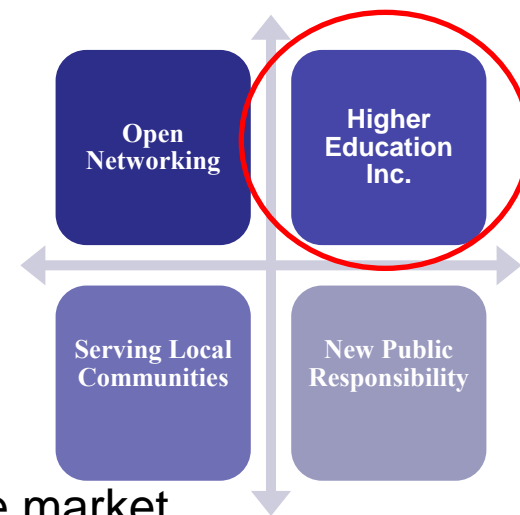
Source: Stéphan Vincent-Lancrin - OECD - www.oecd.org/edu/universityfutures

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

Open Networking

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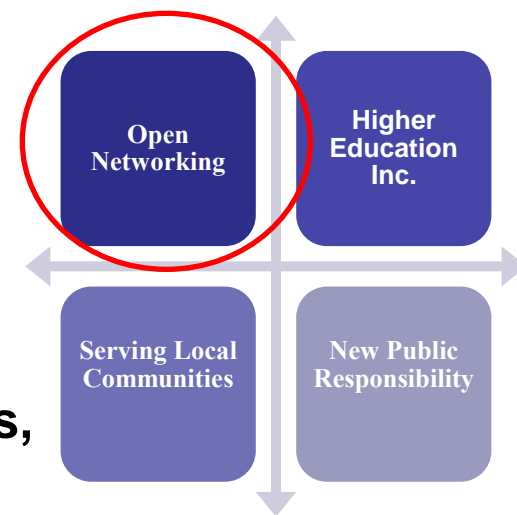
Source: Stéphan Vincent-Lancrin - OECD - www.oecd.org/edu/universityfutures

Collaboration, cooperation, networking… some proposals

- Joint pool and exchange of on-line courses

- Distant join use of research equipment by remote operators

- A common framework of joint summer schools

- On-line seminars directly broadcasted form research centers labs for high school classes

- Use of ICT for the development of social sciences and humanities

- Identification of common cross-borders smart specialization strategies

The ALADIN (ALpe Adria Danube universities INitiative) network

Established in Ljubljana on **23rd October 2002** by
– **Karl-Franzens University Graz (Austria),**
– **University of Rijeka (Croatia),**
– **University of Trieste (Italy) and**
– **University of Maribor (Slovenia)**

as an international network working at regional level
– to share common ideas and knowledge in teaching and research activities in the **field of e-Commerce and ICT**
– to cooperate creating **mobility of students and professors**, offering common lectures, creating virtual teams of students from different universities and professors lecturing at different universities,
– in order to harmonize with global and international activities of e-Commerce, involving SMEs

Today, universities, associated centers of excellence and Living Labs located in 11 European countries, namely **Austria, Bosnia & Herzegovina, Bulgaria, Croatia, Czech Republic, Germany, Hungary, Italy, Serbia, Slovakia and Slovenia**, **are represented**.

The ALADIN network represents 19 universities in the Danube Region.
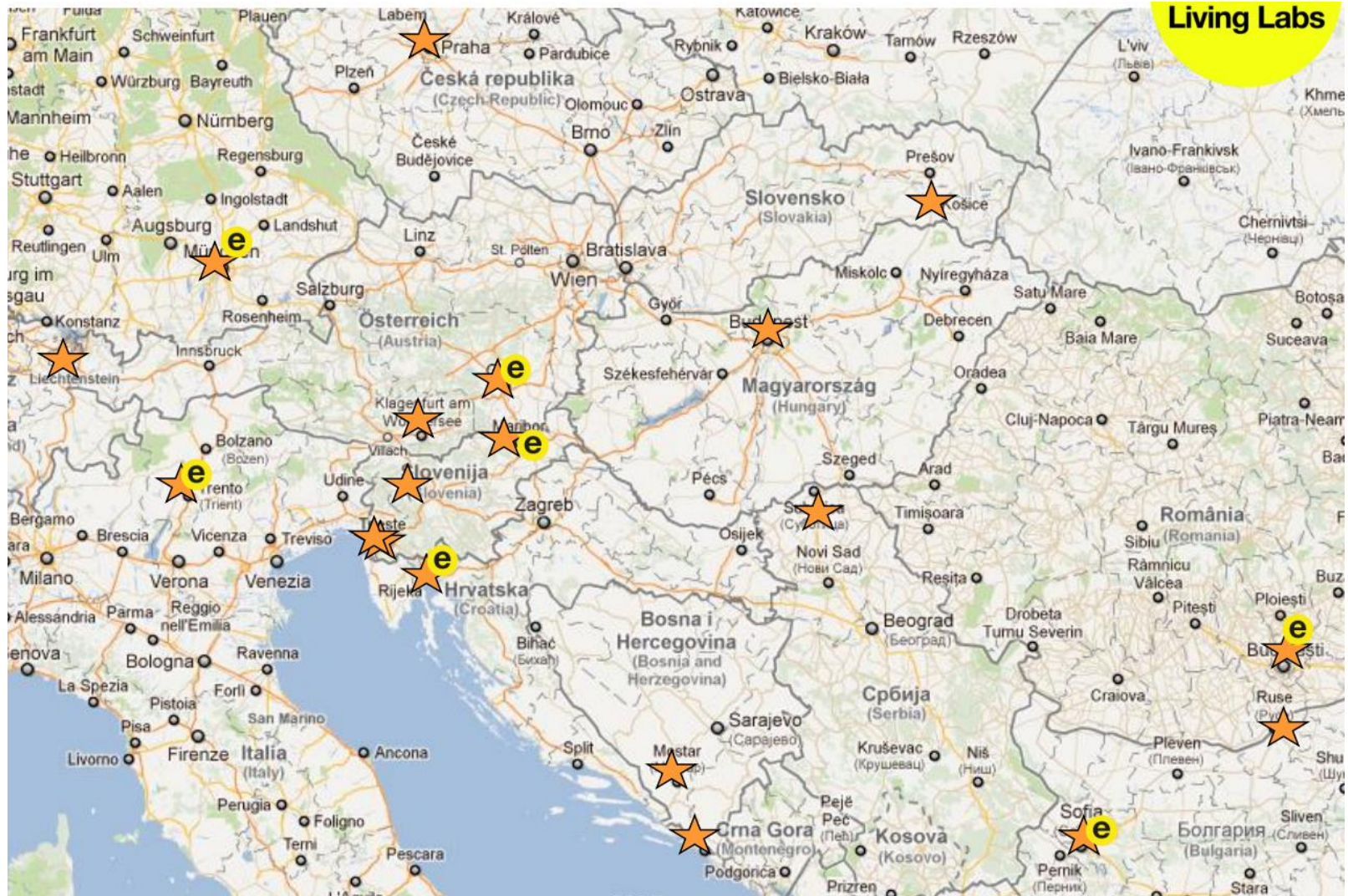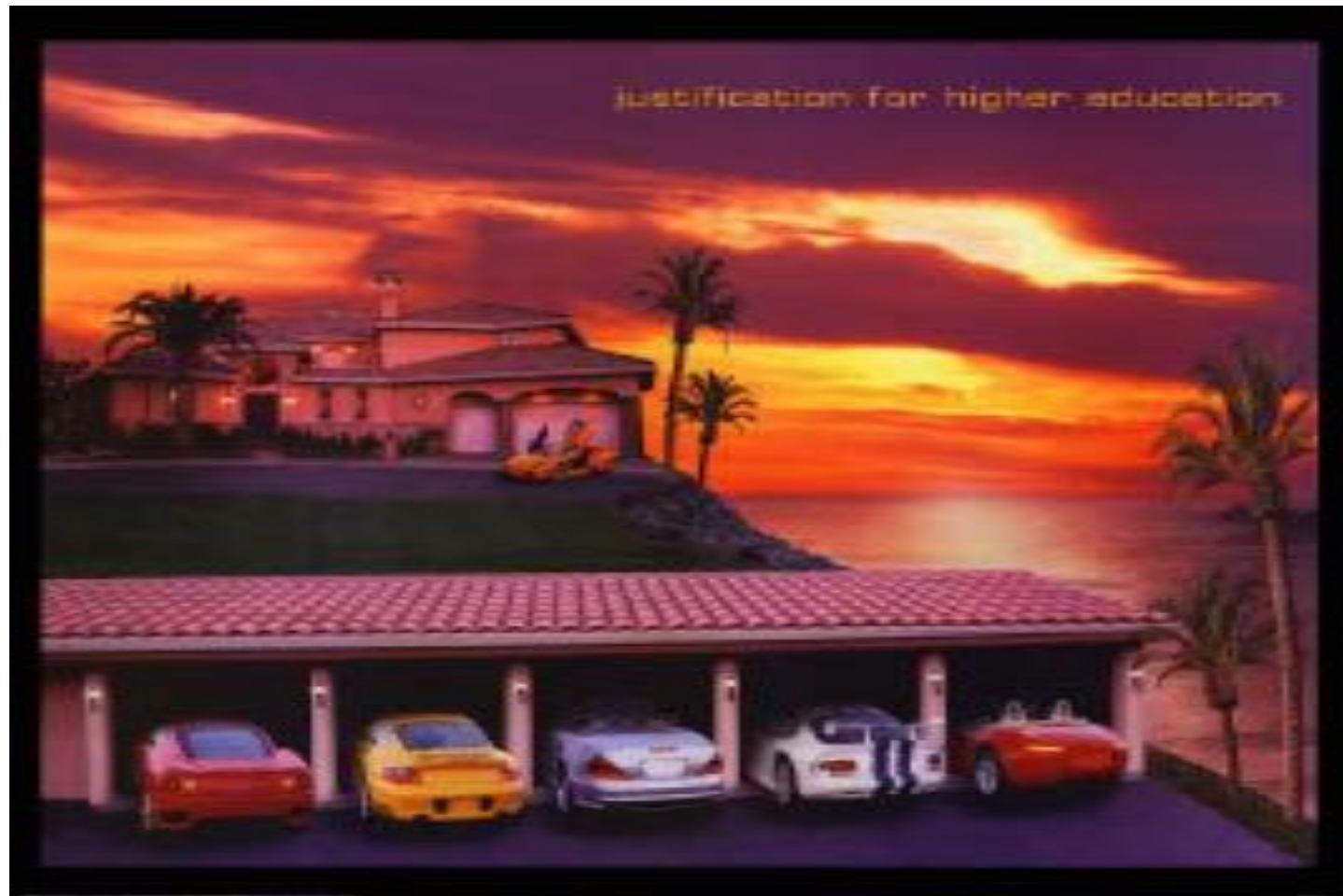
21st Century Learning Competencies

- "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."

Albert Einstein

Is Higher Education Primarily for Economic Gain?

Or Developing the Nation's Talent and Creativity?

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"If you think education is expensive, try ignorance"

Derek Bok - Presidente of Harvard University
1971-1990