Collaborating with industry: implications for public research organization and SMEs

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Science, technology & society

Science

Seeks to improve

Informs

Technology is the use or application of scientific knowledge for a specific goal or purpose

Demands more

Society

Benefits from

Technology

Makes life easier

Demands more
### Disciplines and challenges

<table>
<thead>
<tr>
<th>Disciplines</th>
<th>Energy</th>
<th>Water</th>
<th>Environment</th>
<th>Food</th>
<th>Human health</th>
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<td>Physics</td>
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<td>Chemistry</td>
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<td>Engineering</td>
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<td>Biology</td>
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<td>Medicine</td>
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<td>Economy</td>
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<td>Humanities</td>
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<td>Social sciences</td>
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Horizon 2020 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
- Facilitate access to risk finance
- Support for innovation in SMEs

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

**SC1** - health, demographic change and well-being
- Short-term effects: answering the needs of enterprises; keeping or increasing the number of operators in the target sectors; improving the uptake of medium- and high-level professional profiles.
- Medium-term effects: creating new, hi-tech, synergic production environments.
- Long-term effects: making the regional production substrate more compact and resilient to future social, environmental and economical challenge & changes.

**SC2** - food security, sustainable agriculture, marine and maritime research and the bio-economy

**SC3** - secure, clean and efficient energy

**SC4** - smart, green and integrated transport and raw materials

**SC5** - climate action, resource efficiency

**SC6** - inclusive, innovative and secure societies

MARINE TECHNOLOGY

Strategic production chains: METAL & BUILDINGS

CULTURE, CREATIVITY AND TOURISM

AGRO FOOD

SMART HEALTH

Macro-Regional Innovation Week – From Technology transfer to open innovation system
Innovation in Science

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
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

Fonte: IntelligentHQ, Fonseca, 2014
Top 10 Strategic Technology Trends

1. Computing Everywhere
2. The Internet of Things
3. 3D Printing
4. Advanced, Pervasive and Invisible Analytics
5. Context-Rich Systems
6. Smart Machines
7. Cloud/Client Computing
8. Software-Defined Applications and Infrastructure
9. Web-Scale IT
10. Risk-Based Security and Self-protection
Towards Industry 4.0

3rd Platform Drives Digital Transformation

Continuous Industry Transformation

- Future of Work
- Abundance
- Efficiency
- Incredibility
- New Buying Centers
- Personalization

- 3D Printing
- Internet of Things
- Cognitive Systems
- Next-Gen Security

INNOVATION ACCELERATORS

- Robotics
- Natural Interfaces
- Social Business
- Big Data/Analytics
- Mobility

3rd Platform

Millions of Apps • Billions of Users • Trillions of Things

Source: IDC, 2013

Source: IDC, 2015
The 4th Industrial Revolution - "Industry 4.0"
An Autonomous, 3D Printed Bus That Talks To Passengers? Olli Has it All
Materials Genome Initiative (MGI)

On July 15, 2013, NIST held a webinar about the Center of Excellence Program and the Materials Genome Initiative:

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

The Materials Genome Initiative at NIST

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

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>

- President Obama, June 2011 at Carnegie Mellon University
The future of employment

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Probability of massive reduction of occupation by 2030</th>
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<tbody>
<tr>
<td>Telemarketers</td>
<td>99%</td>
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<tr>
<td>Accountants &amp; Auditors</td>
<td>94%</td>
</tr>
<tr>
<td>Retail Salespersons</td>
<td>92%</td>
</tr>
<tr>
<td>Real Estate Sales Agents</td>
<td>86%</td>
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<tr>
<td>Structural Iron and Steel Workers…</td>
<td>83%</td>
</tr>
<tr>
<td>Machinists</td>
<td>65%</td>
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<tr>
<td>Audio and Video Technicians</td>
<td>55%</td>
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<tr>
<td>Taxi drivers/drivers</td>
<td>55%</td>
</tr>
<tr>
<td>Firefighters</td>
<td>17%</td>
</tr>
<tr>
<td>Chemical Engineers</td>
<td>2%</td>
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<tr>
<td>Music Directors and Composers</td>
<td>1.6%</td>
</tr>
<tr>
<td>Marine Engineers - Naval</td>
<td>1.0%</td>
</tr>
<tr>
<td>Architects</td>
<td>0.8%</td>
</tr>
<tr>
<td>Clergy</td>
<td>0.8%</td>
</tr>
<tr>
<td>Athletic Trainers</td>
<td>0.7%</td>
</tr>
<tr>
<td>Dentists</td>
<td>0.4%</td>
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</tbody>
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Source: Bureau of labor statistics, the Future of Employment (Frey & Osborne, 2013)
The Future of Jobs and Skills

Top 10 skills

<table>
<thead>
<tr>
<th>in 2020</th>
<th>in 2015</th>
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<tbody>
<tr>
<td>1. Complex Problem Solving</td>
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<tr>
<td>2. Critical Thinking</td>
<td>2. Coordinating with Others</td>
</tr>
<tr>
<td>3. Creativity</td>
<td>3. People Management</td>
</tr>
<tr>
<td>4. People Management</td>
<td>4. Critical Thinking</td>
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<tr>
<td>5. Coordinating with Others</td>
<td>5. Negotiation</td>
</tr>
<tr>
<td>6. Emotional Intelligence</td>
<td>6. Quality Control</td>
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<tr>
<td>7. Judgment and Decision Making</td>
<td>7. Service Orientation</td>
</tr>
</tbody>
</table>

- 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**.
Technology Transfer: a link between research and Industry

The Future: New Innovation Ecosystem

Federal State
- Public-Private
  - Design-Build Centers
  - Quasi-Open Innovation

Start Ups
  - Incubator Accelerators
  - Regional Innovation Centers

100%
- Public
  - Basic Research
- Trans Research
- Companies
- Private

Tech Transfer
“If you think education is expensive, try ignorance”

Derek Bok - Presidente of Harvard University
1971-1990