The background of the slide is an aerial photograph of a snowy mountain range. A winding road is visible, leading to a small building nestled in a valley. The overall scene is bright and somewhat overexposed, with soft shadows and highlights on the snow.

IT as a catalyst of modern economy: the challenge for Higher education

Symposium

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Chair CDESR, Council of Europe, Vice-President IAU

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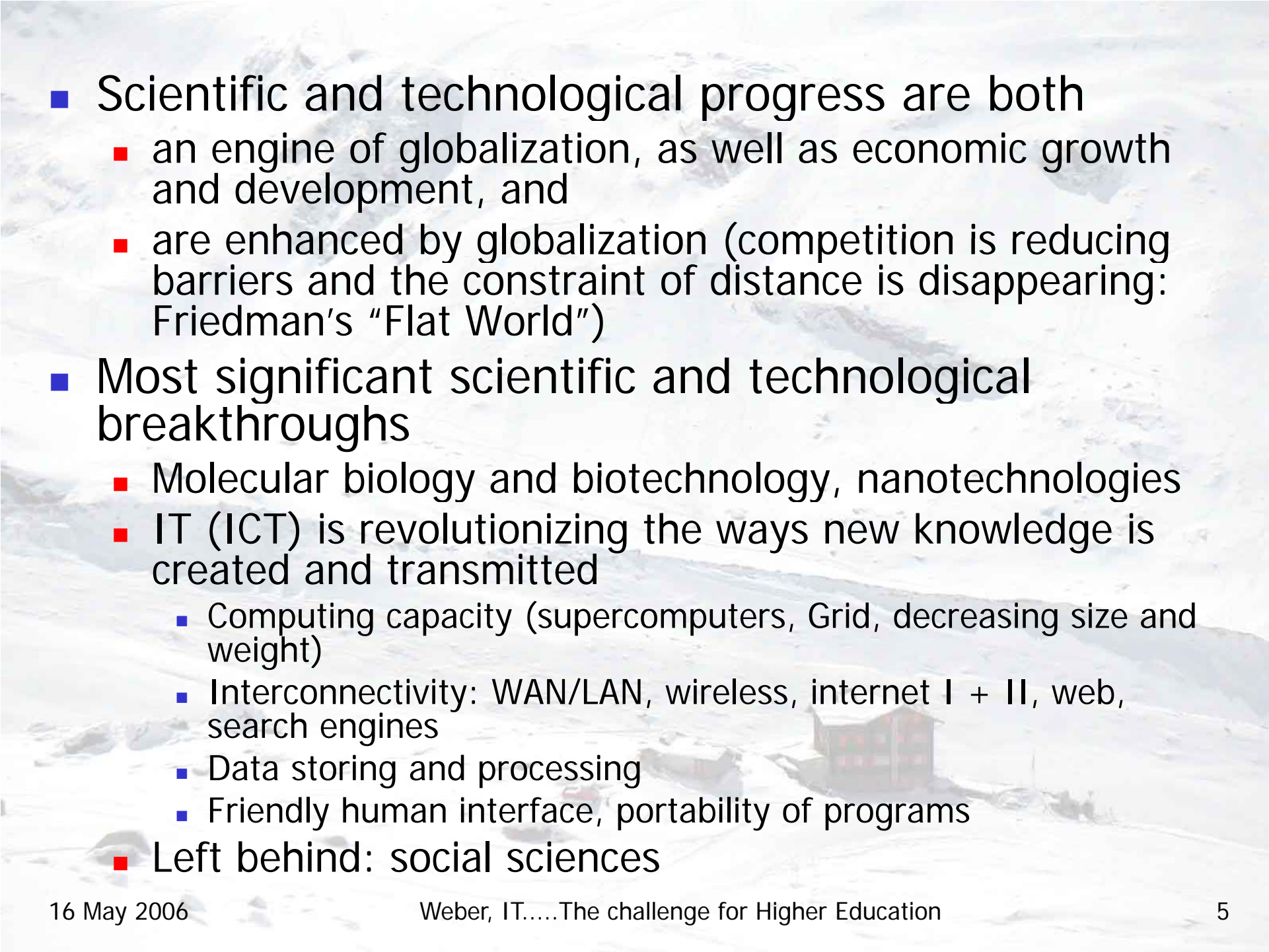
An aerial photograph of a vast, snow-covered mountain range. The terrain is rugged with deep valleys and ridges. In the lower right foreground, a small, multi-story red building with a dark roof stands out against the white snow. A few other smaller structures and a vehicle are visible nearby. The overall scene is desolate and high-altitude.

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The fast changing environment of Higher education and research

The world is changing at an increasingly rapid path

- End of the cold war
- Liberalization of trade (WTO, EU, ...)
- Emergence of new economic powers
- Scientific and technological progress:
 - Move into a post-industrial knowledge-based society: the creation of wealth depends upon advanced education, research and innovation (the closer to the “technology frontier”, the more profitable it is to invest into knowledge)
 - Knowledge has become a factor of survival for “old” countries

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- Scientific and technological progress are both
 - an engine of globalization, as well as economic growth and development, and
 - are enhanced by globalization (competition is reducing barriers and the constraint of distance is disappearing: Friedman's "Flat World")
 - Most significant scientific and technological breakthroughs
 - Molecular biology and biotechnology, nanotechnologies
 - IT (ICT) is revolutionizing the ways new knowledge is created and transmitted
 - Computing capacity (supercomputers, Grid, decreasing size and weight)
 - Interconnectivity: WAN/LAN, wireless, internet I + II, web, search engines
 - Data storing and processing
 - Friendly human interface, portability of programs
 - Left behind: social sciences

Factors more specific to European Higher education and research institutions

- Building of the EHEA (Erasmus, Bologna process)
- Building of the ERA
 - Framework programs
 - Lisbon agenda (2000), 3% initiative (2002)
 - ERC and EIT (?)
- Other background trends
 - Increasing participation rate and number of part time students (second chance, LLL, ...distance learning, ...)
 - Multiplication of (contradicting) demands from State, business and society
 - Internationalization
 - Increasing cost of research and teaching
 - Insufficient or even decreasing institutional autonomy
 - Overstretched public finance

Consequences of the fast changing environment

- Increasing competition from
 - other traditional universities (inland or abroad)
 - new type of universities (private non- and for profit universities, cross-border teaching (franchises, subsidiaries, distance teaching))
- Increasing need to cooperate: quest for the critical mass
- In brief, need for:
 - increasingly rapid change
 - greater differentiation
 - need to specialize more
 - Moreover, many institutions will disappear or at least lose their present status; new (types) of institutions are emerging (for-profit, cross-border,...)

An aerial photograph of a vast, snow-covered mountain range. The terrain is rugged with deep valleys and sharp ridges. In the lower right foreground, a small, multi-story red building with a dark roof stands out against the white snow. The overall scene is bright and somewhat hazy, suggesting a high-altitude or winter environment.

II

The role of Higher education and research institutions in a modern economy

1) HE&R institutions contribution to the economy and to society

- The knowledge economy is increasing expectations on HE&R institutions : “Europe needs strong universities” (EUA, Barroso and the EU Commission)
- **Knowledge creation and innovation**
 - Maintain a high level of curiosity driven research, source of expected and unexpected discoveries
 - Promote interdisciplinarity, as a factor of new discoveries
 - Replace the linear model of innovation by a non linear (iterative model), thanks to a close collaboration university-business (create trust, promote a sensible IPR policy)
 - However,
 - great prudence should be exercised in managing research (fixing priorities in research), as it is very difficult to foresee potential discoveries and their applications
 - sufficient room should be given to views opposed to the main stream (fight “integrism”, also in science)



- **Training of researchers**

- HE institutions must train the needed additional researchers (+700'000? or +70%?)
- This implies
 - Attracting young people to research
 - Developing attractive MA, PhD programs and setting up carrier programs for post-doc students
 - Attracting talents from abroad

- **Deliver the right teaching and learning**

- Necessary move from teaching to learning
- Greatly reduce the time needed to introduce new courses. This requires
 - Flexible programs and room for choice
 - Restricting or abandoning tenures
 - Employing more non permanent staff with a main activity in business and public or private research labs

An important remark

- HE institutions must respond to the pressures from the changing world (mainly market pressures) (=responsive institutions)
- BUT, HE institutions have also a long term **responsibility** towards society
 - Secure and transmit the cultural heritage and societal values
 - Analyze social problems independently, scientifically and critically

2) HE&R institutions should take full advantage of their discoveries and innovation (particularly for IT)

■ **Use of new technologies in research**

- Access to scientific literature and to other information, as well as to collaborate with other teams
- Data storage and processing
- Training of different skills (i.e. surgeons, ...)
- Simulation (chemical processes, economic models,...).

■ **Consequences:**

- Need for sophisticated equipments and computing facilities
- Cooperate to have access to the most costly pieces of equipment

- A favorable factor: the scientists are directly and personally interested in developing these new tools (necessary condition for frontier research)



- **Use of new technologies in teaching to**

- Support traditional teaching: Introduce live elements (video clips, simulations, teleconferences, interactive teaching, continuous control)
- Alleviate part of the teaching load: Use of computer assisted teaching software
- Offer courses and complete programs at distance
 - Open university concept
 - Entrepreneurial universities opening subsidiaries or providing distance teaching)

- Remark: acceptance and implementation of IT in teaching is lower than the enthusiasm of specialists due to resistances and/or constraints:
 - Human resources: resistance to change; lack of enthusiasm to learn new tools (no incentive, contrary to research)
 - Costs: the preparation of teaching material is very costly; It requires
 - teams of different specialists and the collaboration of many institutions (to distribute the tasks or to establish joint projects)
 - considerable additional financial resources (i.e. Swiss virtual campus)
 - Language: the English language is dominating; translation into other languages is lagging behind
 - Conclusion: the development and application of modern teaching material requires a very determined and strong leadership

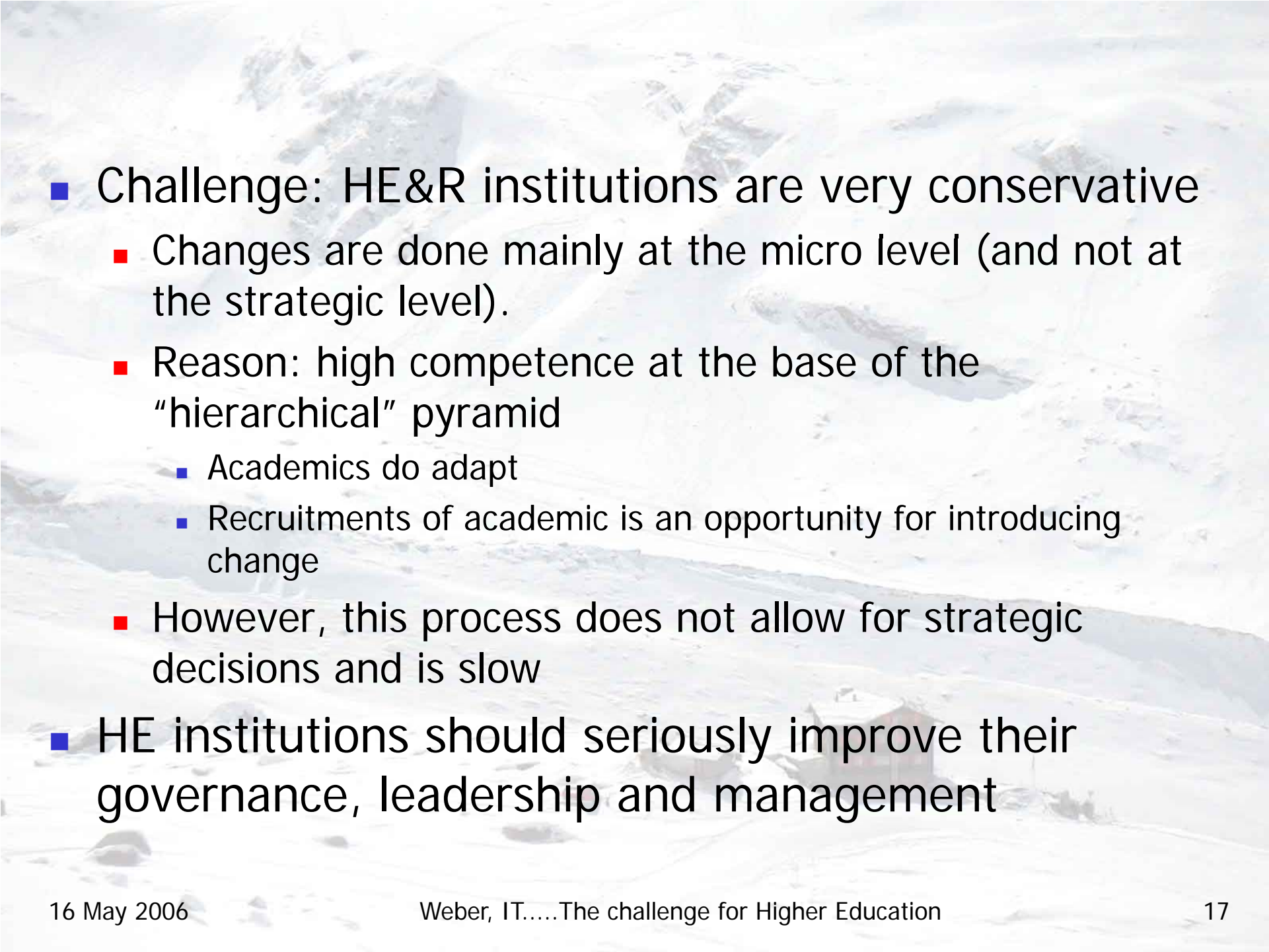
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III

Higher education and research
institutions should improve their capacity
for change

Higher education and research institutions should have strategies of change

- Objective: to position themselves in activities where they have the greatest comparative advantage
- Motto: quest for critical mass
 - Increase the size for strategic departments (means also shutting other departments)
 - Cooperate with other institutions (joint research projects, reallocation of resources)
 - Constraint: maintain teaching capacity for basic disciplines

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- Challenge: HE&R institutions are very conservative
 - Changes are done mainly at the micro level (and not at the strategic level).
 - Reason: high competence at the base of the “hierarchical” pyramid
 - Academics do adapt
 - Recruitments of academic is an opportunity for introducing change
 - However, this process does not allow for strategic decisions and is slow
 - HE institutions should seriously improve their governance, leadership and management

An aerial photograph of a vast, snow-covered mountain range. The terrain is rugged with numerous ridges and valleys. In the lower right quadrant, a small, two-story red building with a dark roof stands out against the white snow. Next to it, a red car is parked. The overall scene is a high-altitude, alpine environment.

By way of conclusion

- “Europe needs strong universities”, necessary condition to maintain its envied standard of living and to improve employment
- Traditional HE&R institutions – in particular research universities - are contributing as no other organization to the creation of new knowledge and to the development of new products and services, among others in the IT sector
- Double paradox:
 - They are relatively slow in introducing these progress in their teaching function
 - Their monopoly position is threatened by newly created research consortia (i.e. human genome) and new teaching institutions relying intensively on IT
- In brief: to be strong, higher education institutions cannot anymore rely entirely on initiatives taken at the level of departments and academic staff; they have to think and act strategically

An aerial photograph of a vast, snow-covered mountain range. The terrain is rugged with numerous ridges and valleys. In the lower right quadrant, a small, multi-story wooden building with a dark roof is visible, surrounded by a few smaller structures and a red car. The overall scene is serene and isolated.

THANK YOU DENNIS