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RESEARCH IN DIVERSE SOCIAL CONTEXTS : TENSIONS, DYNAMICS AND CHALLENGES

FINAL REPORT

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Research in diverse social contexts: Tensions, dynamics and challenges

Summary report • Themes, viewpoints and summaries

International Experts' Workshop

UNESCO, Paris, 19 to 21 March 2009

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CONTENTS

FOREWORD

The UNESCO Forum on Higher Education, Research and Knowledge is pleased to publish this Summary Report of the International Experts' Workshop on "*Research in diverse social contexts*: *Tensions, dynamics and challenges*" held at UNESCO, Paris, 19 to 21 March 2009. Participants from over fifteen countries gathered together as well as experts from UNESCO's IGO and NGO partner organizations such as OECD, AAU, IAU and ISSC which carry out work in this important area.

It is appropriate to situate this publication in relation to the aims of UNESCO Forum and, thus, to contextualize current issues related to systems of higher education, research and innovation research (known as HERI). The UNESCO Forum focuses on the role and status of research systems (whether national, regional or global) and international trends in this domain in relation to the challenges posed by the Knowledge Society of the twenty-first century. Located at UNESCO and supported by the Swedish International Development Agency (Sida), the UNESCO Forum provides a platform for researchers, policy-makers and relevant stakeholders to engage critically with the key elements underpinning research systems*:* **(i) policy trend; (ii) infrastructure; (iii) human capacity; and (iv) investment**. This project has assured follow-up action for two major UNESCO conferences, the 1998 World Conference on Higher Education, "*Higher education in the twenty-first century*" and the 1999 World Conference on Science, "*Science for the twenty-first century*", and links closely to the intergovernmental programme for the *Management of Social Transformation* (MOST), located in the Sector of Social and Human Sciences (SHS), UNESCO.

Today, unprecedented emphasis is being placed on research as key motor for advancing the knowledge society and its offspring, the knowledge economy. Consequently, "*research on the state of research*" has moved high on the priority agendas for governments, for their specialized agencies and bodies devoted to this area, and for higher education institutions. Thus, mapping and analyzing their systems has become essential in order to acquire an understanding of their functioning and, therefore, future requirements.

This systemic approach necessitates the study of specific issues arising from the various areas involved:

- Comparing methodologies for the study of knowledge systems.
- Case studies related to higher education (notably universities), to the mapping and analysis of research systems.
- Specific dimensions of knowledge systems (inter alia, policies, governance, infrastructure, human resources, research output, cooperation agreements and emerging tensions and dynamics).

This Workshop analyzed the diversity of research contexts across all regions and the implications of these for generating a sustainable knowledge base which can both underpin national policy-making for development and link into international research networks to keep abreast of new discoveries. The theme is inspired by the final indicator in the Template resulting from the Forum's *Special initiative project* mapping and analyzing

research systems. Entitled *Tensions, dynamics and challenges*, this indicator identifies and examines the specific social contexts where research activity is facilitated by investment (e.g. Chile, Malaysia, Qatar, and Singapore) or this faces specific challenges and obstacles [e.g. least-developed countries (LDCs)]. Thus, favourable environments, limiting factors, and the diverse challenges posed by major social transformations (e.g. globalization and the current world economic crisis) will be examined. The data of the Special Initiative project [notably the regional syntheses for Africa, Arab States, Asia and Latin America and the Caribbean (LAC)] and the global meta-review of current trends) will constitute background documents placed at the disposal of the workshop participants. (www.unesco.org/education/researchforum).

The various dimensions of context to be examined may include: *governance trends; emerging economies; challenging geographical contexts such as the geographical information systems (GIS) of the State Institute of Statistics (SIS); levels of socio-economic development including the existence of a robust private sector and the small- and medium-sized enterprise (SME) sub-sector; multiculturalism; demographic issues and information technology (IT) connectivity.*

The Workshop has prepared a Final Statement to be conveyed to the International Social Science Council's (ISSC) first World *Social Science Forum* (WSSF), to be held in Bergen, Norway, 10 to 12 May 2009.

The UNESCO Forum expresses its gratitude to all Workshop Participants and especially to Professor Albert Sasson (Morocco/France) for his assistance in preparing the final Summary Report.

Mary-Louise Kearney, Director

Forum secretariat,
UNESCO Forum on Higher Education, Research and Knowledge

Part 1 SUMMARY REPORT

Albert Sasson, *Rapporteur General*

A General message to be conveyed to the:

- **First World Social Science Forum (WSSF) (Bergen, 10 to 12 May 2009).**
- **World Conference on Higher Education (WCHE) (Paris, 5 to 8 July 2009).**
- **Fourth World Science Forum (Budapest, 5 to 7 November 2009).**

Through the deliberations and outcomes of the International Experts' Workshop on "Research in Diverse Social Contexts: Tensions, Dynamics and Challenges", Paris, 19 to 21 March 2009, the UNESCO Forum on Higher Education, Research and Knowledge can send strong messages to these gatherings to highlight the crucial contribution of Research and Development (R&D) and innovation to social and economic development and the role of higher education in this process.

Rather than citing specific country cases, the Workshop insisted on the social contexts that promote R&D and innovation and that support higher education: **political will, continuity in policy-making, relevance, and effective regional and international cooperation. UN agencies, including UNESCO, and IGOs, including the OECD, should play their role as facilitators so as to help create relevant political and social conditions.**

Examples of good practice and of success stories – or, in contrast, of failures – can help pass the basic message:

- Investment in R&D and innovation and in higher education is essential.
- However, this must take place in a social context of relevance and through long-term and connected partnerships amongst universities, government decision-makers and the private sector.
- The traditional social contract must be renewed to ensure the primacy of relevance in relation to social context.
- Social scientists, working in a climate of academic freedom and open enquiry and able to critically analyse the impact of knowledge in varied context, are key players for underpinning the quality and relevance of this renewed contract.

I / Knowledge and knowledge systems: some theoretical observations

Messages to researchers and decision-makers

1. Due to the increasing gravity of new or unsolved global problems and their local ramifications, the overwhelming challenge is for knowledge to be enabling in character so that citizens can act and positively shape their specific social reality according to their differing contexts.
2. The Knowledge Society of the twentieth century has left legacies notably the knowledge economy, the quest for sustainability, assessing the real value of knowledge, new systems and spaces of knowledge. For the twenty-first century (an era in constant movement), the imperatives are building and expanding knowledge networks and enhanced strategies for the decentralization of knowledge for optimal access.
3. Knowledge in context, in high-income countries (HICs), low-income countries (LICs) and middle-income countries (MICs), requires fresh methodologies to ascertain how governance, infrastructure, human resources and investment are being addressed. Each context has its own special tensions, dynamics and challenges: historical data, assets of the systems, relevant niches, the trust in science by society, how science and technology can be useful to society and whether knowledge is a shifting value conferred *via* wealth or political power. HERICS (i.e. higher education, research and innovation contexts and systems) pose many questions in relation to three areas: (i) resources, (ii) population and (iii) technology:
    - How to understand knowledge societies in their respective HIC, MIC, or LIC contexts?
    - How to manage risk and opportunity in differing contexts?
    - Why are some research systems more sustainable than others?
    - How does decision-making by scientists differ from that of politicians?
    - How can the dynamics of networks and the impact of this process be better utilized?

Nico Stehr (Germany) emphasized that enabling knowledge is the capacity to act and to model social reality. This type of knowledge enhances the capacity to act effectively (*sciencia es potencia*). However, not all knowledge is automatically enabling and its potential benefits can actually be hampered by restrictions arising from certain social contexts.

A Key Question is: *Can we remedy the gaps and imbalances in knowledge*?

Certainly there are efforts at the present time to regulate knowledge in relation to global equity and to the governance of science. Knowledge can be considered as a commodity and there is a clear trend towards the globalization of knowledge. Limiting factors with regards to this trend are legal practices, trade barriers and self-protecting knowledge.

Technically, the world is more closely connected but we do not understand each other better. The success of the globalization issue itself is open to question in some respects and the absolute priority is the necessity to equip ordinary citizens with the capacity to act effectively.

Mary-Louise Kearney (UNESCO Forum) insisted on the importance of building, maintaining and understanding context-relevant local knowledge systems in a globalized world where knowledge has become an indispensable component for sustained social and human development. Central to these systems is research – as a key function of academic higher education and as a cornerstone of scientific capacity at national, regional and international levels. Reinforcing these systems is a threefold process which entails:

- **Understanding the context in which research is taking place is the primary focus.** This is the essential framework for formulating advice as to how this area can be strengthened.
- **Documenting research systems** whether national or wider in their scope, *via* the collection of reliable data is a necessary base for action which would aim to improve them.
- **Strengthening research universities**, which are perhaps the single strongest component of knowledge systems and their potential as intellectual institutions with crucial social, economic and cultural impact.

Expertise in knowledge systems as they operate in diverse contexts are essential to meet the challenges related to sustainable development. Knowledge systems will certainly continue to evolve and become increasingly sophisticated. In the current turbulent economic climate, opportunities to advance and benefit from the knowledge dividend may not be easily available to all countries. However, equity demands that no state will be excluded in this regard and this should remain the prime policy objective.

Nazli Choucri (USA) highlighted the legacies of the twentieth century notably the knowledge economy, the quest for sustainability, assessing knowledge value, new systems of knowledge and new spaces for this. It was thought that the Knowledge Economy, combined with sustainability objectives, would lead to alternative and more equitable ways of valuing knowledge beyond the current emphasis on ownership including intellectual property rights.

As a result of the decentralization of the knowledge industry, knowledge can become a public good. One example is the worldwide availability of MIT academic courses, due to technology. This, in itself, is another major legacy of the twentieth century as the world has become embedded in cyberspace. The intellectual challenge is to understand the logics of its systems while the forms and functions of knowledge are concurrently expanding.

For the twentieth century, the imperative are the building and expansion of knowledge networks and enhanced strategies for the decentralization of knowledge. Nothing is static since new knowledge is being constantly generated. For the knowledge industry, the challenge is how to best use this entity which is virtual in character. One way could be to promote multilingualism worldwide in order to clone the system and thus to reduce the barriers to knowledge.

Roland Waast (France) explained the purposes and achievements of the *Special Initiative: Mapping and Analyzing Research Systems* which is a project within the UNESCO Forum on Higher Education, Research and Knowledge. He also described the resulting template which aims to measure the collection of data, the compiling of relevant descriptions and narratives, ways to take stock of available human resources, types of research and their quality, funding sources, publications and the numbers of patents filed and granted. The tenth indicator of the template relates specifically to the social context of research, development and innovation where special tensions, dynamics and challenges pertain: historical data, assets of the systems, relevant niches, to trust in science by society, how science and technology can be useful to society and whether knowledge is a shifting value conferred *via* wealth or political power.

Jean François Mascari (Italy) described an alternative method for mapping knowledge. MIT's *Global Social Sustainable Development (GSSD)* focuses on the sustainable development of knowledge societies and economies. This is both an ontology model and a scale-free E-knowledge system and studies the architecture of HERICS (higher education, research and innovation contexts and systems) in relation to three areas (resources, population and technology). Numerous questions are associated with the study of contextual tensions, dynamics and challenges: How to understand knowledge societies in their respective HIC, MIC, or LIC contexts? How to manage risk and opportunity in differing contexts? Why are some research systems more sustainable than others? How does decision-making by scientists differ from that of politicians? How can the dynamics of networks and the impact of this process be better utilized? The ultimate objective of the GSSD investigations is to enhance the management of research systems, whatever their social context may be. The various models generate different dynamics and tensions which then determine and affect the best strategies for policy- and decision-making.

II / Research in diverse social contexts: tensions, dynamics and challenges Regional and national case studies

Messages for researchers and decision-makers

- For countries in transition with ambitious development goals, robust triple helix interaction amongst government, universities and the economic sector is essential to build knowledge systems. These should be underpinned by certain socio-political conditions: consistent policies, protection for democracy and human rights, academic freedom, attention to the varied voices of civil society and support for the status of women and minority groups.
- Higher education institutions, notably universities are major agents for generating knowledge which shapes social change and development.. While a small number of top research universities operate as global elite, emphasis must be placed on the critical role played by the vast majority of universities *in situ* where they can ensure that their knowledge resources directly serve the needs of their contexts.
- With states and their institutions buffered by economic turbulence, it is important to maintain investment in research for long term sustainable development. Research in fields such as business ethics helps emphasize the social responsibilities of the economic and financial sectors.
- Given the high level of experimentation in knowledge systems today, the research community should seize opportunities to share good practice and to learn from one another so as to provide sound evidence-based advice to policy-makers.
- CIT continues to shape social change and knowledge systems in powerful ways. Special efforts to provide connectivity to low-income countries and the Africa Region are merited and the private sector offers promising new perspectives in this regard.

Addressing key factors in emerging societies

Edmundo Torres Godoy (Nicaragua) stressed the need for sustained and continuous science and technology policies in Central America where failure has been frequent due to laissez-faire approaches and the importation of models appropriate for different contexts. The major challenge is thus to strike the right balance between societies and their universities – or, between research and knowledge systems. How can this be achieved? A new approach to the traditional social contract based on the 'triple helix" involving governments, the academic community and the private sector (notably industry and services).

Joseph Gahama (Rwanda) presented the design of Rwanda's national science and technology systems. Following the end of the genocide in 1994, a new political will has been evident. Amongst the new initiatives is the creation of a University of Science and

Technology in 2006 to promote research in both the natural and social sciences. Rwanda is positioning itself to become the region's counterpart of Singapore over the next decade so as to act as a hub for knowledge and innovation serving regional development.

Abdelwahab Ben Hafaiedh (Tunisia) underlined, in the case of the Arab States, certain contradictions between globalization and emerging issues (such as the status of women, family patterns, social protection and political Islam). The lower number of web sites and Internet users in these countries is less a technology issue but rather due to the ways in which IT is used. Thus it has become a sociological problem. In the MENA region (Middle East and North Africa), there are very few scientists (perhaps only some 70,000) and also there is a major deficit of trust between decision-makers and researchers. Consequently, the current transition to democracy in some Arab States could be an opportunity to connect researchers more closely and to promote a new research agenda with greater academic freedom and a research-prone environment based on national interest, public good and the influence of comparative research.

Universities in context: promoting diversity and responding to needs

Alec Boksenberg (United Kingdom) gave a detailed description of the Super Research University model (Super RUs) which are part of a continuum engaged in worldwide competition. Their alumni span the globe and they interact closely with their counterparts to the extent that their national state has much less control over them than with other universities. Funding is their major challenge as their success depends on alternative resources generated beyond the national base. These rely heavily on endowments which can fall significantly in difficult economic climates. Academic freedom is also a key factor of their success. Super RUs can be qualified by two words: intensification and globalization.

Merle Jacob (Trinidad & Tobago and Sweden) proposed a redefinition of higher education and research, not only as a capital good and an investment in the future but also as something that could be marketed to produce income *via* services. She insisted on the essential role of the social sciences and of the humanities for development and to produce instruments which feed into the other sciences (e.g. linguistics and computer science). She advised against making unrealistic promises to policy-makers but rather to show them that it is vital to fund research including in STI areas. The current obsession with "world-class excellence" is based on contexts found in high-income countries. While the super RUs have their place, universities can be very useful and relevant if they are oriented to serving their own national and regional contexts.

Ambivalent force of the economic sector

Peodar Kirby (Ireland) stressed the 'late developer' character of this country. Investment in R&D is not the cause of the recent economic boom but rather a consequence of that success. A research culture has gradually emerged bringing the creation of new institutions and regulating bodies. In particular, the 1990s saw the growth of philanthropy mainly emanating from the Irish American community. However, at the present time, there are serious concerns: declining levels of job creation in the R&D sector, low rates in patent production, the changing role of multinationals which are primary actors in R&D and receive state subsidies, reduced levels of innovation and lack of consistency in public policy-making.

Wallace Baker (USA) commented on the growing importance of Business Ethics (as a branch of philosophy) within university research in the service of social development. Because Business Ethics permits the private sector to act in the public interest, it links to public policy-making. For this reason, the field has considerable power to direct and transform both social change (e.g. support to the SME sector as part of the economy) and the thinking and behaviour of citizens (e.g. social engagement *via* philanthropy). Analyzing the place of business in socio-economic development is multifaceted and thus requires interdisciplinary research to cover the dimensions involved.

Community partnerships to meet contextual challenges

Saran Kaur Gill (Malaysia) highlighted the case of this country where strong efforts have been made to build up partnerships between university R&D, and the private sector so as to respond to the specific needs of local communities. This demonstrates a renewal of the contract between society and knowledge systems since programmes, like Universiti Kebangsaan Malaysia (UKM)'s University-Community Partnerships help to preserve and foster ties with national institutions and local communities. Student internships and placements within local businesses also help to keep an open dialogue between mainstream and local needs to help build bridges between people from different ethnic groups. Such initiatives bypass the political realm and replace it with practical action and community involvement.

Knowledge in context: learning from good practice

Jacqueline Alger (Honduras) described the case of health research systems in Latin America, focusing on the results of a WHO-led survey conducted in April 2008 at a regional conference in Rio de Janeiro, Brazil. She illustrated the great variety of health research systems within the region: the differing socio-economic contexts, varied approaches to the organization of these systems, of their legal aspects and in the priority-setting processes. She drew certain useful lessons for Honduras, inspired in part by the experience and practices of its neighbour, Costa Rica.

Jaana Puukka (Finland) recalled that, between 2004 and 2007, fourteen reviews of twelve different countries were carried out under the auspices of this IGO. These highlight the links between the role of higher education and definitions of innovation (involving both high and low technology). These results already achieved could be relevant to applications of the template elaborated as part of the UNESCO Forum's Special Initiative project, thereby stressing the need for UNESCO and the OECD to cooperate more closely to share experiences in this field.

Albert Sasson (Morocco/France) highlighted factors driving investment in STI in three contexts. In China and India, these are competition with the West in international markets for increasingly sophisticated products, response to their population's needs to raise living standards, the influence of a growing middle class, rivalry with Japan and 'old Asia'. Cultural factors (e.g. emphasis on education and work as a conduit for social advancement) contribute to this investment trend. Yet, open markets and innovation are not always compatible with censorship and control. Certain Gulf States (e.g. Abu Dhabi *via* its Masdar City Project) have increased research grants in the field of solar energy to

foreign institutions so as to become less dependent on oil and gas and to export energy in the future. In Cuba, political will, perseverance and constant priority for health care have created a successful medical bio-industry. This exports pharmaceuticals (including vaccines), therapeutic proteins and diagnostics. This pragmatic approach to medical bio-technology has helped meet local needs and those of developing countries in terms of low-cost market niches.

CIT as a force in social transformation: the dynamics of context

Olusola Oyewole (Nigeria) called to attention the situation of IT Connectivity in Africa, and some of the challenges specific to the continent, such as a lack of human resources, very limited bandwidth, little to no regional collaboration or inter-institutional collaboration, and a need for funding. The proper management of bandwidth combined with the necessary infrastructure to increase internet availability – improving electrical supply and availability, for example, could dramatically enhance the situation of many African universities. Adequate fundraising by institutions and by governments to support research and to retain qualified personnel will also help to better the overall CIT situation in Africa.

Diem Ho (Viet Nam) offered a much more optimistic outlook for CIT in Africa. He presented the issue of connectivity as one that simply needs to be addressed through continued and increasing support both financially and academically to programmes that are already being implemented. Mentoring, internships and other student training programmes, sponsored by private firms; in cooperation with the exploration of alternative forms of connecting, such as mobile phone technology, can help to eclipse the gap in Africa's internet connectivity. The infrastructure will come, if there are enough trained people to ensure its continued progress. Ho describes a "Research and Innovation Ecosystem" where the links between various stakeholders, societal and business actors, proper governance, funding, and resources are intertwined to achieve a fluid working system, where 'sustainability', 'pertinence', and 'quality', are the chief measurements of the system's continued viability. If these components are all in place, then ICT growth can be achieved anywhere.

Florin Popentiu (Romania) used the case of Romania's booming IT environment to shape his viewpoint on how countries can develop and grow ITC capacity. Popentiu emphasized that in Romania, IT and research were able to expand at such a rapid pace due to the support of its national government. Romania created several governmental institutions to fund and promote innovation within its higher education system and these institutions were able to then expand to regional and global partnerships. This national – to regional – to global outlook and the initiatives that were brought about because of them (for instance, the University of Oradea being chosen as the UNESCO Chair for Information Technologies) contributes to Romania's continuing progress in implementing new IT policy and innovation. Integrating higher education, IT capacity and innovation is going to be the challenge that faces both pan-Europe and the global contexts for the future of IT development and research.

Part 2 Global keynote address

Nico Stehr
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Research in diverse social contexts: tensions, dynamics and challenges

Introduction

I shall begin my presentation with a startling but brief quote from a World Bank Development Report on "Knowledge for Development". The World Bank (1999:1), which is reinventing itself as the *Knowledge Bank*, notes: "Knowledge is like light. Weightless and intangible, it can easily travel the world, enlightening the lives of people everywhere. Yet billions of people still live in the darkness of poverty – unnecessarily".

As the quotation from the World Bank Development Report suggests there are apparently huge gaps, imbalances and barriers to the actual production and dissemination of knowledge around the world. Perhaps, the sharpness of the divide may have increased in the last decades but these disparities appear to constitute 'problems.' Thus, the uneven distribution of knowledge across societies may be overcome in principle. Yet the project of global knowledge is – if we follow the World Bank – far from a human achievement. The greatest challenge is to determine whether the implied imbalance may be healed not only in theory, but also in practice, at some future point.

For much of the twentieth century, research activity has been concentrated in few countries. Since the last decade, science and innovation have become increasingly and genuinely global. Science is now being done in more places, forcing policy-makers to expand their horizons, but the distribution of growth remains uneven.

We cannot any longer assume that the potential benefits of research are unproblematic. On the one hand, the development of knowledge politics in many countries and effort to regulate new knowledge and technical artifacts is testimony to changing public perception of its virtue.

On the other hand, a growing number of prominent voices in the **science community** are skeptical of the increased use of contemporary, natural scientific knowledge, not only by governments but also as a tool of politics, and the increasing **inability** of large segments of citizens to take part in democratic decision-making. Ordinary citizens are **robbed of the ability** to rationally enter into discourse about modern science and technology and

its social consequences. Besides this *inability,* there is also the question of the *desire* to become involved in an active manner. On a psychological plane, ability and desire likely vary from person-to-person as well as from issue-to-issue (Mulder, 1971). This raises the question of whether contemporary scientific research in diverse social contexts allows for the possibility of reconciling expertise and democracy.

My brief presentation will focus on a number of key terms in a discussion of research in diverse social contexts (see also Ozolina, et al., 2009). Foremost among these terms will be the notion of 'global knowledge,' the issue of governance, the issue equity and social and cultural cleavages both within and across societies, ethics, and last, but not least, globalization. I will advance my observations in *Sections I to V* below.

I will offer a brief definition of knowledge and **enabling** knowledge in *Section I*. In *Section II*, I refer to research contexts and divides; and in *Section III*, I will discuss globalization and research divides. *Section IV* will follow with the question "Globalizing Knowledge?" And *Section V*, in conclusion, will reference research in globalizing societies.

Section I. Knowledge

I would like to characterize knowledge as a generalized **capacity to act** and as a model **for** reality. The German term for this would be *Handlungsvermögen*. The verb *vermögen* signals "to be able to do," while the noun *Vermögen*, in this context, is best translated as 'capacity' (rather than 'fortune'). Simmel ([1907] 1989:276), in his discussion of money as a generalized code, uses the term *Vermögen* to describe the fact that money is more than a medium of exchange, but also transcends a mere functional understanding of its social capacities. Knowledge creates, sustains and changes existential conditions. Social statistics emerging out of research efforts, for example, are not simply mirrors of societal reality; they problematize social reality by showing and suggesting other capacities for action.

Additional knowledge enlarges our capacity to act; thus it is unavoidable that knowledge has **political** attributes. Knowledge as a capacity to act contributes to what is necessary for politics – to change or to preserve and perpetuate. No one knows everything, therefore capacity to act is stratified and unequally distributed throughout society.

My definition of the term 'knowledge' is indebted to Francis Bacon's famous observation that **knowledge is power** – a somewhat misleading translation of Bacon's Latin phrase: **scientia est potentia**. Bacon suggests that knowledge derives its utility from its capacity to set something in motion.

Knowledge, as a generalized capacity for action, acquires an 'active' role in social action only under circumstances that do not follow purely stereotypical patterns or are strictly regulated. Knowledge assumes significance under conditions where social action is, for whatever reasons, based on a certain degree of freedom of choice. The circumstance of action I have in mind may also be described as the capacity of actors to alter, transform or change a specific reality (*Gestaltungsspielraum*).

The capacity to alter and affect reality (enabling knowledge) is not synonymous with the capacity to act (knowledge). Knowledge may be present but cannot be employed because actors may not have the necessary authority, power or material resources to change reality.

Section II. Enabling knowledge

Knowledgeability or **enabling knowledge** refers to capacity to act that is coupled with specific social context (similar to Mode 2: Knowledge). Not all knowledge is enabling knowledge. For knowledge to constitute enabling knowledge it must resonate with specific social contingencies. Enabling knowledge must be tied to social characteristics and conditions that are amenable or **open to action**.

There are two models that describe in rather distinctive ways how enabling knowledge emerges from research contexts:

The first and much acclaimed model is based on the assumption that there tends to be a steep gradient of knowledge between science and society. This is best described as the **model of instrumentality**. Science speaks to society and does so not only with considerable authority and success while society has little if any opportunity to talk back. The alleged dominance of scientific knowledge in society and the extensive respect granted to it to the exclusion of other forms of knowledge led Feyerabend ([1974] 2006) to ask: "How can society be defended against science?" His answer is with the help of an educational system that is intellectually more inclusive.

The alternative approach to the social pathways, especially but not exclusively, of social science knowledge is the **capacity model**. Research under the auspices of the capacity models is closely linked to the ability of actors to manipulate or manage unique, context specific sets of conditions of action in practical circumstances.

The capacity model extends to the potential practical influence of **ideas and meaning** on society and its actors generated by the social sciences and the humanities, in particular. In this sense, the social science and the humanities primarily operate as meaning producers—to borrow the term 'mind-makers' from historian James Harvey Robinson. Robinson (1923:16-17) refers to a long list of occupations and professions serving as mind-makers in modern society: "Mind-seekers are the questioners (of the taken-for-granted or the commonplace) and seers. We classify them roughly as poets, religious leaders, moralists, story-tellers, philosophers, theologians, artists, scientists, inventors". But Robinson (1923:17) also raises a significant follow-up question "What determines the *success* of a new idea; what establishes its currency and gives it social significance by securing its victory over ignorance and indifference or older rival and conflicting beliefs?" In this context, he stresses that the " … *truth* of a new idea proposed for acceptance plays an altogether secondary role" (Robinson, 1923:20). Robinson's question about the conditions for success of a new idea must be extended to the question of why new ideas are incapable of displacing the commonplace and the taken-for-granted and what 'social labour' established ideas accomplish and under what circumstances?

Section III. Research contexts and divides

"The thought processes of science constitute an unreal world of artificial abstractions, which with their lean hands seek to capture the blood and sap of real life without ever being able to grasp it" (Weber ([1919] 1989:15).

Max Weber's Munich lecture on "Science as a Vocation," given in September 1919, discusses some of the fundamental questions and misgivings about the role of scientific knowledge in modern society, especially the emerging distance and alienation from science felt by society's younger generation. Almost a century later, prominent members of today's scientific community are echoing the same, even more general concerns.

On a larger level, the most visible challenge to research efforts is global equity. The notion that 'research and science divides' in the context of globalization and global governance seems to be a strange observation, given long held assumptions that scientific advances bridge the social, cultural and economic gap between rich and poor, developed and developing worlds. The reality, of course, is that the gap has grown wider over the years.

The divergence between developed and developing worlds may be aggravated by the complexity of science, economic and military benefits of research, and the difficulty of encouraging global governance of science. One route may be a greater emphasis on **collaborative research** between societies. It should also extend to stakeholders, civil society organizations and transnational institutions. Collaboration may have enormous potential benefits but could be slowed and interrupted by overemphasis on the protection of individual property rights.

Section IV. Globalizing knowledge?

"We have learned to understand what is meant by the universality of science: not that science is valid under *all* conditions, but that it is valid under definite conditions" (Böhme, 1992:59).

The concept of global or globalizing knowledge, as used here, does not refer to the already existing worldwide community of knowledge but to the social and intellectual processes and obstacles that knowledge has to master to become global in scope and overcome the unbalanced distribution across societies.

When we think of global knowledge, we tend to think of the dissemination of modern technical and scientific knowledge mainly produced in the West and not the global presence of traditional or indigenous forms of knowledge. Moreover, it is hardly necessary to point out that the assumption that global knowledge is virtuous is rarely questioned.

Nonetheless, among complicated questions that form part of an inquiry into global knowledge would be:

- How dependent is the worldwide dissemination of knowledge systems on social structure, for example, 'global' job markets? Do 'issues' considered to have a worldwide impact 'force' global dissemination of associated forms of knowledge, for example, environmental, security or health issues?
- Does knowledge change as it travels?

- Is an equal or uniform distribution of knowledge even possible in modern societies?
- Is knowledge the intellectual mark of an age of globalizing knowledge societies?
- If knowledge becomes global what are its benefits or drawbacks?

The approach to and implementation of global or globalizing worlds of knowledge have hitherto been realized by decree in normative and idealistic speculations, as a thought experiment or as a business plan. Similar premises about globalizing knowledge may be found in economic and management literature. Reflections on the development of a global world of knowledge without borders may be found not only in discussions about extending a global knowledge-based economy, such as global production networks, but also in the field of the so-called knowledge management, which ever more frequently deals with institutionalizing global knowledge agendas, experts, and management strategies.

Rather than focus on the social, cultural and economic conditions and processes that might facilitate globalizing worlds of knowledge, I will list two major constraints in a cautionary note:

1. I refer, first, to intrasocial and intersocial limits, such as a society's legal practices, cultural traditions that resist easy assimilation of new ideas, inherent inequalities in division of cognitive labor; disincentives for asymmetrical access to knowledge, such the ability to defend the power of the market, boundaries between social organizations, companies and laboratories) and trade barriers between societies; and
2. Constraints that may be directly linked to certain attributes of knowledge itself.

Only the latter constraint is in need of further explanation: **Knowledge protects itself**: the thesis of self-protecting knowledge has a demand and a supply side. The thesis of the possibly self-protecting characteristics of modern knowledge does not primarily concern itself with characteristics of knowledge that make it something like a private asset, as may have been the case in earlier centuries when scientific knowledge was protected from laymen by being formulated in one of the least accessible languages. Rather, it refers to context – dependent institutional attributes that hinder simple dissemination of knowledge in modern society, such as access to an educational system and its intellectual capital.

Knowledge is extremely difficult to steal. Hardly anyone has an interest in stealing knowledge, since one profits only with great difficulty. On the supply side, self-protecting knowledge refers to the requirement that its use be closely tied to the ability to mobilize cognitive abilities that are both rare and difficult to articulate. The difficulty of using knowledge secondarily or in transporting it, depends on, the manner in which knowledge is organized. The form in which knowledge is organized helps to protect it: As Kitch (1980: 712) underscores, " … managers can avoid increasing the ease with which information can be transmitted by resisting the temptation to assemble the information in organized written form." At the same time, self-protection of knowledge signals the fact that it is anchored in a particular infrastructure, such as the ability to learn how to learn, and thus can neither circulate freely nor be easily reconstituted. The concept of 'sticky information,' coined by von Hippel (1991, 1994), refers to the same fact. Implicit stock of knowledge (*tacit knowledge*), is difficult to transfer because cognitive abilities and experiences limit its mobility, facilitate control, and reduce the necessity of comprehensive legal norms to protect these forms of knowledge (cf. also Polanyi, 1958, 1967; Cowan, David and Forey,

1999: pp. 6-7). Antonelli (1999:244) refers to structural or cultural processes and argues that it *technical* knowledge, in particular, is context-dependent because it "tends to be localized in well-defined technical, institutional, regional and industrial situations. It is specific to each industry, region and firm and consequently costly to use elsewhere. The localized character of technical knowledge increases appropriability but reduces its spontaneous circulation in the economic system."

The self-protecting qualities of knowledge on the *demand* side might be processes associated with its characteristics or application, such as the high depreciation of knowledge. Knowledge quickly loses its value relative to the cost of acquisition and future profits. Moreover, rights of ownership associated with such knowledge, as in the case of a famous painting or a rare book like the Gutenberg Bible, are easily attributable and are therefore primarily of value to the owner. One can accelerate the rate of 'wear and tear' on knowledge and information by behaving according to that information (for example, by following the advice to sell or buy a certain share).

If one follows the advice to buy a certain stock, for example, that does not mean that it will necessarily be more valuable afterwards. The high degree of wear and tear experienced by information implies that "… by the time someone steals the information it is worthless which in turn means there is no incentive to steal it" (Kitch, 1980:714).

Section V. Outlook: research in globalizing societies

A democratic system in which knowledge is made the focus of continuing public concern is the only basis, under modern conditions, for government which is both effective and responsible" (Lakoff, 1971:12).

The world is an immensely stratified figuration. It has multiple social, cultural, economic and political cleavages. These observations conform to reality as we experience it. But it also is a reality that is often forgotten in the search for the main engine that drives social change in modern societies. The population of the world is continuing to grow. In most societies, nationalism is still an influential cultural and economic point of reference. The majority of the so-called global corporations or firms that are present in many countries are still linked with justification to a particular home base. The Economist (1993) reported that in 1991 "… only 2 per cent of the board members of big American companies were foreigners. In Japanese companies, foreign directors are as rare as British Sumo wrestlers".

Multinational corporations continue to carry out the vast majority of their research and development efforts right at home. At the same time, many of the rapid changes and risks around the world are a function of an increasingly powerful science system. Biomedicine, in particular, asks greater and greater ethical questions, testing a society's capacity to realize its benefits while minimizing its risks.

Technically, the world may be more closely connected because of satellite television and the Internet, but this does not extend to cultural, social and political realities. We see each other faster and more often, but this does not mean that we understand each other better or that our capacities to learn from each other have greatly improved. On the contrary, technical integration and connectedness, as well as worldwide migration and mass

tourism, often produce and sustain envy and misunderstanding and generate more stress and anxiety. Global communication facilities and access to the Internet have not really transformed this world into a more civilized place. Some of risks of the globalization process may be found in a reified, alienated understanding of the globalization process itself: actors and corporate and political systems primarily conceive of themselves as objects of the globalization process. What is equally true is that this process cannot simply be reversed by decree or the will of groups and institutions.

The chance for the globalization process, therefore, must rest in the emerging capacity to act – which the process affords – and in the ability to deploy and implement this capacity in a constructive fashion. Even the critics of globalization must acknowledge that nothing has been decided as yet and that the history of globalization is still open.

Biography of Professor Nico Stehr

Nico Stehr is Karl-Mannheim-Professor for Cultural Studies at the Zeppelin University, Friedrichshafen, Germany. He received a Ph.D. in sociology from the University of Oregon in 1970. Between 1967 and 2000, he taught at American and Canadian universities. He was fellow professor in Peter Wall Institute for Advanced Study of University of British Columbia in Vancouver and is currently a fellow of the Center for Advanced Cultural Studies, Essen, Germany. In 2001, Professor Stehr organised, *inter alia*, the International Conference on "The Governance of Knowledge" at the Center for Advanced Cultural Studies. His research interests focus on the transformation of modern societies into knowledge societies and associated developments in different social institutions of modern society. He has widely published on those issues.

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Part 3 SUMMARIES

The following texts are summaries of the full presentations given by the participants at the International Experts' Workshop on "Research in diverse social contexts: tensions, dynamics and challenges", Paris, 19 to 21 March 2009.

Research in the knowledge society: Global and local dimensions

Mary-Louise Kearney, *Director*
UNESCO Forum for Higher Education, Research and Knowledge

Summary

This paper reviews the issues related to diverse research contexts across all regions and their implications for generating a sustainable knowledge base which can both underpin development agendas and link into international research networks to keep abreast of new discoveries. Favourable environments, limiting factors, and the challenges posed by major social transformations (*inter alia*, globalization and the current world economic crisis) provide lessons to be understood in-depth. The numerous dimensions of social context include: (i) governance trends; (ii) political climates; (iii) investment in knowledge and research by emerging economies; (iv) challenging geographical contexts such as small island states; (v) levels of socio-economic development including the existence of a robust private sector and the small- and medium-enterprise (SME) sub-sector, multicultural societies, demographic shifts and the status of IT connectivity. In analyzing these aspects, the more abstract notions of time and space may be additional complex variables. Two questions require attention:

1. **To what extent can (and should) the specificities of diverse research systems determine and legitimize methodologies for mapping and analyzing their design, operation and outputs?**
2. **If specificity is admitted as the key criterion, how can the quality of a particular research system be assured so that its may interact effectively with its ounterparts in other regions of the world to generate relevant knowledge and its optimal application?**

Research and higher education (where research is extensively conducted) constitute a key nexus and permit knowledge to better serve national development agendas. In a globalized world, the knowledge gap is widening with dangerous consequences for social equity. In response, nations of varying scale are according priority to developing their knowledge

base, through higher education and research, and to commit the necessary resources to this goal. Success stories are characterized by specific indicators:

- **Innovative policies** in higher education, research and development (R&D) and Science, Technology and Innovation (STI).
- **Political will** to improve and profile the necessary infrastructure, including universities.
- **Efforts to** train and retain and attract highly-skilled human capital (HC).
- **Increased** levels of investment in research and in higher education.

Though contextual challenges will remain, and notwithstanding the current global economic crisis, a prime policy objective should be acquire and strengthen expertise in knowledge systems so that sustainable development goals may advance.

Biography of Dr Mary-Louise Kearney

Mary-Louise Kearney is Director of the Secretariat of the UNESCO Forum on Higher Education, Research and Knowledge. Ms Kearney holds degrees in Education: BA, MA and a Diploma in Teaching from Auckland University, New Zealand, and two doctorates (in Linguistics and in Education and Culture) from the Université de Paris III, la Sorbonne Nouvelle. On joining UNESCO in 1985, Ms Kearney was responsible for university cooperation and partnerships in the Division of Higher Education of UNESCO. In 1998, she was in charge of the organization of the *World Conference on Higher Education (WCHE*). In 2000, she was appointed Director of the Division for Relations with National Commissions and New Partnerships (ERC/NCP). Ms Kearney is a Senior Research Fellow in Higher Education at Oxford University, United Kingdom and the Vice President of the Society for Research into Higher Education (SHRE). She has authored numerous publications and research papers on Higher Education.

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Legacies of the 20th Century and knowledge imperatives for the 21st Century

Nazli Choucri, *United States of America*

Summary

This viewpoint focused on the changing nature of knowledge imperatives as these have evolved from models used in the 20th Century to new forms which can address contexts and needs of the Third Millennium.

The major knowledge legacies of the last century are well known: commitment to the sustainability objectives which has renewed the relevance of the social sciences , enhancing human skills for the knowledge economy, the emergence of new models of

knowledge value and forms (*such as intellectual property rights, knowledge commons, open access and knowledge networking*), and new systems and spaces (*i.e. social, ecological and cyberspace systems which have their own logic, laws and modes in interaction*). An example of this approach to knowledge management is MIT's OpenCourseWare Initiative, which uses cyberspace potential to widen access to knowledge for diverse publics of learners. These previous forms and functions of knowledge generated their own concepts and theories, ontologies and frameworks, indicators and measurement practices, models and methods and strategies to link to the policy-making arena.

In contrast and in a short space of time, the new millennium has presented a totally new social context for knowledge management. Already it is recognized that *complexity* characterizes every aspect of the social development process. As a result, social systems are constantly changing, closely interwoven, nonlinear and self-organizing, easily adaptive, counterintuitive and policy resistant. The power of *knowledge networks* has grown and their discreet and autonomous actors wield considerable authority due to their knowledge-producing capacities and ability to advance the frontiers of knowledge. Another significant innovation are ontology-based *collaborative knowledge platforms* which network expertise and so can provide support to public policy decision-making in domains such as the environment, science and technology, economic development and international relations.

As the 21st Century unfolds, emergent knowledge challenges can be listed as follows: benefiting from the relevance of cyberspace, reducing barriers to knowledge and so promoting equity of access, abandoning the constraints of time in favour of the liberty offered by new spaces, enabling and managing multilingualism and linking globalized knowledge to its localized counterpart.

Biography of Professor Nazli Choucri

Professor Choucri works in international relations and international political economy. Her current research is on the power of knowledge in the global economy, and the political and strategic implications of e-development, e-knowledge, and e-politics. She is Director of the Global System for Sustainable Development (GSSD). Professor Choucri is also Associate Director of the MIT Technology and Development Programme, and as Head of the Middle East Programme at MIT. She has also served as an advisor to numerous international organizations. She currently is in her second term as the Chair of the Scientific Advisory Committee of the Management of Transformation (MOST) Programme of UNESCO. Professor Choucri is an elected member of the European Academy of Science.

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Mapping and analyzing research systems: How to 'breathe dynamics' into a template

Roland Waast, *France*
and
Johann Mouton, *South Africa*

Summary

This presentation is based on the *Special Initiative Project of the UNESCO Forum* – Mapping Research Systems – which studied research systems in fifty-two middle-income (MICs) and low-income countries (LICs). This produced a general synthesis, regional syntheses and a global meta-review of trends, along with a Template for collecting data on these systems. The prime purpose was to present a reference study and a panorama of data to assist evidence-based policy-making and fresh initiatives related to research. Data collection faces stiff challenges in MIC and LIC contexts: scattered and unreliable information, lack of statistical offices and non-existent storage and monitoring services. The *Special Initiative Template* is not a manual but rather a guide which attempts to structure information *via* indicators, descriptors and narratives. The Template is neither evaluative nor prognostic and can be adapted to various contexts, purposes and users. Its applications are experimental and should be regarded as work in progress.

- The structure of the Template and its ten indicators is as follows:
- *National context* is depicted *via* four indicators (the country situation, history and governance of science and its informal Sand T structures).
- *Input/output* is studied *via* five indicators (performers, human resources, funding, cooperation and research production such as publications).
- *National dynamics* are analyzed *via* the tenth indicator which looks at tensions within the research systems, specific challenges for the country, identification of urgent issues to be resolved and a review of initiatives designed to address these.
- Grasping the national dynamics requires consideration of five specific areas:
    1. **Country's assets and obstacles** (e.g. history, development strategies, its trust in science and its social environment).
    2. **Human resources** (e.g. numbers of scientists, their calibre, renewal of expertise, brain drain).
    3. **Institutional situation** (e.g. role of universities, policy and management issues, cooperation challenges).
    4. **Research output** (e.g. its quality and relevance, collaborative research, networking).
    5. **Function of research** (e.g. whether national research is cutting edge and credible for economic partners, whether it provides expertise and advice to the state, strategic input to problem-solving and can anticipate new trends and innovation patterns).

Biography of Professor Roland Waast

Roland Waast graduated from the Ecole Polytechnique and the Sorbonne, Paris. He first practised research in Madagascar as a rural sociologist, then in Algeria (where he was a professor at the Institute for Statistics and Planning). He was head of a department of social sciences at ORSTOM (1981-1986). Since 20 years he has specialized in the social studies of science. He is emeritus senior researcher at the Research Institute for Development studies (IRD, France). He is also the founder of the international network ALFONSO, co-director of the review *Science Technology and Society* and an expert for the European Commission. His interests are particularly in the development of scientific communities, science indicators and evaluation methods. In 2000 he launched for the European Commission a "state of the sciences in Africa". In 2002-2004 he organized the evaluation of the Moroccan Research System. Since then he participated in the European ESTIME project, assessing the scientific and technological capabilities in the South Mediterranean countries.

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Biography of Professor Johann Mouton

Johann Mouton is Director of the Centre for Research on Science and Technology and Professor in the Department of Sociology at the University of Stellenbosch. He received his Doctorate in Philosophy at the Rand Afrikaans University in 1983. He has been Director of the HSRC Investigation into Research Methodology from 1983 to1994. More recently, he has served as a member of the US Research Committee, the Research Ethics Committee and the Senate Committee on Academic Development He is currently involved in educational evaluation projects in the fields of service learning and multigrade schooling. He received Merit Awards HSRC (1987,88) and was awarded the Stals Prize for his contributions to trans- and inter-disciplinary research in 2001 and the Stals Prize for General Science Education and General Research Methodology in 2007.

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Higher education, research and innovation: Global Social Sustainable Development (GSSD) perspective

Nazli Choucri, *United States of America*
and
Jean François Mascari, *Italy*

Summary

This viewpoint describes a methodology being researched at MIT entitled *Global Social Sustainable Development (GSSD)*. Its aim is to map knowledge on the sustainable development of knowledge societies and economies. Whereas the 'Special Initiative' led by Johann Mouton and Roland Waast involves narratives, descriptors and indicators, the GSSD is both an ontology model and a scale-free E-knowledge system. In particular, it studies the architecture of higher education, research and innovation contexts and systems (HERICS) in relation to three areas (resources, population and technology).

The specific perspective of context or system alters the analysis process: resources may mean natural assets or knowledge and research; population may designate demographics or human resources; technology can be studied in relation to trade, industry or transport, or as part of research infrastructure, educational environments and knowledge dissemination. This approach, rooted in the reality of globalization, invites policy-makers to think about research systems in different ways because it clearly illustrates the outcomes of different systems and contexts. For example, research in mathematics is a top priority in Japan which helps explain the country's strong cohort of scientists and investment in R&D. This logic is not the case in other national contexts.

Numerous questions are associated with the study of contextual tensions, dynamics and challenges:

- How to understand knowledge societies in their respective HIC, MIC, or LIC contexts?
- How to manage risk and opportunity in differing contexts?
- Why are some research systems more sustainable than others?
- How does decision-making by scientists differ from that of politicians?
- How can the dynamics of networks and the impact of this process be better utilized?

The next step in this modelling exercise is to build *HERICS Profiles* which will look at the objectives, processes and components of the three basic areas of resources, population and technology in relation to context and system.

Then ultimate objective of the GSSD investigations is to enhance the management of research systems, whatever their social context may be. The various models generate different dynamics and tension. In turn, this influences the choice of the best strategies for policy and decision-making.

Biography of Professor Jean François Mascari

Jean-François Mascari is a researcher at the Italian National Research Council (CNR) in mathematics and computer sciences. Before he was, *inter alia*, a researcher at the Université Paris 7 (Fr), at the European Commission in Bruxelles (Be), at the Los Alamos National Laboratory (Los Alamos-USA) and at the University of California (Berkeley-USA). He is also a referee of the American Mathematical review, referee of European Union research projects, and a referee of the Italian Research Ministry, mainly on rigorous software development and advanced mathematical models of computations. Besides, Jean-François Mascari has been member of CNR working groups on e-government and e-research and is currently on an ongoing collaboration with the MIT project GSSD on e-knowledge for Sustainability Science. He was awarded Outstanding Scientist of the Twentyfirst Century in 2000.

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Biography of Professor Nazli Choucri

Professor Choucri works in international relations and international political economy. Her current research is on the power of knowledge in the global economy, and the political and strategic implications of e-development, e-knowledge, and e-politics. She is Director of the Global System for Sustainable Development (GSSD). Professor Choucri is also Associate Director of the MIT Technology and Development Programme, and as Head of the Middle East Programme at MIT. She has also served as an advisor to numerous international organizations. She currently is in her second term as the Chair of the Scientific Advisory Committee of the Management of Transformation (MOST) Programme of UNESCO. Professor Choucri is an elected member of the European Academy of Science.

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Tensions and challenges for research in middle- and low-income countries: A viewpoint

Edmundo Torres Godoy, *Nicaragua*

Summary

This presentation focused on the reality of the Knowledge Society in Low-Income (LICs) and Middle-Income Countries (MICs) where, all too often, the poor availability and sound use of knowledge severely impede social progress. A series of important questions require serious reflection:

- Why does such a vast knowledge gap exist?
- Why should the South invest in high-level knowledge?

- What really constitutes knowledge in middle and low income countries?
- Can state ideologies affect the development of knowledge?
- What is the role of Higher Education Institutions (HEIs) in LICs and MICs in the context of a Knowledge Society?

Various responses to these complex issues were suggested: First; the social and political context of the South (of LICs and MICs) is much more diverse than for their counterparts in the North, High-Income Countries (HICs) and hence investment in this area is much less supported. Secondly, the political agendas in LICs and MICs tend to seek rapid results rather than thorny longer-term investment in knowledge infrastructure. Thirdly, the governance of research is hampered by a dangerous indifference to the issues related to research, to higher education and to private sector involvement.

Furthermore, other primary emphases cause problems: for instance, insistence on the relevance of knowledge for development can lead to an over-emphasis on industrialization policy; certain countries are importing expertise (e.g. the Gulf States) while others export knowledge (e.g. Cuba's bio-technology capacity), thus causing an incoherent policy approach. This unfortunate situation engenders a cycle of low investment, capacity and economic growth.

Six specific challenges are identified for future analysis: (i) the relevance agenda has affected academic freedom in terms of freely choosing the content of teaching and research; (ii) the dichotomy between teaching and research has implications for the real development agenda which go far beyond economic concerns alone; (iii) while higher education institutions are a prime force in the Knowledge Society, resistance to this role remains strong, thus affecting their status as major development actors; (iv) when the role of civil society remains weak in certain states, the negative impact on the development and knowledge debate is very damaging; (v) a new social contract would appear necessary involving not only the traditional "Triple Helix" of government, the economy and universities but adding civil society as a vital fourth component; (vi) since development is always non-linear, the eventual negative consequences of this process cannot be ignored. Progress may take place but not without certain inequalities. In this regard, higher education must retain its role as the social conscience within its particular context.

These factors point to the danger of wrong models of development. While needs are recognized (e.g. in STI), approaches should be context-sensitive so as to avoid tensions which diminish the social benefits of higher education teaching and research.

Finally, HEIs in LICs and MICs must change if they are to play a meaningful role in terms of knowledge providers. The essence of this transformation entails the adoption of new paradigms for knowledge generation. This includes coupling the advance of knowledge with the solution of concrete problems. The spectrum of problems that are to be tackled through research must include both economic and social challenges. Higher Education Institutions (HEIs) in Low-Income Countries (LICs) and Middle-Income Countries (MICs) are summoned to evolve from merely teaching organizations to comprehensive, development-oriented knowledge institutions.

Biography of Professor Edmundo Torres

Edmundo Torres is a biophysicist and a doctor in Higher Education Management (University of Bath, United Kingdom). His main research projects are focused on the role of higher education institutions in a knowledge economy, with special emphasis on developing countries. Since 1990 he has worked as a lecturer and researcher at the School of Medical Sciences, National Autonomous University of Nicaragua at León (UNAN-León). In 1998, he was, *inter alia*, appointed as member of the University Reform Committee at UNAN-León. From 2000 to 2006 Edmundo Torres has been Vice-Rector for Research and Graduate Studies at UNAN-León. He is, since 2000, General Coordinator of the UNAN-León – Sida Research Cooperation Programme and is, currently, the Coordinator of the Research Unit on Knowledge, Innovation and Work at the Research Centre on Health, Work and Environment (CISTA/UNAN-León).

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"Vision 2020" Government Initiative: Rwanda

Joseph Gahama, *Rwanda*

Summary

In this summary the author has presented his country, Rwanda, as an example of how governments in small, mostly agricultural countries, at the present time, prioritize technology and research. Rwanda is distinct from certain other countries – suffering a tragic civil war and genocide in the early 1990s leaving a relatively youthful general population with many citizens living in exile from their homeland. Over the past decade much of the infrastructure, such as schools, hospitals, and communication centers has been reconstructed. The author states that "politically, there has been a positive movement where the post-conflict period of transition which ended in 2003 ushered in a new constitution and presidential and parliamentary elections with 'universal suffrage'".

Currently, scientific research in Rwanda revolves around four research institutions subsidized by the Government; they are the Institute of Scientific and Technological Research (IRST), the *Institut des Sciences Agronomiques du Rwanda* (ISAR), the Karisoke Research Centre (KRC), and the Institute for Research and Dialogue for Peace (IRDP). These research centers combined with Rwanda's increasing number of universities represent the majority of opportunities for Rwandan research and development (R&D). In order to 'revitalize' the future of scientific research in Rwanda, and in recognition of the mounting importance of science, technology and research for Rwanda's future development, the Government has created a Ministry for Science, Technology and Scientific Research. This ministry has, in turn, formed two bodies that work to advance science and technological research in the country.

"Vision 2020", an initiative by the Rwandan Government for the long-term development of Rwanda, runs on the basis of six pillars as follows:

1. Good governance and the rule of law.
2. Human resource development.
3. A private-sector economy.
4. Infrastructure development.
5. Productive and market-oriented agriculture, and
6. Regional and international economic integration.

These aforesaid six objectives are the foundation of what the Rwandan Government hopes will lead to a transformation of its economy. Currently, Rwanda has mostly an agriculturally-based economy, but there are plans to evolve into a 'knowledge-based economy', one such as Singapore, that has notably been transformed into a more knowledge and information and communication technology (ICT) centered country.

Joseph Gahama also notes that Rwanda is becoming a leader in ICT in sub-Saharan Africa, and that more emphasis on medical research needs to be included and funded, such as maternal health, family planning and HIV/AIDS as well as Malaria prevention and treatment. Also important are conservation and protection initiatives for Rwanda's environment and wildlife, including its mountain gorilla population. If these issues are continually addressed and improved, then industries like tourism will continue to expand. Some of the challenges that Rwanda faces on its journey to reaching its "Vision 2020" goals are the fact that the general population is very young and inexperienced when it comes to programme implementation; the current research capabilities of Rwanda's higher education institutions are inconsistent and lacking quality facilities and research materials; there is a real shortage of funds for research, science and technology; so it is difficult to cover operating costs and researchers' salaries. In spite of the aforementioned, Joseph Gahama's presentation ended on a positive note as he stipulated that that Rwanda is beginning to 'carve out a niche for itself' in the Great Lakes Region of Africa and that its higher education institutions are gaining ground in reputation.

Biography of Professor Joseph Gahama

Joseph Gahama holds a doctorate in History of African societies. He is a professor at the Kigali Institute of Education since 2000. He has been a professor at the University of Burundi from 1981 to 2000 and is a visiting professor in numerous African and European universities. He has contributed widely to international and national conferences and seminaries. He is also a consultant to UNICEF, UNESCO, PNUD and several international NGOs. Professor Gahama is the author of multiple books, articles, and chapters of edited books on history and political life of African Great Lakes Region, in particulary Rwanda and Burundi.

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What can be said about research on social science in the Arab States?

Abdelwahab Ben Hafaiedh, *Tunisia*

Summary

This viewpoint analyses the central role of Social Science Research, and more specifically, the connectivity status among research actors within the Arab Region. To introduce the subject, Abdelwahab Ben Hafaiedh underlines the correlation between academic achievement and multi-entity/multidisciplinary cooperation. In that sense, "research in the fields of hard science, life sciences or engineering sciences cannot be developed in the long run if the context is not favourable for Social Science Research".

There is a regional tendency of investing in human resources, at the expense of promoting connectivity among the active population. Moreover, human resources, material resources and capital investment constitute the dynamic trinity, believed to ensure the development of research and innovation. The present economic crisis has demonstrated that good 'time management' is a key factor in research and development (R&D) – and not, capital investment.

Amidst the crisis, the universities of the Arab States face consequent financial repercussions on their research funds, pushing many professionals into private practice and burdening the remaining teaching staff.

Through five indicators: (i) Indicator of Performance of Higher Education and its impact on Social Science Research; (ii) Indicator of Dissemination of Social Science; (iii) Indicator of Regional Co-operation and Collaborative Research; (iv) Indicator of Accumulation of Knowledge; (v) Indicator of Accessibility to Scientific Information, Abdelwahab Ben Hafaiedh examines the present and recent past challenges of Social Science Research in the Arab Region. On the one hand, the growing impact of Higher Education on Social Science Research has led to the multiplication of research entities (passing from ten universities, in the 1950s, to about 250 higher education establishments, nowadays). On the other hand, due to a lack of press freedom, social sciences publications are decreasing significantly, affected by funds cuts. This restrictive trend is also denoted in the decrement of funds destined to collaborative researches. Despite this, a tremendous effort is made to work with foreign investigation centres, permitting an international exposure of the regional actors. The analysis of the indicator of accumulation of knowledge signifies the emerging themes developed by social scientists – such as: (a) women studies; (b) cultural identity; (c) professional and family life; (d) regional conflict, and (e) education. We can underline the specificity of these subjects to the Arab context. The access to scientific information that one should consider as primordial, is touched by the lack of information technology (IT) infrastructures.

From these observations, stand out three evidences. Firstly, a social recognition of social science is needed, in order to bring awareness to the Higher Education field, integrating the idea that students will eventually be part of the active population – and not necessarily, have a career in the education body. Another remarkable aspect in the Social

Sciences environment is the critical mass of active researchers, in the Region. The passage between generations of researchers is not well-established, leaving little to no traces of the past works. This is accentuated by another factor, the lack of trust among the regulatory entities (governments, policy-makers) and the research field.

This being said, the Higher Education and Research measures in the Arab Region have to be harmonized, in order to guarantee the durability of pending research processes, and the academic freedom. The Middle East and North Africa (MENA) countries have to update the Research priorities agenda, to keep pace with the international research situation.

Biography of Abdelwahab Ben Hafaiedh

Abdelwahab Benhafaiedh is a researcher and professor in Social Sciences (University of Tunis). He worked on the establishment of the Arab Observatory on Education within the programmes of the Arab League Educational, Cultural and scientific Organization (ALECSO). He is, currently, the director of the Middle East Research Competition (MERC). He has widely published on education issues and he is the editor of the social science review *Awrak Al Awsat*.

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Super research universities

Alec Boksenberg, *United Kingdom*

Summary

With the ongoing belief that "expanded education leads to social betterment", Higher Education has given a significant role to research entities. Some of these entities have developed into *Super Research Universities (Super RU's),* prioritizing the discovery of new knowledge, generally in Science and Technology. Such research universities act as referent for the rest of the investigation field, and also for other entities involved in Higher Education (government, policy-makers, etc): "their influence on the sector is far greater than their number suggests".

These research institutions of certain renown ensure particular functions, such as an emerging global mission (transcending boundaries of the nation state), research intensity (mainly oriented towards the sciences and disciplines related to social change such as political sciences and economics), new roles for professors (team oriented, cross-disciplinary and international partnerships), diversified funding (to overcome diminishing governmental support), new performance-based relationships, worldwide recruitment, increasing complexity (due to the substantial expansion of research activity) and the collaboration with other global institutions.

Before acquiring such a relevant role, how did the *Super Research Universities* emerge? On this point, Boksenberg refers to the ideal defended by Wilhelm von Humboldt, in the

early nineteenth century, that preached "a university characterised by the primacy of research, the importance of science, the integration of teaching and research, with all these activities contributing to the development of the nation. Knowledge production was the top priority". Since the 1980s, a research-based model of university, open to all, has replaced the *national university* type, in a concern to embrace a wide continuum of institutional bodies with the *Super Research Universities* being extreme but strongly participating components.

A broader observation at an international level points out the resulting advantages of having at least one research university (especially in less affluent countries) launching the national education development. Countries deprived of such entities might fatally be isolated from participation in the world knowledge system and in the international research dialogues. It is expected that in the next decades, this model will be adopted worldwide by the majority of higher education institutions.

As an illustration of a *Super Research University*, the case of the University of Cambridge is quite representative. Ranked among the world's top few universities, Cambridge had in 2006 the largest financial endowment in Europe (US$8 billion). Reputed for its strong science faculties, the University is also closely linked with the development of a high-tech business cluster, known as *Silicon Fen*, a real rival of Silicon Valley.

The international connections with foreign research entities are a fundamental feature of the University's research reputation. This is evident in its extensive studies of global issues, notably in the environmental sciences (climate change, energy, water, technology and urbanization). Last but not least, Cambridge engages in research collaboration across all regions, including Africa, and Asia, *via* its active involvement in multilateral academic alliances.

Biography of Professor Alec Boksenberg

Physicist and astrophysicist (observational cosmology), Fellow of the Royal Society (FRS), Honorary Professor of Experimental Astronomy in University of Cambridge, Fellow of Churchill College in Cambridge, Visiting Professor of Physics and Astronomy and Fellow of University College London, Chair of United Kingdom National Commission for UNESCO and its Chair of Sciences. Formerly Director of the Royal Greenwich Observatory and the Royal Observatory, Edinburgh. Awarded, *inter alia*, Commander of the Most Excellent Order of the British Empire (CBE), Docteur Honoris Causa Observatoire de Paris, D.Sc. Honoris Causa University of Sussex, Royal Society Hughes Medal, Institute of Physics Glazebrook Medal and Prize, Royal Astronomical Society Jackson Gwilt Medal, he has Asteroid Boksenberg named after him. Professor Boksenberg has developed satellite and ground based astronomical observatories and observationally researches the early Universe. He has written 240 learned publications.

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Research in diverse social contexts: Changing demographics and social outreach

Merle Jacob, *Sweden*

Summary

The governance of research has become a new policy imperative due to the fact that policy-makers now regard research as critical input to economic growth and innovation. This focus on research, the importance of higher education institutions for training the future workforce and the fact that higher education and research are now regarded as tradable commodities, have propelled universities into the position of strategic actors in innovation and growth policies.

The redefinition of the strategic role of universities has arguably motivated a quantitative and qualitative shift in the governance of the sector in most nation states. At the same time that universities are coping with the implications of their new strategic role, they are also facing a number of internal challenges. One of these is the impact of changing demographics, the traditional Western dominance in science is now challenged by the aging academy in OECD member countries, by the declining interest in science and technology subjects in all countries except for the developing and transition countries and by the altered student flows due to the geopolitics of the war on terror.

One of the most compelling issues for universities is the new governance imperatives since unlike the previous generation, they promote profound changes in resource allocation, arrangements for research collaboration, the type of knowledge generated and its beneficiaries and the overall focus of research agendas (both individual and institutional). What then are these measures and how are they justified? To begin with the second question first. The governance of research is a challenging endeavour in part because higher education and research is a sector without a clearly defined political constituency and its activities are costly and opaque to all but a few member of the polity, almost all of whom by dint of their expertise are partisan. Thus, the very nature of higher education and research is the justification for higher accountability demands.

The most popular mechanism for steering higher education and research is ex ante and ex post impact assessment. This includes the increasingly controversial use of bibliometric measures such as of citation counts as measures of scientific quality and number of papers published as a measure of productivity. These indicators are controversial not the least because there are problems with the methods used to arrive at these figures. Further, while they are useful for assessing productivity, bibliometric indicators have well known shortcomings with respect to measuring scientific quality. The latter is a difficult measure to achieve not the least because there is no one definition of quality on which all scientists can readily agree and which would function equally effectively across all fields of science.

As this complex situation evolves, attention must be paid to several key aspects: first, the research community must balance reputation and self-protection with the attractive funding

opportunities offered by market forces; second, decision-makers must admit that S&T, though vita, cannot resolve *per se* the most pressing issues on the policy agenda today; third, world-class researchers and research groups exist in all regions and merit support.

Biography of Professor Merle Jacob

Merle Jacob is Director of the Centre for Technology, Innovation and Culture at the University of Oslo and Professor of Research Policy at the Research Policy Institute at the Lund University. She was, *inter alia*, guest professor at the Centre for Climate Science and Policy Research at the Linköping University and Reader and Project Leader at the Institute for the Management of Innovation and Technology (IMIT) at the Chalmers University of Technology. Professor Jacob was also, amongst other projects, a scientific leader in the research group on Management of Innovation and Knowledge (MINK) at the Copenhagen Business School from 2002-2005 and is, since 2004, a Scientific Leader for Phase 1 MISTRA financed research programme at the Linköping University.

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Evolvement of emerging economies Case study of Ireland

Peadar Kirby, *Ireland*

Summary

In his presentation Peadar Kirby laid out a case study on how emerging economies can evolve, using Ireland as an example. During the decade of the 1990s investment in Scientific and Technological (S&T) research in Ireland increased significantly. The Irish economy at the beginning of the twentieth century was a typical underdeveloped 'mono-crop economy' as almost half its exports consisted of live cattle to the British market.

Following independence in 1922, and particularly with the election of a more progressive government in 1932, the country began to industrialize behind high tariff barriers. In the 1960s, Ireland's signing of a Free Trade Agreement with the UK and joining the EEC, paved the way for foreign investors and businesses to contribute to the Irish economy. By the 1980s, Ireland began to invest in indigenous firms and businesses which led to an increased appreciation of the need for investment in research, and technology development. As a 'late developer' Ireland has finally learned that state investment in research and development is a necessary precondition for its future economic progress. By creating world-class research facilities and promoting institutions for higher education, technology and science, Ireland can hope to attract world-class researchers and to become known for its excellent research capacities.

To support this new emphasis on research and technology development, the Irish Government has created institutional infrastructure, such as the Irish Research Council for Science, Engineering and Technology (IRCSET), the Science Foundation Ireland (SFI)

and the Programme for Research in Third Level Institutions (PRTLI). These programmes all work to advance and support science, research and technology development in Ireland.

However, provoking the Government of Ireland to action – to seriously consider funding research –came from outside the state system, in the form of Atlantic Philanthropies, a foundation run by an Irish-American named Chuck Feeney. Atlantic Philanthropies brought to the Irish Government's attention issues related to higher education and research, and contributed almost US$200million to national research initiatives. They also identified opportunities for improvement in the Irish higher education system such as developing a system for more collaboration between universities.

Kirby noted that over the past fourteen years Ireland has seen a drastic increase in funding of R&D and not just nationally, but from foreign and EU sources as well, which has resulted in it rising to 14th place from 22nd place in the OECD rankings of higher education research and development (HERD). But the author stated also that Ireland has not significantly increased its ranking on R&D spending as a percentage of its GDP when compared with other members of the EU. Unfortunately though, it has been noted that the increase in state funding for research and development in Ireland has not been matched by a similar increase by indigenous business; university presidents complain that state funding of the core higher education budget has also declined in real terms in recent times. Ireland lags significantly behind EU averages for patent applications and has failed to develop a strong culture of innovation among indigenous businesses. Kirby contends that the failure to maintain core funding to universities risks undermining the quality of third-level education over time.

He concluded with the following two lessons for other economic latecomers to development:

1. That Ireland was successful in its development of research in higher education and effectively developed the necessary supporting infrastructure, and
2. In order for increases in research and development to be relevant and successful, there needs to be strong cooperation between researchers and businesses, and the gap between research funding and core education funding needs to be reduced through stronger investment in the latter.

If policies were developed to address these issues, then Ireland and others in the same position would be better placed to face the current financial crisis. Unfortunately, it may be too late!

Biography of Professor Peadar Kirby

Peadar Kirby is Professor of International Politics and Public Policy at the University of Limerick, Ireland and Associate Fellow of the Institute for the Study of the Americas, School of Advanced Studies, University of London. He received the President's Research Award for the Humanities and Social Sciences in 2003. He has been a visiting professor at Ben Gurion University in Israel, at the Catholic University of Chile, at Sciences Po Paris and at the University of Costa Rica, San José. His research interests include the political economy of the Celtic Tiger, globalization, and the social, political and economic development of Latin America.

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Business ethics

Wallace Baker, *United States of America*

Summary

This presentation was made as part of the Forum's International Experts' Workshop's debate entitled *Research Imperatives for Emerging Economies*. It consisted of a reflection on the issue of Business Ethics and on the impact of academic research in this field on social development. As Business Ethics permits the private sector to act in the public interest, it links to public policy-making. For this reason, the field has considerable power to direct and transform both social change and the thinking and behaviour of citizens. These remarks were based on the author's commissioned paper for the UNESCO Forum and entitled *"A Reflection on Business Ethics: Implications for the UN Global Compact and Social Engagement and for Academic Research"*.

The 1999 UN Global Compact was the UN's call to the private sector to reinvigorate the commitment of the economy – and especially of the business sector – to sustainable development. Today, the private sector exerts a powerful influence on socio-economic development. It comprises enormous wealth since individuals are richer than certain low-income countries (LICs). As well Small- and Medium-size Enterprises (SMEs) play a key role in national economic growth and in the empowerment of citizenries. Though the business sector remains too weak in many middle-income country (MIC) and low-income country (LIC) contexts, ethical business conduct must be nurtured and strengthened as a major force for positive social transformation**.** To some extent, the promotion of business ethics and the encouragement of social engagement depend on the role and contribution of relevant academic research.

Certainly researchers, by virtue of their wide knowledge and investigative as well as analytical approaches, can help to identify and document the main or emerging issues surrounding the place of business in socio-economic development. The issues in question are complex ones necessitating reflection from various standpoints on the nature of commercial activity, of profit, of the human professional conduct involved, and of the contribution of this milieu to the general public good. Consequently, the research angle must be an interdisciplinary one so as to study the varied dimensions of the issues. Moreover, it should be recalled that research is the lifeblood of the Knowledge Society and the fuel for its successful operations because it helps generate new and effective approaches to problem-solving.

Biography of Professor Wallace R. Baker

Wallace R. Baker is an International partner and founder of the Baker & McKenzie office in Paris with Professor Emeritus Roger Pinto. Dr. Baker is also a Member of the Paris and Illinois Bars. He holds a LLB from Harvard Law School 1949-1952, a Doctorate of Laws from University of Brussels, 1959-1961 and a licence en Droit from the University of Paris, 1970-1972. He is currently engaged in research and advice to companies in risk management relating to the rapidly developing field of corporate responsibility. He has been active since 1990 with Professor Nazli Choucri, at MIT, in creating and developing the Global System

for Sustainable Development (GSSD). Dr. Baker has written articles on Corporate Social Responsibility, Business Ethics and the GSSD as well as on the Kyoto Protocol. Recently, he has been active with UNESCO in studying how UNESCO can work with companies in order to fulfil its mission in Education for All (EFA).

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Innovative systems and structures for higher education-industry-community collaboration in Malaysia

Saran Kaur Gill, *Malaysia*

Summary

Saran Kaur Gill's presentation for the theme of: ***Research Systems and Specific Challenges for Social Development***: (Outreach to key social partners, multiculturalism, changing demographics) used an outreach programme from the Universiti Kebangsaan Malaysia (UKM) as its case study. This University is working to bridge the gap between the community, industry and higher education institutions, by promoting several programmes which foster partnership and exchange. For students, these encompass more traditional internship-type student placement within a workplace, 'simulated workplace experiences', entrepreneurial-based internship programmes, NGO experience, and international student exchanges. These opportunities all endeavour to make UKM students more competitive in the working world and to give the surrounding communities opportunities to benefit from the presence of a higher education institution.

Implementation of these initiatives requires a high level of organization and cooperation between university offices and community and business partners. For this, they have created several positions and offices to facilitate their various projects, from the position of Deputy Vice Chancellor (Industry and Community Partnerships) – a role that is highly visible and which requires a great deal of political savvy, to three offices in the portfolio – the Industry-Liaison Office, the University-Community Partnership Office and the Chancellor's Foundation.

To facilitate its outreach to the community, a University-Community Partnerships Office has been set up. This organizes several projects between the university and local organizations. Some of these projects include: a village adoption project, disaster relief efforts, and environmental sustainability and preservation initiatives. The Industry-Liaison Office aims to make the university more relevant to industry needs. This is by providing internship opportunities for students, placing academics in industry, inviting industry players to be on curriculum boards as well as working on research that is relevant to industry. A third office, the Chancellor's Foundation, is charged with maintaining 'UKM-Global' exchanges and partnerships (e.g. encouraging foreign students to study at UKM on two four-week courses on "Sustainability of Tropical Heritage" and "Indigenous

Communities"), fundraising, and setting up chairs of endowment for niche research areas of the university".

Some of the reasons why these programmes are so important in the case of the UKM's surrounding communities are best explained *via* a second article that Saran Kaur Gill wrote for the Forum's International Experts' Workshop, but did not formally present. Here she identified some of the main issues in Malaysia concerning nationalism, multiculturalism, and ethnic and linguistic minorities. Four of the areas she identified as important in promoting minority community linguistic and cultural needs are: (i) When writing on these issues, it is important to change the format of academic papers, so that they are more accessible to politicians and other decision-makers. (ii) The need to educate all of society, using the news media as a vehicle to raise awareness of key issues. (iii) The need for politicians in the majority groups to be aware of minority issues and to be sympathetic to their needs. (iv) Better organization within the communities to develop 'community-based plans' for sustaining 'mother-tongue' languages in the minority communities.

Programmes, like UKM's University-Community partnerships help to preserve and foster ties with national institutions and local communities. While, the student internships and placements within local businesses also help to keep an open dialogue between mainstream and local needs, and may possibly help to build bridges between people from different ethnic groups.

This commitment to industry/community, attention to details, and awareness of the complementary skills and experiences that exist between academics, students, and external parties enable UKM to continue with its successful and innovative industry and community partnership initiatives.

Biography of Professor Saran Kaur Gill

Saran Kaur Gill is a Professor of Sociolinguistics and International Communication at Universiti Kebangsaan Malaysia (National University of Malaysia). She obtained her Ph.D. from the University of London. She has presented at several international conferences and has written several articles, in international journals. As a chairperson, she organized the international conference – "English Language Education: National and International Challenges and Responses" in 1994. It was sponsored by UNESCO funding and organized in collaboration with the International Association for World English and National Language and Literacy Institute of Australia. She has also planned and organized together with UNESCO, training programmes for "Asian Women Leaders in Higher Education." She is the first Malaysian-Sikh woman to be appointed Deputy Vice Chancellor (Industry and Community Partnerships) at Universiti Kebangsaan Malaysia.

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National health research systems in Latin America: Outcomes of the first Latin American conference on Research and Innovation for Health Review of 14 countries

Jackeline Alger, *Honduras*

Summary

This viewpoint focuses on the conclusions withdrawn from the very first regional encounter dedicated to National Health Research Systems and Innovation (NHRS) in Latin America, gathering local trends' and analyses from fourteen country papers. The First Latin American Conference on Research and Innovation for Health, organized in Rio de Janeiro (April 16-18 2008) assembled specialists and key speakers from twenty-seven Latin American countries, including fourteen countries whose representatives prepared a NHRS country background paper (Argentina, Bolivia, Brazil, Chile, Costa Rica, Cuba, Ecuador, El Salvador, Honduras, Panama, Paraguay, Peru, Uruguay and Venezuela), and officials from academic institutions, research institutions, civil society organizations, technical cooperation agencies, development agencies and research networks. The focus of the meeting was the Latin America Spanish- or Portuguese-speaking countries and the organizations that work in or with these countries including Canada, France, Spain, UK and the USA, as well as observers from the English- speaking Caribbean and the AFRO Region.

The analysis of the information brought up by each country team demonstrated the variety of ongoing research processes in public health, ruled by the local social specificities – some of which do replicate in several Latin American countries. The main subjects addressed were:

- National Health Research Systems.
- Human resources for health research.
- Funding of research for health.
- Innovation, product development and access.

On this point, Jackeline Alger stressed the importance of finding a common approach for NHRS development in the Region, in order to facilitate the circulation of information and the collaboration between key entities – considering, with particular attention, the social contexts of the concerned countries. In this sense, the mediation by international cooperation organizations would strengthen the field for a Health Research Network. This case study channels the value of multinational exchanges, provided that a real work of continuity follows this kind of event.

Biography of Professor Jackeline Alger

Jackeline Alger is a parasitologist associated at the Parasitology Service, Department of Clinical Laboratories, University Hospital, Tegucigalpa, Honduras, since 1997. She is also member of the Scientific Research Unit of the Faculty of Medical Sciences, National University of Honduras (UNAH), since 2008. Under a Fulbright Scholarship, Dr. Alger performed studies at the Tulane University Graduate School Department of Parasitology, New Orleans, Louisiana, USA, and obtained a Master of Science degree in Parasitology in 1992. At the same institution, in 1997 she obtained the Doctor of Philosophy degree supported by the Paul C. Beaver Fellowship and a training grant from the UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases. She obtained the Medical Doctor degree in 1986 at UNAH. Her current interests include parasitic diseases prevalent in Honduras, laboratory diagnosis quality assurance systems, biomedical publication and health research systems.

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Knowledge exchange at national, regional and institution levels

Jaana Puukka, *Finland*
Programme for the International Management of Higher Education (IMHE) OECD, Paris

Summary

Jaana Puukka, OECD analyst, outlines in her presentation how the OECD Reviews of Higher Education in Regional and City Development can be used to evaluate and improve the contribution of higher education to regional innovation, human capital development, social, cultural and environmental development and regional capacity-building. She discusses how universities and other higher education institutions can organize their research and other activities to address local economic and social development needs and argues for a stronger focus in low-income countries (LICs) on broader forms of innovation and for the adaptation of already existing technologies.

Drawing from the MIT study, Puukka identifies four pathways to innovation-led growth which each involve a different role for higher education institutions. She argues that for many non-metropolitan regions, the appropriate strategy is one which allows for incremental change.

Puukka concludes that cities and regions can, with the help of universities and other higher education institutions, play a key role in making countries globally competitive. There is mounting evidence of a positive link between economic competitiveness and investments in human capital development and regional innovation system which

connects higher education institutions, public authorities and business and industry. In order to take full advantage of higher education institutions and their research in local and regional development, there is a need to remove the existing constraints for more responsive knowledge exchange at national, regional and institutional levels.

Biography of Professor Jaana Puukka

Jaana Puukka heads the OECD work on Higher Education and Regional and City Development. She joined the OECD Programme on International Management in Higher Education (IMHE) in 2005 to coordinate and manage the project on "Supporting the Contribution of Higher Education Institutions to Regional Development" which embraced reviews of 14 regions in 12 countries throughout the world. She is now co-ordinating the Phase 2 reviews which reach out to 15 regions in G8 countries and rapidly developing economies. She is the co-author and editor of the OECD publication "Higher Education and Regions – Globally Competitive, Locally Engaged". Jaana Puukka has experience in higher education and regional development in Finland as a national and local government adviser, programme manager, practitioner and evaluator.

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Why is Asia investing heavily in research and development?

Albert Sasson, *Morocco/France*

Summary

In his presentation, Professor Albert Sasson explored the recent trend of heavy investment into research and development (R&D) by Asian countries, Cuba and some Gulf states. He noted that all are recognizing the need for continued progress in research, innovation and development, and different regions are responding to the need in different ways.

In Asia, countries like China, Japan, Korea and Taiwan are greatly increasing the amount of funds being used towards research by billions of dollars. In a positive economic climate, this increased spending should lead to more competitive products by Asian companies competing with Western ones, to the creation of skilled jobs and to a rise in the standard of living. Several of the factors identified from the French Observatory of Science and Technology Report, which indicate whether a country was truly becoming more competitive in the R&D market were, the: (i) number of researchers per 1,000 population; (ii) number of scientific publications by local researchers, and (iii) number of patent applications per country. These, along with the global distribution of students and researchers, all help to illustrate a country's current position in the field of innovation and research and development (R&D).

A second case explored by Albert Sasson was oil-rich countries, such as those in the Gulf Region. Recently, they have been greatly attracted to R&D advancements, but do so for

different reasons than the Asian "Tigers". These states are trying to stay ahead of the world's dependency for oil by researching and creating alternative 'green' energy sources. By partnering with higher education institutions, such as the **Massachusetts Institute of Technology** (MIT), or enlisting world-renown researchers through generous research funding. Countries will be able to reposition themselves as 'energy suppliers' and not just oil suppliers. The move from reliance on natural resources to an aggressive acquisition of knowledge and technology-based industries should ensure the future sustainability of the region and its residents' lifestyles. Here, there is a clear relationship between the advancement of research and a facilitating social context.

The author also presented the case of innovations in biotechnology and public health in Cuba. He noted that due to a wide-scale education of thousands of physicians and a great push for public health care (particularly preventive treatment), a large number of immunologists were trained in scientific/biomedical research and many more scientists work in this area. This has led to Cuba becoming a leader in developing countries for vaccines and other bio-pharmaceutical production. According to Agustin Lage, this is due to the strong "link between research on immunology and public health", which then produces a need for comparatively competent and advanced medical biotechnology. Again, the link between R&D and social context is evident.

In conclusion, Albert Sasson evoked issues surrounding higher education in China and India. These cases are similar in that both countries have populations of over a billion, and thus face enormous challenges of organization and funding due to their sheer scale. But they differ in their approach. China's Confucianism leads to a strong support for the educational process and knowledge acquisition, but the nature of its political leadership regarding control and censorship may conflict with innovation and knowledge expansion. That said millions of Chinese students leave to live and study abroad each year. Indian students generally have easier access to the English language and, thus, their universities may be more competitive for attracting foreign students, linking up with multinational companies and educating researchers who publish in international journals. Though most Asian countries are responding to the challenges of innovation, globalization and the R&D gap in their own fashion and according to their social context; continued financial investment is needed, as well as a willingness to share technology and to be open to innovations to ensure their competitiveness globally.

Biography of Professor Albert Sasson

Albert Sasson (Morocco) holds an Aggregation degree and a doctorate in the Natural Sciences from the University of Paris. He is a Senior Visiting Professor at the United Nations University Institute for Advanced Studies (UNU/IAS) and an international consultant in scientific matters to, *inter alia*, UNCTAD, FAO, the European Commission and UNESCO. He is a founding member of Morocco's Academy of Science and Technology. From 1979 to 1999, he held several high level posts at UNESCO and was named Assistant Director-General for Programming and Evaluation in 1993. Professor Sasson has published widely on scientific issues as microbiology, biotechnologies and development.

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Research and information technology connectivity: Opportunities for innovation and issues for Africa

Olusola Oyewole, *Nigeria*
Coordinator, mobilizing regional capacity initiatives
Association of African Universities (AAU), Accra, Ghana

Summary

In the thematic of "Research and Information Technology Connectivity", the case study of Africa illustrates the importance of knowledge as a critical element for sustainable development. As presented by Olusola Oyewole, Africa has known a long period of neglect and stagnation, relegating Research to a minor status.

Nowadays a key element in Higher Education, Information and Communication Technology (ICT) infrastructures have yet to be developed throughout the African Continent, where Internet access remains too expensive and the bandwidth management has to be redefined. Alongside the connectivity challenge, persist other barriers that rein in the solidification of Research platforms, such as:

1. Poor human resources (constantly menaced by brain drain).
2. Inadequate power and water supply.
3. Policy and regulatory process which is not always conducive to the immediate necessities.
4. A lack of research networks (isolating research entities from the global development process).

In conclusion, some proposals were brought up to outface the ongoing challenges. It is in the best interest of the Region to instigate and install research and educational collaborations. The improvement of the information technology connectivity will allow educational networks to share database and reports, motivating the creation of multinational and transdisciplinary institutions.

Connectivity being severely affected by the power generation, urgent measures in this matter should be taken to – if not resolve – better the electricity supply. Institutional leadership has to be taken into consideration, when developing education policies, in order to regulate the transforming Higher Education and Research environment. This evolution has to be supported by improved 'fundraising for research', perhaps even seeking to diversify its sources.

Biography of Professor Olusola Oyewole

Olusola Oyewole is a professor of Food Microbiology at the University of Agriculture, Abeokuta, Nigeria. He has served as the Head of the Department of Food Science and Technology from 1992 to 1999 and as the Director of the Research and Development Centre

of the University of Agriculture, Abeokuta. As a food microbiologist, Professor Oyewole is involved in many research activities into the fermentation processing of cassava. He is a scientific adviser to the International foundation of science, in the area of Food Science. He has served as a Consultant to the Food and Agricultural Organization (FAO) of the United Nations. Within the past two years, Professor Oyewole has moved over to the Association of African Universities as a Project Officer for Research and Programmes and the Coordinator of the quality Assurance Support Programme for African Higher Education systems.

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Africa: Current CIT situation Viewpoint

Diem Ho, *Viet Nam*

Summary

This presentation provided a private sector viewpoint on the current situation of CIT in Africa including its role in academic research where potential is growing although serious CIT discrepancies continue to exist within the region. For example, while over 18 per cent of South African households have a working fixed line telephone, the figure for Uganda is only 0.3 per cent and 1.8 per cent for Cameroon. In contrast, mobile phone ownership is increasingly common (e.g. Ghana 59.8 per cent, 52 per cent Kenya, 41.7 per cent Cote d'Ivoire, 25.7 per cent Mozambique) and can facilitate diverse leapfrog operations in terms of access to knowledge. Yet, despite ongoing problems of bandwidth, cost and sustained connectivity, opportunities for significant progress are evident and private sector CIT companies play a major role in this area. For Africa to benefit from its rich natural resources, its Knowledge Economy must grow much stronger. Skills development for young people and stronger CIT infrastructure, including using the benefits of wireless connection, are essential in this regard. In each of these areas, innovative opportunities are already, *inter alia:* mentoring internships and training programmes for students sponsored by CIT companies, linking national economic strategies to CIT infrastructure investment plans, distance learning and health care management *via* CIT.

With specific reference to research, IBM has provided support to academia through projects such as its Academic Initiative which makes free software available to universities, the creation of a mentoring programme entitled Makocha Minds to link top technology specialists with students in nineteen universities in eight countries, and the launching of Africa's first Cloud Computing Centre and the first High Performance on Demand Solutions Lab (HiPODS) at the African Innovation Centre.

However, for sustained success, this potential must be realized and underpinned by a *Research and Innovation Eco-system* which illustrates the linkages amongst social and economic challenges, sound governance structures, the involvement of key stakeholders and the identification of achievable goals. (i) Quality; (ii) Relevance and (iii) Sustainability are the three vital criteria for the optimal operation of this system, whatever the region concerned.

Biography of Professor Diem Ho

Diem Ho is Manager of University Relations for IBM Europe, Middle East and Africa (EMEA). He manages IBM University Relations in EMEA relating to skills development, technology access and collaborative research. Diem's past research interests covered Science, Technology and Finance/Economics fields. He has published in physics, mathematics, image processing, remote sensing, engineering, optimization and finance. He is an associate editor of the journal of Computational Economics and is a member of the IBM Academy of Technology. Before assuming his current position, he was an EMEA practice leader with the IBM Management Technologies Consulting Group. Diem graduated from Stanford University with two Master degrees and a Ph.D. in Magnetospheric Physics.

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Aspects in higher education, research and information technology capacity in Europe: the case of Romania

Florin Popentiu, *Romania*

Summary

Developing the subject of Information Technology within the Research process, Professor Florin Popentiu illustrated the present Western European situation, with the case study of Research in Romania.

Following the present IT boom, Romanian Higher Education entities have focused on the integration of an *e-approach* to the learning and teaching systems. Among the different institutions working for Research in Romania, were presented, the:

- National Authority for Scientific Research.
- Romanian Office for Science and Technology (It supports the cooperation between industrial & service companies).
- National University Research Council (Its mission is to consolidate and develop the scientific research in HE system).
- Sectorial Operational Programme for Human Resources Development (SOP HRD) that aims developing the human capital.

In order to exploit these new resources, it is vital to embrace an international approach in the use of these new tools.

Adopting this global strategy, the University of Oradea, where resides the UNESCO Chair, has consistently stimulated partnerships with European universities. The fields developed are ICTs, distance and continuing education and computer-based learning.

(http://portal.unesco.org/education/en/ev.php-URL_ID=3021&URL_DO=DO_TOPIC&URL_SECTION=201.html)

In the same order, NATO Collaborative Linkage Grants (CLGs) provide opportunities for collaboration on research projects to members of research teams in universities or research institutions in countries of the Euro-Atlantic Partnership Council and the Mediterranean Dialogue.

Some other feature study cases were analysed such as the **Doctoral School of the University of Oradea** (founded by SOP HRD), the **CampusNet**, developed by the Technical University of Danemark-IMM, and the **ATHENS Network**, that includes fifteen prestigious universities.

The cross-integration of IT is definitely the most important challenge that Higher Education and Research face presently.

Biography of Professor Florin Popentiu

Florin Popentiu is professor of **Software Engineering** and UNESCO Chairholder in "Information Technologies" at University of Oradea, in Romania. Also he is associated **professor** at **University "Politehnica" of Bucharest**.Currently he is Visiting at a number of renowned European technical universities, such as TELECOM Paris Tech (**ENST**), **ETH** in **Zürich**, Technical University of Denmark (DTU), ENSTA, Paris, Tech and City University, London. His research interests center on software safety and reliability, the fields in which he is Ph.D. Supervisor. Professor Florin Popentiu has published over 100 papers in International Journals and Conference Proceedings. He has worked for many years on problems associated with software reliability and has been Co-Director of two NATO research projects, involving collaboration with partner institutions throughout Europe. Also he is an expert for the **Seventh Framework Programme-FP7**.

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Part 4 Agenda of topics

Thursday, 19 March 2009

Global keynote address and viewpoints:
Research in diverse social contexts: tensions, dynamics and challenges

Presentation and viewpoints:
Template proposed by the UNESCO Forum Special Initiative project "Mapping Research Systems", notably Indicator 10: Tensions, Dynamics and Challenges

Discussion

Friday, 20 March 2009

Theme 1: **Current governance trends and implications for research including research universities**
Viewpoints and discussion

Theme 2: **Research imperatives for emerging economies**
Viewpoints and discussion

Theme 3: **Organizing research in challenging geographical contexts**
Viewpoints and discussion

Saturday, 21 March 2009

Theme 4: **Research systems and specific challenges for social development: (Outreach to key social partners, multiculturalism, changing demographics)**
Viewpoints and discussion

Theme 5: **Research and information technology (IT) connectivity: (i) Opportunities for innovation. (ii) Issues for Africa.**
Examples from the private sector, Africa and Central Europe
Viewpoints and discussion

Final conclusions and recommendations

Farewell remarks

All full presentation papers/powerpoints to be found on UNESCO Forum Website

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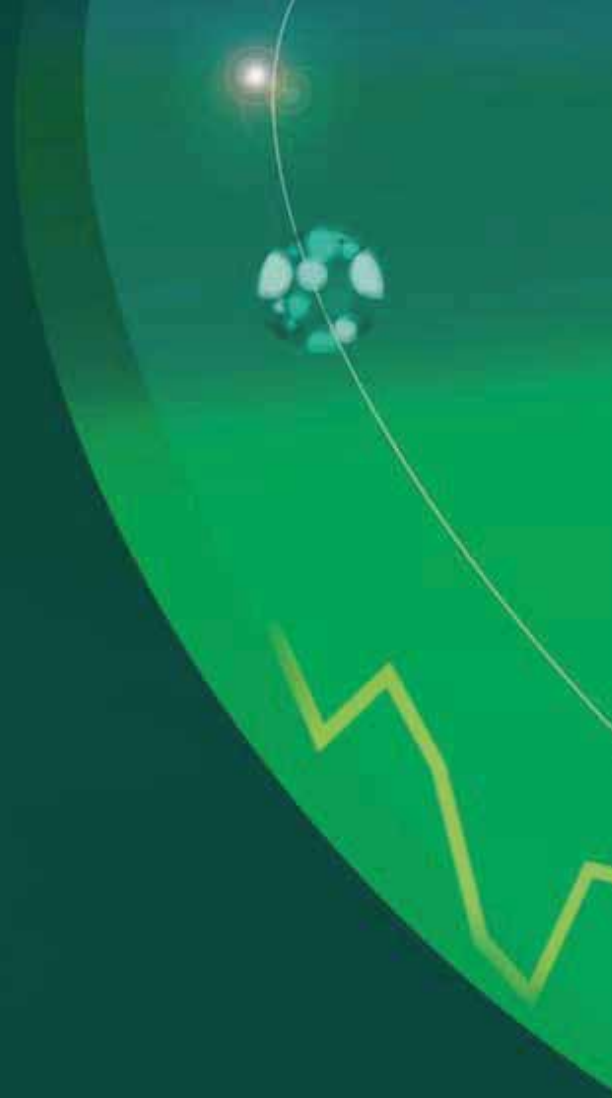


INTERNATIONAL PERSPECTIVES ON RESEARCH IN DIVERSE SOCIAL CONTEXTS FROM:

Finland /OECD

France

Germany

Honduras

Ireland

Italy

Malaysia

Morocco

Nicaragua

Nigeria /AAU

Romania

Rwanda

Sweden

Trinidad and Tobago

Tunisia

Vietnam

USA

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

Organising research in challenging geographical contexts:

What can we learn from the OECD reviews of HE in Regional Development?

Research and Knowledge
Research in Diverse Social Contexts – Tensions, Dynamics and Challenges
Paris, 20 March 2009

Jaana.Puukka@OECD.org

Contents

- OECD reviews of HE in regional and city development
- 4 Pathways to Innovation
- How to organise research and mobilise HE for local and regional development and innovation: Good practice examples
- Limitations and Barriers
- Pointers for the future: for government, regions and universities

With globalisation, the comparative advantage of regions that can create the best conditions for growth and development is increasing.

...High technology companies, once tied to their locations, can now move their production to anywhere in the world.

... but to stay competitive, key parts of their operations need to be based in knowledge and innovation-intensive regions .....

Innovation is vital for social and economic development not only in the OECD countries but also in developing economies

To Be Globally Competitive Countries Need to Invest in their Innovation Systems

not only at the National, but also Regional level

... Universities and other HEIs can play a key role in Regional Innovation Systems and Human Capital Formation.....

Large emerging economies are mobilising foreign direct investment, trade and human capital to transform universities into engines for technology-based innovation...

Low income developing economies face difficulties due to poor framework conditions and limited human and social capital for producing, disseminating and using knowledge

Focus on broader forms of innovation in low tech and non-tech fields;

and on the adaptation of existing technologies to address local social and economic needs

OECD work on HE and regions

Timeline	Project	Outputs
1996-1999	OECD/IMHE project: *The Response of Higher Education Institutions to Regional Development*	Case studies, good practice examples, knowledge dissemination conferences
2004-2007	OECD IMHE/GOV activity: Supporting the Contribution of HEIs to Regional Development *Higher Education and Regions – Globally Competitive, Locally Engaged*	14 regional reviews, capacity building, recommendations to HEIs and national and regional governments
2008-2010	OECD activity in collaboration with the World Bank : HEIs in Regional Development	A set of reviews (15) in strategically important countries; Knowledge sharing and policy making meetings; int'l benchmarking Robust evidence base*

*OECD Metropolitan Database and Regional Economic Growth Model

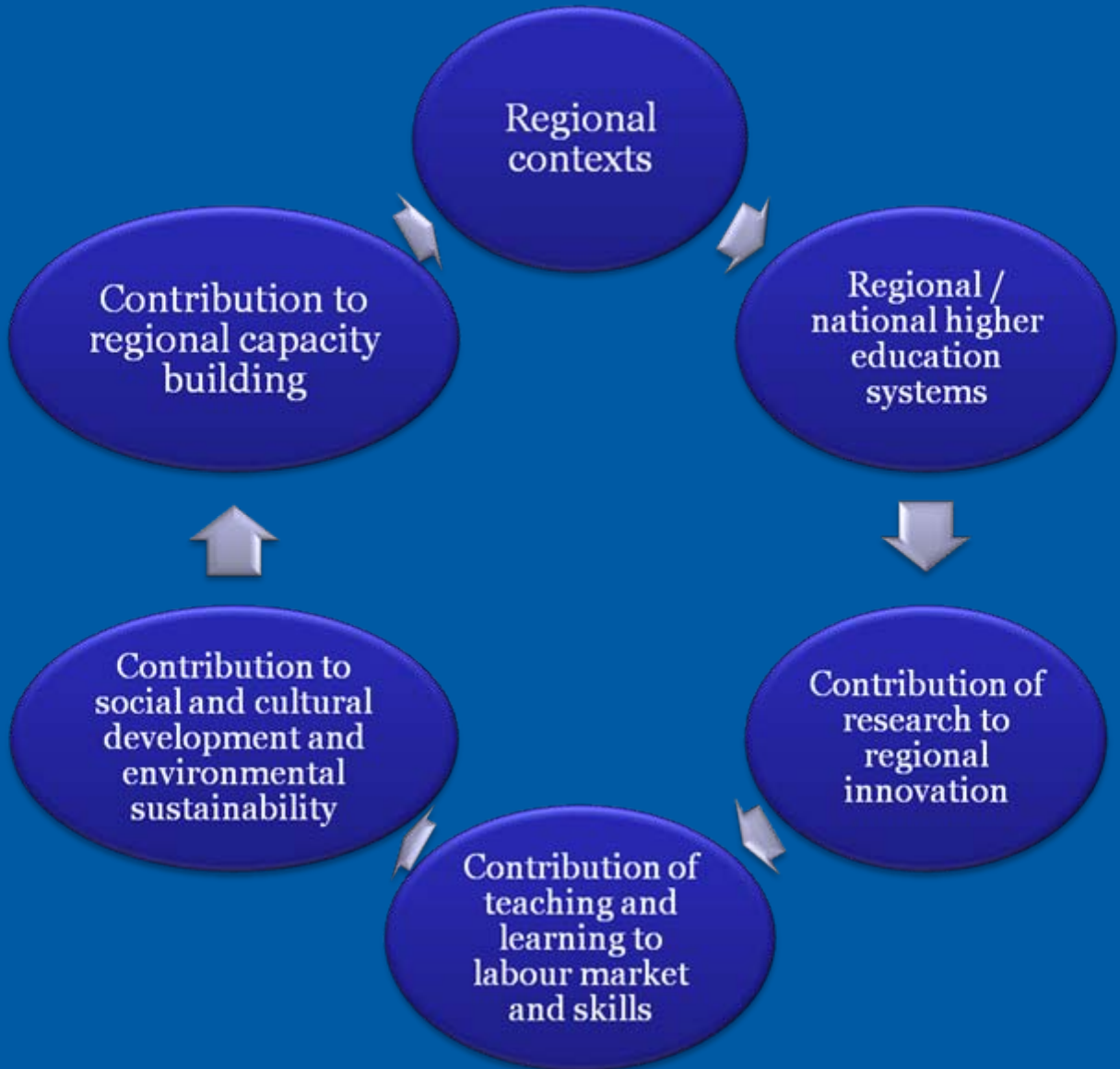
OECD reviews of HE in regions development: why

Respond to initiatives across OECD to mobilise higher education in support of regional development

Synthesise experience into a coherent body of policy and practice to guide HEIs and regional and national governments

Provide opportunities for dialogue and assist in capacity building in each country, region and HEI

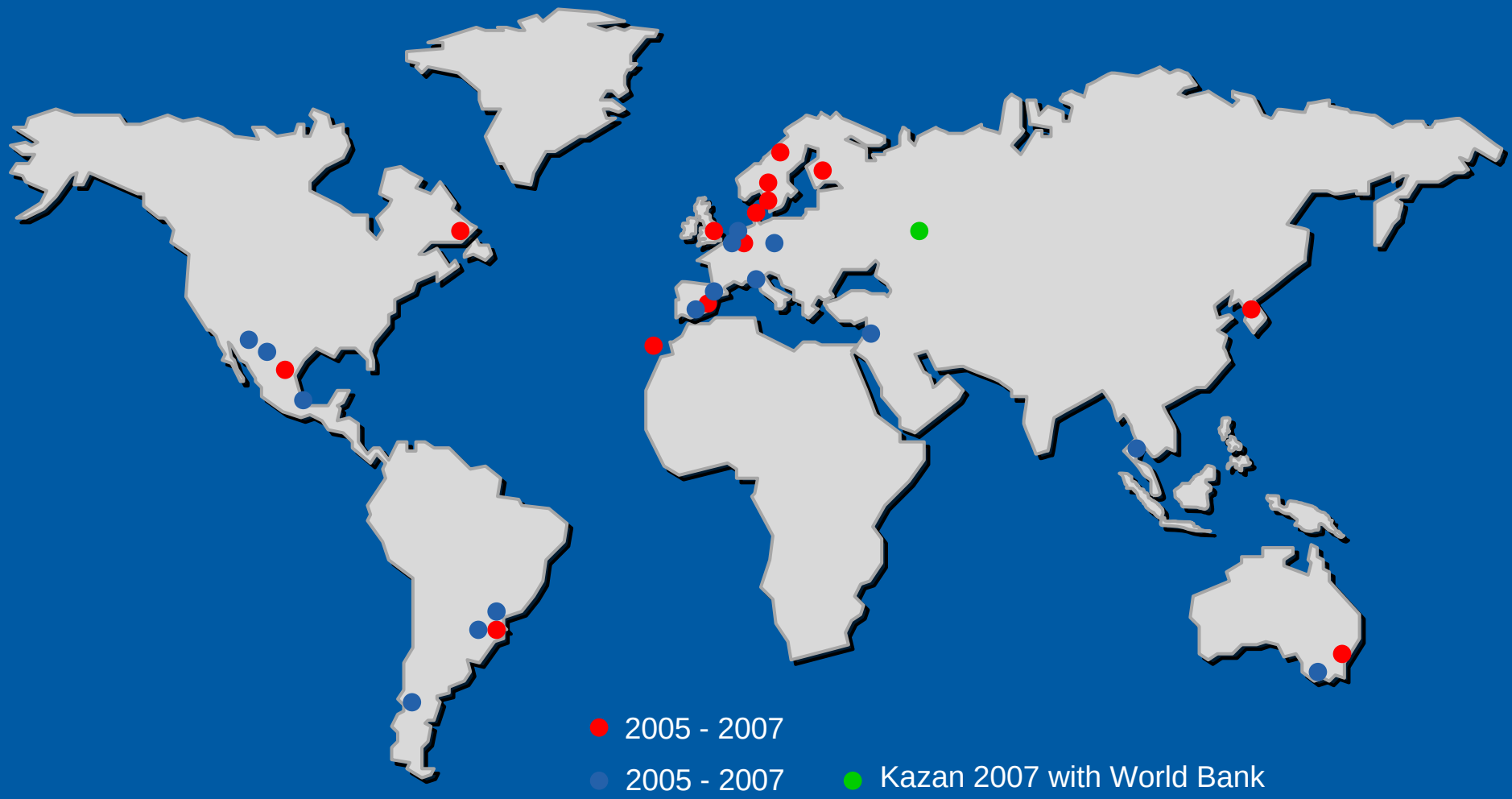
Focus of reviews: what



Review methodology: how

- Self-evaluation report lead and owned by the regional Steering Committee using OECD guidelines
- Visit by international peer review team
- Peer Review Report tailored for the region
- Analysis and synthesis by OECD
- Dissemination of outcomes

Regions under review



Good practice and activity… but

- Most countries invest in making universities engines for high tech-based innovation: policy focus on few high technology fields.

  - But low tech and non-tech fields innovate too.
  - 70% of OECD workforce is in the service sector; In developing countries adapting technologies to address local social and economic development needs may bring more sustainable results.

- Only few universities have gained income through patents and commercialisation: Open science could enhance innovation by reducing the costs of knowledge transfer

  - Human capital development is the key. Students and graduates can engage in “knowledge transfer on legs”

Innovation-led Growth: 4 Pathways (MIT)

Indigenous creation of new industry	Exogeneous creation of new industry	Diversification of existing industry into new	Upgrading existing mature industry
- Create entirely new industry	- Import new industry to the region	- Use the core technologies of an existing and declining industry	- Enhance products, services or production technologies

How to organise research
And mobilise HE
for local and regional development and innovation

Some good practice examples

…adaption of existing technologies can create local gateways to local companies..

In Castellon, Valencia, Universidad Jaume I is recognised as a world leader R&D in the tile industry.

It has helped to transform the region's traditional industry. The growth is built on technology transfer, spin-offs and upgrading of existing technologies.

- Today, Valencia is a global leader in the tiles and ceramics industry.

Source: the Review of Valencia Region

.Localising the learning process to engage students into "knowledge transfer on legs"

In Aalborg University, Denmark, up to 50% of the study work consists of problem-oriented project work: students work in teams to solve problems which have been identified in co-operation with firms, public organisations and other institutions.

At any one time there are 2000-3000 ongoing projects that ensure the university's engagement with the surrounding society.

Source: the review of Jutland-Funen

…Creating a one-stop-shop for industry contacts

In the North East of England, the 5 universities have set up Knowledge House to help companies access university skills, expertise and specialist services. KH offers expert solutions for developing ideas and solving problems through collaboration, consultancy, training and R&D.

It receives 1000 enquiries from companies and delivers around 200 contracts every year. Business growth is 25%. The cradle-to-grave service stretches from the receipt of enquiries to delivery and post-completion evaluation.

Source: review of NE England

Limitations and Barriers

National	Regional	Inside HEIs
Uncoordinated HE, S&T and territorial policy	Fragmented local govs, weak leadership	Weak management, lack of entrepreneurial culture
Limits to HEIs' autonomy	Intraregional and interinstitutional competition	Tensions between regional engagement & academic excellence
Limited incentives to HEIs	HEIs not part of strategy work and implementation	Lack of incentives to individuals

Pointers for governments

- Make regional engagement explicit in HE legislation
- Strengthen institutional autonomy (human, financial and estate resources) and provide funding incentives
- Develop indicators and monitor outcomes
- Require HEI governance to involve regional stakeholders; Encourage the participation of HEIs in regional governance
- Support collaboration between HEIs and mobilise resources for joint regional and urban strategies
- Provide a more supportive environment for university-enterprise co-operation
- Focus on human capital development

Pointers for regional authorities

- Establish a permanent partnership structure of key stakeholders from local and regional authorities, business and industry, the community and higher education

- Mobilise the resources of HEIs in the preparation and implementation of regional and urban strategies

- Invest jointly with HEIs in programmes which bring benefit to regional business and community

Pointers for HEIs

- Map external links; Carry out a self- evaluation of institutional capacity to respond to regional needs
- Revisit institutional mission to adopt a wide agenda of regional engagement; Deliver regional engagement through the core missions of teaching and research;
- monitor results
- Develop senior management teams, Establish a regional development office to mainstream the regional agenda; Develop facilitators
- Review recruitment, hiring and reward systems.
- Establish partnership organisations between HEIs

New round of reviews now going on 2009-2010

Focus on City-Regions and rapidly developing economies:

Bío Bío Region (Chile), Campinas Metropolitan Region and State of Paraná (Brazil), Paso del Norte Region (US-Mex), Veracruz (Mexico), Penang (Malaysia); Southern Arizona (US); State of Victoria (Australia) and European City-Regions...

www.oecd.org/edu/higher/regionaldevelopment

For all review reports
and
information on reviews in 2008-2010
see

www.oecd.org/edu/higher/regionaldevelopment

or
Contact

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Aspects on Higher Education, Research and IT Capacity in Europe

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UNESCO Forum Research and Knowledge
Research in Diverse Social Contexts: Tensions, Dynamics and Challenges
International Experts' Workshop, **UNESCO Paris , 19-21 March 2009**

Contents

- Introduction
- Research and national innovation systems
- Strategic international cooperation
- Case studies
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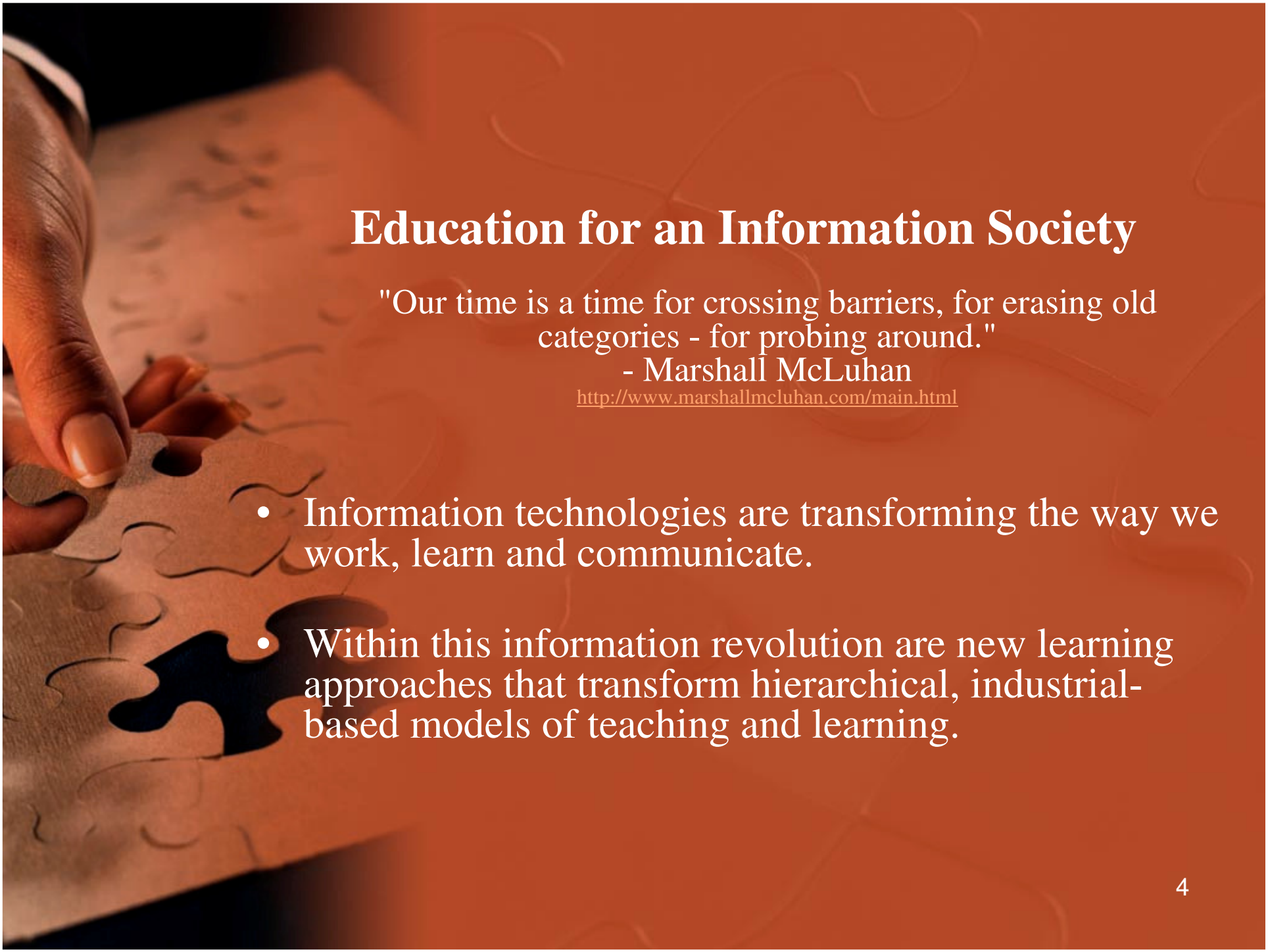
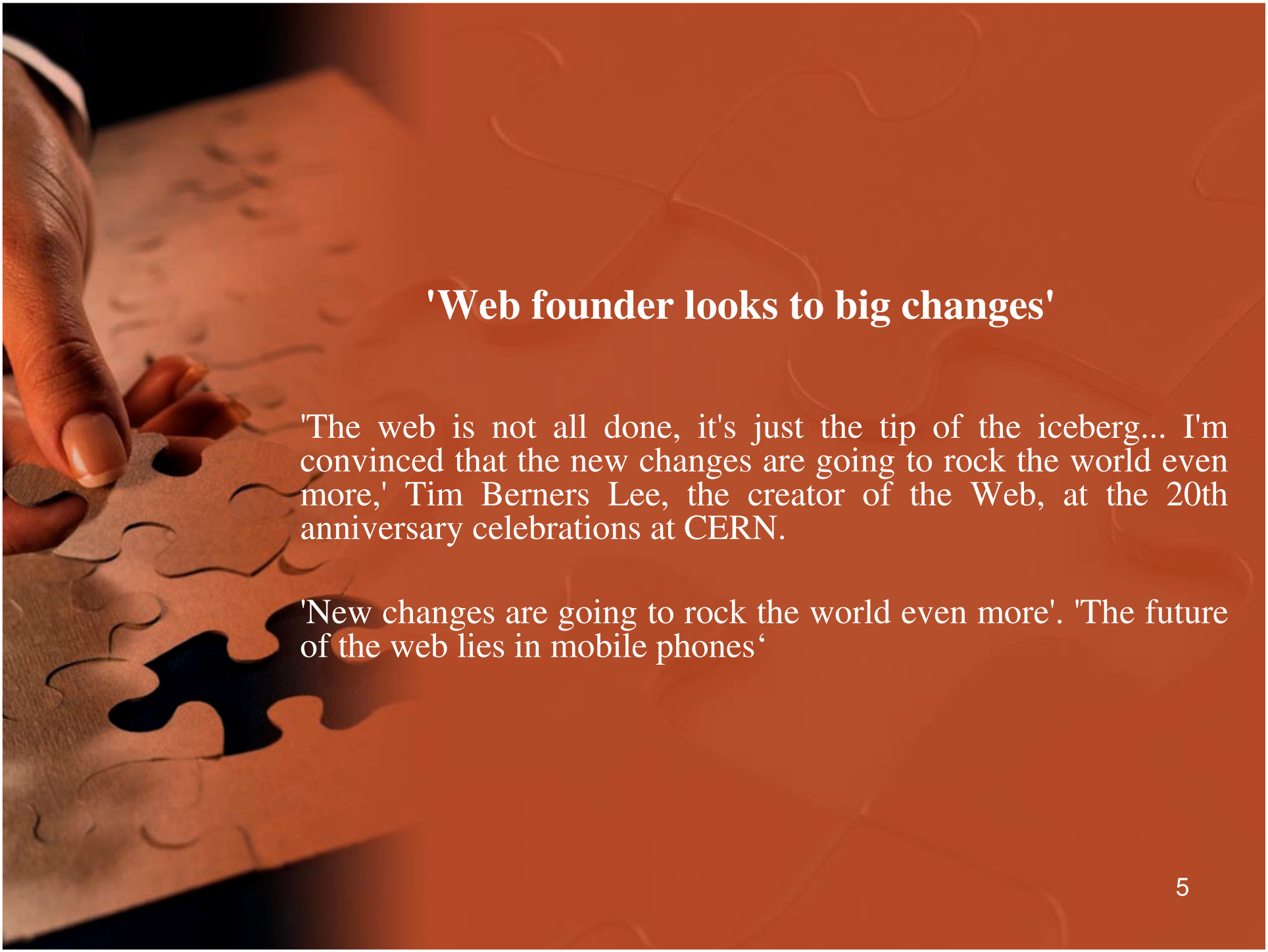


Education for an Information Society

"Our time is a time for crossing barriers, for erasing old categories - for probing around."
- Marshall McLuhan
http://www.marshallmcluhan.com/main.html

- Information technologies are transforming the way we work, learn and communicate.
- Within this information revolution are new learning approaches that transform hierarchical, industrial-based models of teaching and learning.



'Web founder looks to big changes'

'The web is not all done, it's just the tip of the iceberg... I'm convinced that the new changes are going to rock the world even more,' Tim Berners Lee, the creator of the Web, at the 20th anniversary celebrations at CERN.

'New changes are going to rock the world even more'. 'The future of the web lies in mobile phones‘

- Introduction
- Research and national innovation systems
- Strategic international cooperation
- Case studies
- Conclusions

National Authority for Scientific Research (NASR)

ANCS
Autoritatea Nationala pentru Cercetare Stiintifica

SEARCH
Advanced search

About NASR | Research System | Research Policy | Programmes | Legislation | Support | Info

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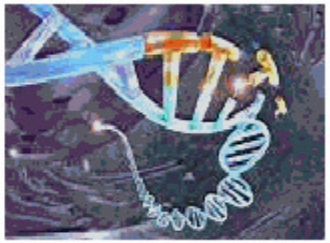
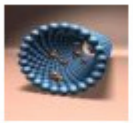
traffic RANKING

The rationale to establish the **National Authority for Scientific Research** emerged from the requirement to promote the development of the knowledge-based society. Given the relative large gap in research and technology development between Romania and the EU average, NASR assumed the mission to act as the executive manager of the Romanian government's decision to rapidly increase the public support for RTD towards the Lisbon "Three Percents for RTD" ambitious goal.



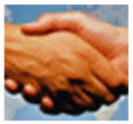
SCIENCE COMMUNITY UPDATES

- The National R&D System
- National R&D Policy (including the CRIC Report 2007)
- IST-FP6 Projects with Romanian partners
- The Central Registry of Potential COntractors in RTD (only in romanian)



TECHNOLOGY TRANSFER
The new TT website of the ANCS

ROST
Romanian Office for Science and Technology



RESEARCH JOBS
http://www.mct.ro/jobs
http://www.eracareers.ro

LINKS
The ANCS collection of links...

Romanian Government - Ministry of Education and Research
National Authority for Scientific Research - 2005

Terms of use

http://www.mct.ro/index.php?&lang=en

Romanian Office for Science and Technology (ROST)

Mission

- to promote the efficient participation of the Romanian research community in the EU R&D programmes;

- to introduce Romanian research, development and innovation policies and the S&T potential to the organizations concerned;

- to support and promote the co-operation between the industrial and service companies, universities and research institutes, in order to participate in European R&D consortia;

- to stimulate the setting-up of interest groups at the European level, by focusing on the existent competencies at the national level, in order to increase their chances to participate in European projects/programmes.

National University Research Council (NURC)

NATIONAL UNIVERSITY RESEARCH COUNCIL

MINISTRY OF EDUCATION AND RESEARCH

THE NATIONAL UNIVERSITY RESEARCH COUNCIL

17 March 2009

ABOUT NURC

GRANTS

SCIENCE POLICY

RESEARCH CENTERS

MURC

EVENTS

USEFUL LINKS

SITE MAP

CONTACT

The Reform Program of Higher Education and University Research RO-4096

1 Schitu Magureanu Street, Sector 5, Code 76626, Bucharest, Romania

The National University Research Council is the main Romanian funding organisation for university and postgraduate research programmes.

Decided by the Ministry of National Education and approved by the Romanian Government, the creation of the National University Research Council in late 1994 represented an essential component of the ongoing reform of the higher education reform. [...]

The mission of the current programmes run by the National University Research Council

Consolidating and developing scientific research activities in the Romanian higher education system.

Providing funds for the development of a new generation of researchers in the Romanian academic education, and highly trained professionals. [...]

Management and Research Administration Days

News

Call for Evaluators

Winner list NWO Pilot Fellowship program Romania

The Journal of Science Policy and Scientometrics

10th Annual EARMA Conference 2004

http://www.cncsis.ro/English/home.php

The National University Research Council (NURC) is the main Romanian funding organisation for university and postgraduate research programmes.

The mission of the current programmes:

- Consolidating and developing scientific research activities in the Romanian higher education system.

- Providing funds for the development of a new generation of researchers in the Romanian academic education, and highly trained professionals. [

SOP HRD - Sectoral Operational Programme for Human Resources Development

http://www.fseromania.ro/index.php?option=com_content&task=blogcategory&id=6&Itemid=11

What is Sectoral Operational Programme for Human Resources Development (SOP HRD)?

- The Member States and European Union regions have access to the European Social Fund within a seven year programming period.

- The Member States elaborate operational programmes which are implemented by socio-economic actors.

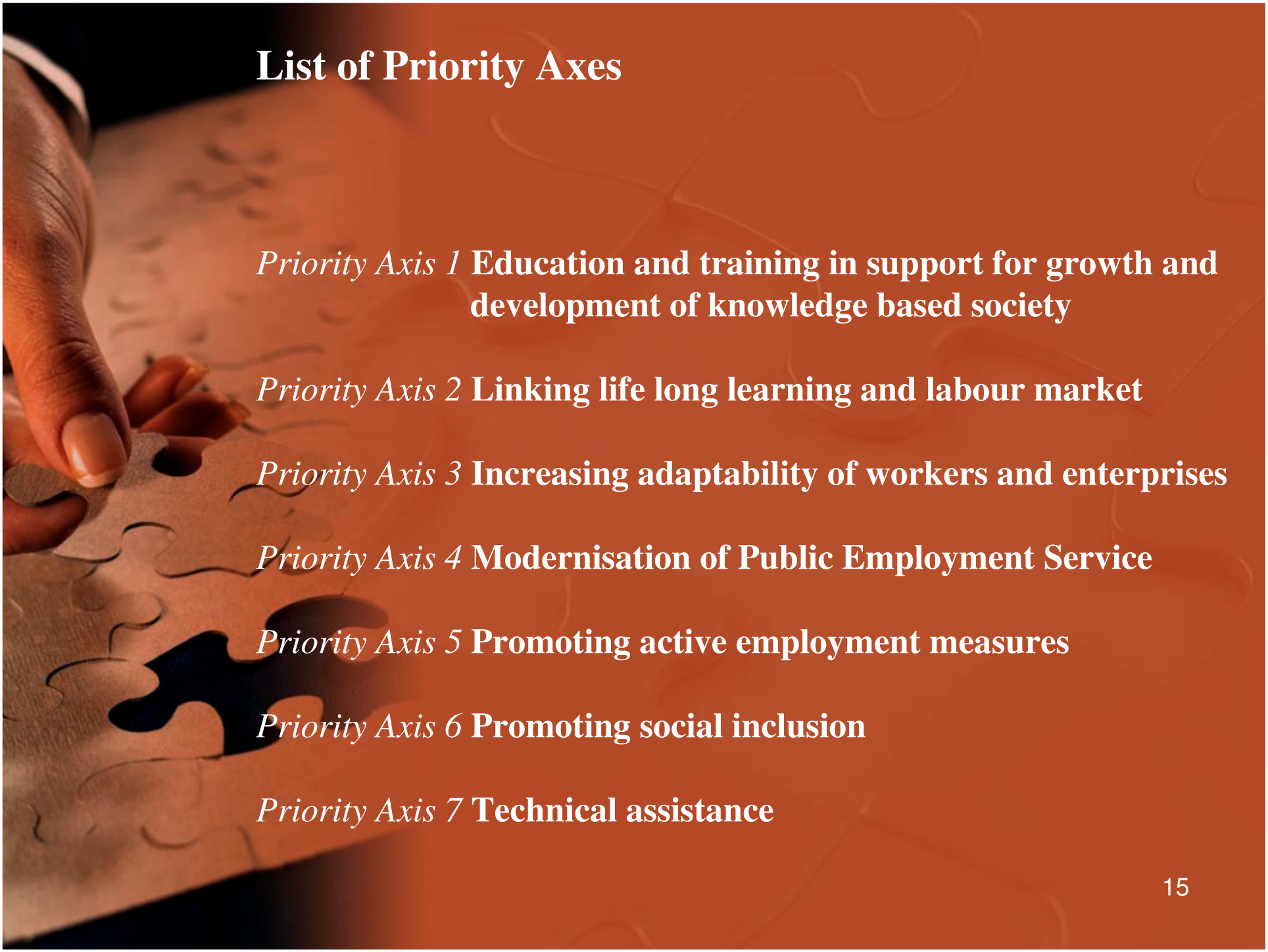
- The Sectoral Operational Programme for Human Resources Development 2007-2013 has been elaborated in a large partnership process.

http://www.fseromania.ro/index.php?option=com_content&task=blogcategory&id=6&Itemid=11

Which are the SOP HRD objectives?

- The development of human capital and increasing competitiveness, by linking education and lifelong learning with the labour market and ensuring increased opportunities for future participation on a modern, flexible and inclusive labour market for 1,650,000 people.

http://www.fseromania.ro/index.php?option=com_content&task=blogcategory&id=6&Itemid=11



List of Priority Axes

Priority Axis 1 **Education and training in support for growth and development of knowledge based society**

Priority Axis 2 **Linking life long learning and labour market**

Priority Axis 3 **Increasing adaptability of workers and enterprises**

Priority Axis 4 **Modernisation of Public Employment Service**

Priority Axis 5 **Promoting active employment measures**

Priority Axis 6 **Promoting social inclusion**

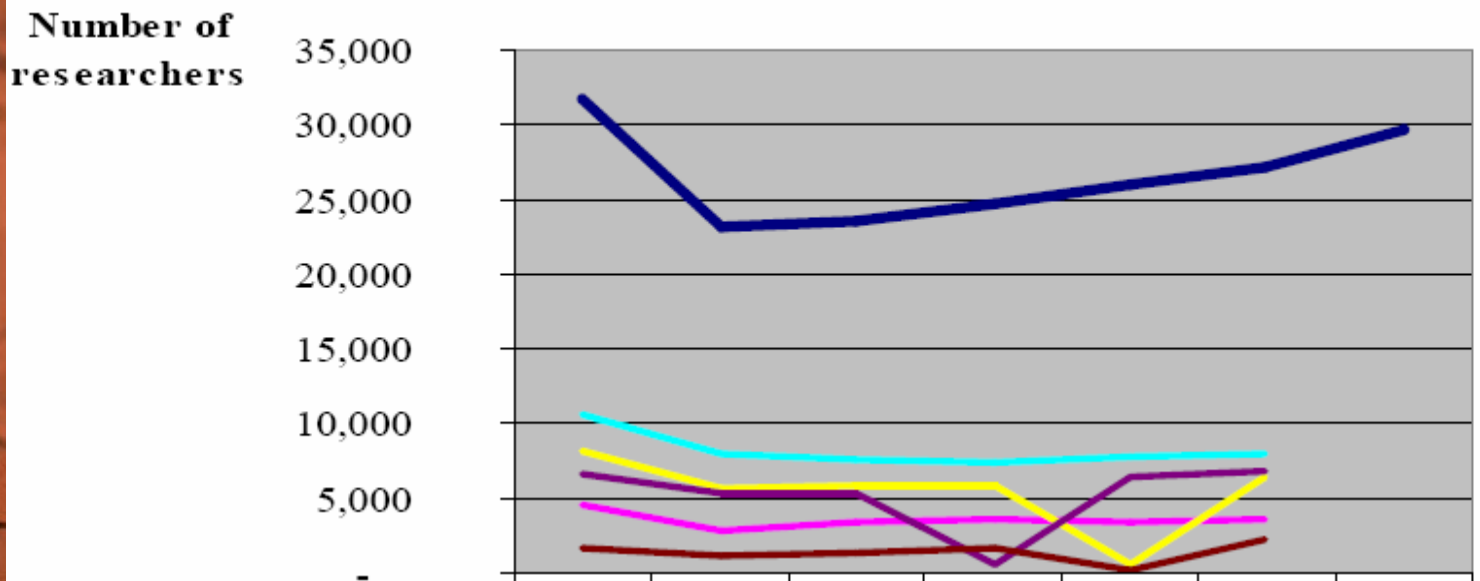
Priority Axis 7 **Technical assistance**

Priority Axis 1 Education and training in support for growth and development of a knowledge based society

Priority Axis	Key Areas of Intervention
1. EDUCATION AND TRAINING IN SUPPORT FOR GROWTH AND DEVELOPMENT OF KNOWLEDGE BASED SOCIETY	1. Access to quality education and initial VET; 2. Quality in higher education; 3. Human resources development in education and training; 4. Quality in CVT; 5. Doctoral and post-doctoral programmes in support of research.

http://www.fseromania.ro/index.php?option=com_content&task=blogcategory&id=6&Itemid=11

Researchers by age groups



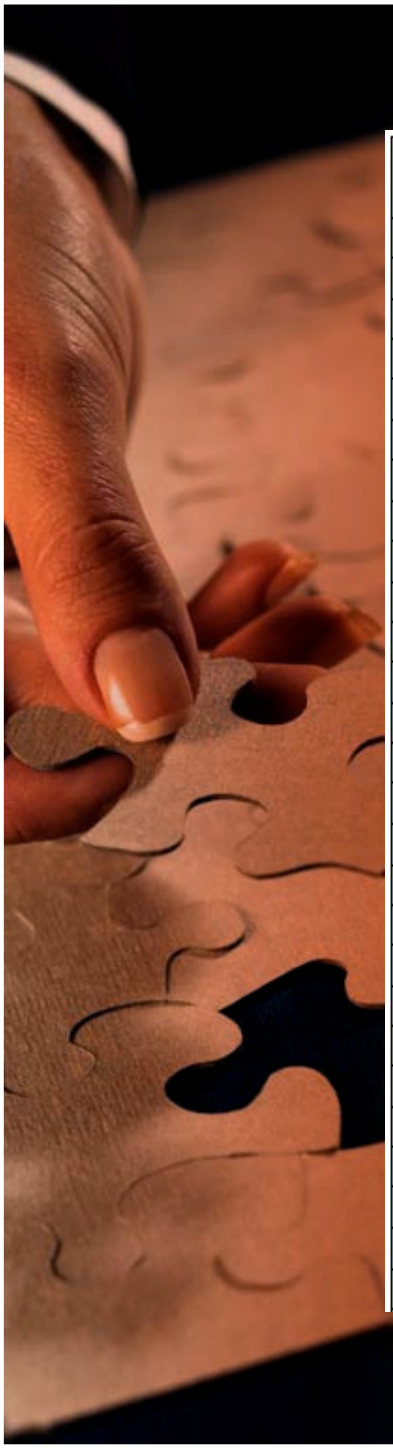
	1996	2000	2001	2002	2003	2004	2005
Total	31,783	23,179	23,597	24,636	25,968	27,253	29,608
<30 years	4,647	2,916	3,381	3,566	3,506	3,536	
30-39 years	8,201	5,706	5,835	5,925	611	6,505	
40-49 years	10,699	8,028	7,677	7,492	7,768	8,022	
50-59 years	6,575	5,337	5,353	601	6,444	6,883	
60 abd over	1,661	1,192	1,351	1,643	214	2,307	

Source: NIS, 2005

Researchers by age groups new structure 2005

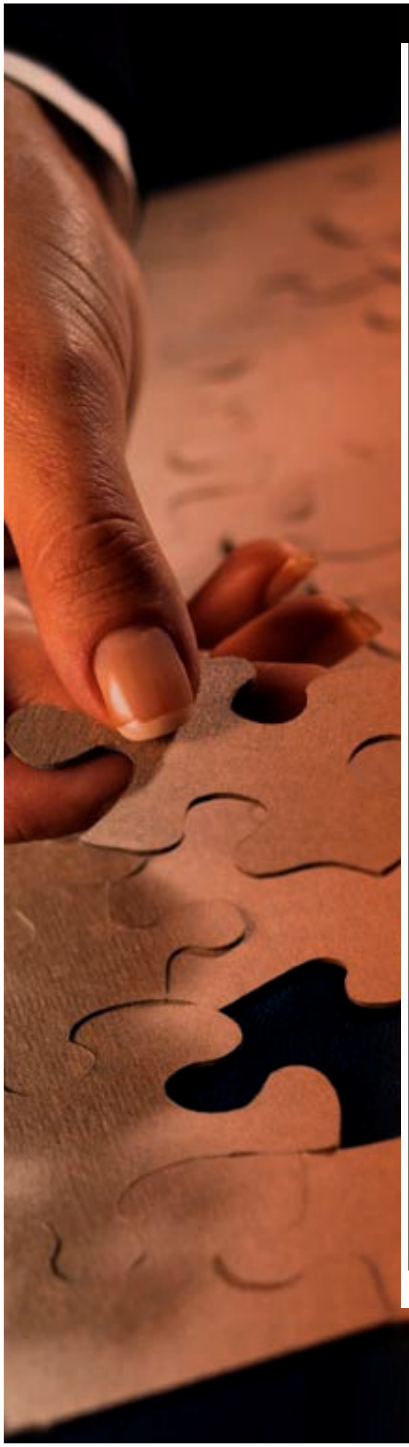
	2005	
	total	%
Number of researchers out of which:	**29,608**	**100**
Up to 25 years old	904	3.1
25-34 years old	6,198	20.9
35-44 years old	7,053	23.8
45-54 years old	8,766	29.6
55-64 years old	5,583	18.9
+ 65 years old	1,104	3.7

Source: NIS



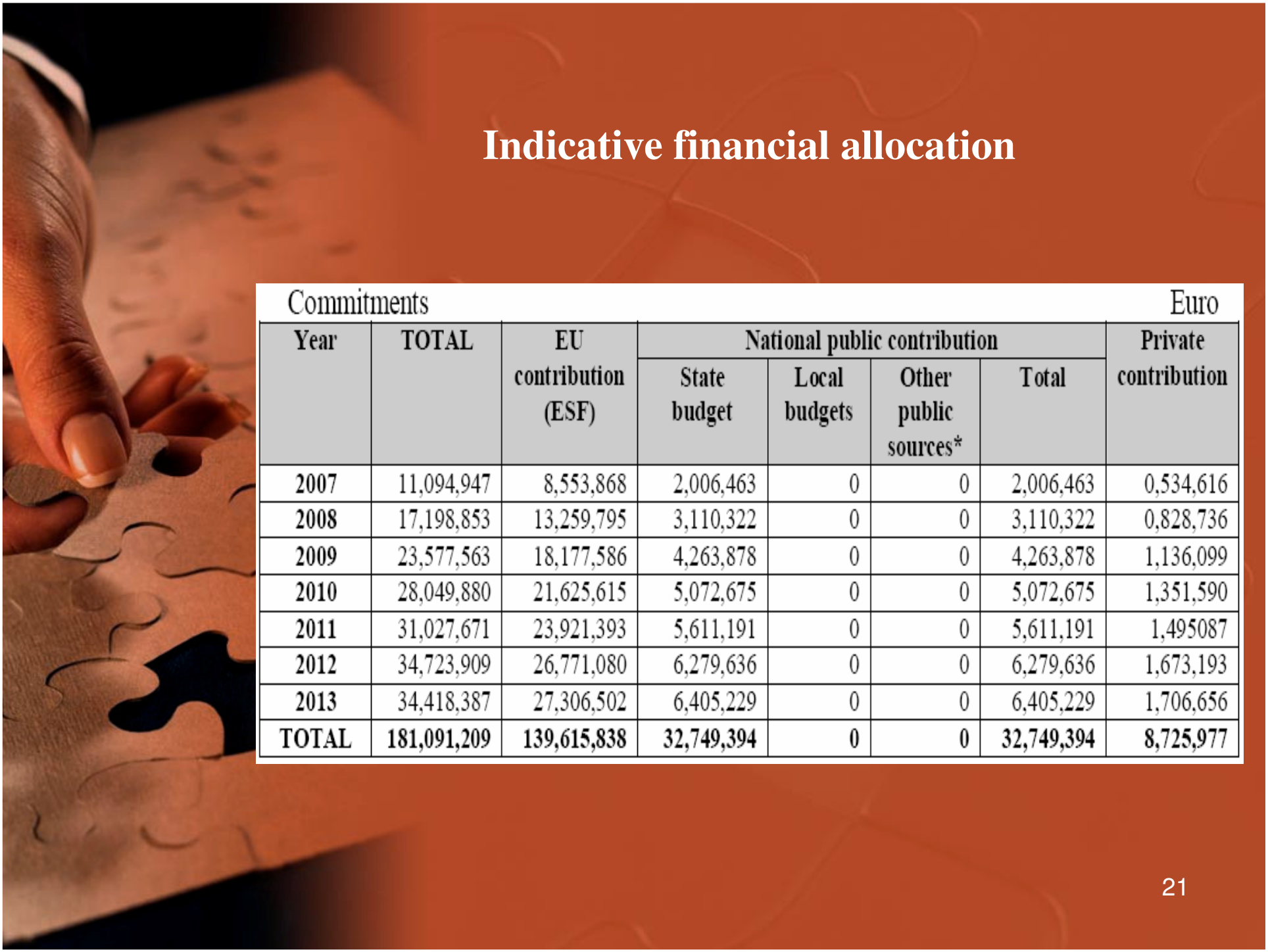
Doctoral graduates (PhD)

Fields	2001-2003	2004	2005	Total
Mathematics	149	83	47	**279**
Physics	193	49	36	**278**
Chemistry	212	83	53	**348**
Chemical engineering	127	53	48	**228**
Engineering	100	50	29	**179**
Biology	172	53	72	**297**
Ecology	4	6	3	**13**
Geography	65	63	37	**165**
Geology	70	29	16	**115**
Philosophy	103	60	62	**225**
Language	427	172	208	**807**
History	187	111	70	**368**
Educational Sciences	84	27	25	**136**
Psychology	86	33	23	**142**
Sports	73	27	34	**134**
Sociology	70	20	34	**124**
Political sciences	8	2	9	**19**
Communication sciences	0	1	1	**2**
Law	248	121	91	**460**
Administration	0	0	0	**0**
Visual arts	17	13	28	**58**
Music	88	82	100	**270**
Theatre	41	20	14	**75**
Cinematography and media	12	14	1	**27**
International business and economics	65	28	32	**125**
International economics and European studies	0	0	1	**1**
Economics	205	89	90	**384**



Cybernetics	100	39	38	**177**
Finance	82	18	28	**128**
Accounting	94	59	49	**202**
Management	114	107	56	**277**
Marketing	20	21	13	**54**
Medicine	1150	476	405	**2031**
Dentistry	95	34	38	**167**
Pharmacy	56	25	18	**99**
Veterinary medicine	93	55	57	**205**
Agronomy	226	70	150	**446**
Horticulture	90	18	48	**156**
Forestry	36	4	10	**50**
Animal husbandry	51	26	37	**114**
Biotechnology	0	0	0	**0**
Architecture	35	14	9	**58**
Urbanism	5	0	0	**5**
Civil engineering	198	62	70	**330**
Electrical engineering	194	72	47	**313**
Energetics	49	15	9	**73**
Electronics and communication	112	51	35	**198**
Automatics	63	29	12	**104**
Computer programming	39	13	12	**64**
Informatics	22	4	11	**37**
industrial engineering	301	114	110	**525**
mechanical engineering	305	111	103	**519**
Aerospatiale engineering	18	4	2	**24**
Transportation	14	2	6	**22**
Mining, petrol and gaze	75	20	19	**114**
Theology	59	46	31	**136**
Military	129	14	43	**186**
Public order and security	0	5	1	**6**
Total	**2631**	**6631**	**2817**	**12079**

Source: MoERY, Internal Statistic 2006



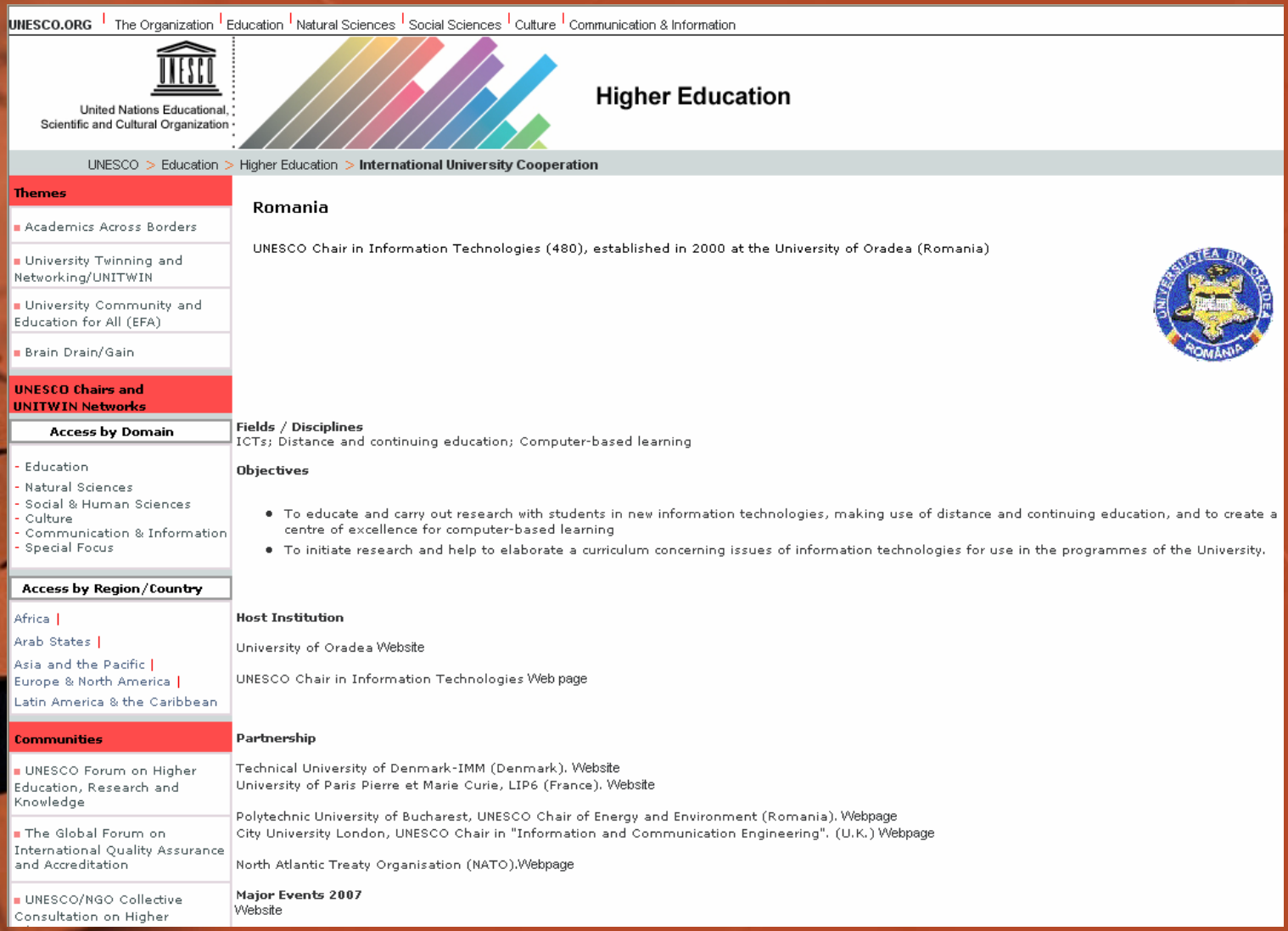
Indicative financial allocation

Commitments — Euro

Year	TOTAL	EU contribution (ESF)	National public contribution				Private contribution
			State budget	Local budgets	Other public sources*	Total	
2007	11,094,947	8,553,868	2,006,463	0	0	2,006,463	0,534,616
2008	17,198,853	13,259,795	3,110,322	0	0	3,110,322	0,828,736
2009	23,577,563	18,177,586	4,263,878	0	0	4,263,878	1,136,099
2010	28,049,880	21,625,615	5,072,675	0	0	5,072,675	1,351,590
2011	31,027,671	23,921,393	5,611,191	0	0	5,611,191	1,495087
2012	34,723,909	26,771,080	6,279,636	0	0	6,279,636	1,673,193
2013	34,418,387	27,306,502	6,405,229	0	0	6,405,229	1,706,656
TOTAL	**181,091,209**	**139,615,838**	**32,749,394**	**0**	**0**	**32,749,394**	**8,725,977**

- Introduction
- Research and national innovation systems
- Strategic international cooperation
- Case studies
- Conclusions

UNESCO Chair at University of Oradea



UNESCO.ORG | The Organization | Education | Natural Sciences | Social Sciences | Culture | Communication & Information

United Nations Educational, Scientific and Cultural Organization

Higher Education

UNESCO > Education > Higher Education > **International University Cooperation**

Themes

- Academics Across Borders
- University Twinning and Networking/UNITWIN
- University Community and Education for All (EFA)
- Brain Drain/Gain

UNESCO Chairs and UNITWIN Networks

Access by Domain

- Education
- Natural Sciences
- Social & Human Sciences
- Culture
- Communication & Information
- Special Focus

Access by Region/Country

Africa | Arab States | Asia and the Pacific | Europe & North America | Latin America & the Caribbean

Communities

- UNESCO Forum on Higher Education, Research and Knowledge
- The Global Forum on International Quality Assurance and Accreditation
- UNESCO/NGO Collective Consultation on Higher

Romania

UNESCO Chair in Information Technologies (480), established in 2000 at the University of Oradea (Romania)

Fields / Disciplines
ICTs; Distance and continuing education; Computer-based learning

Objectives

- To educate and carry out research with students in new information technologies, making use of distance and continuing education, and to create a centre of excellence for computer-based learning
- To initiate research and help to elaborate a curriculum concerning issues of information technologies for use in the programmes of the University.

Host Institution

University of Oradea Website

UNESCO Chair in Information Technologies Web page

Partnership

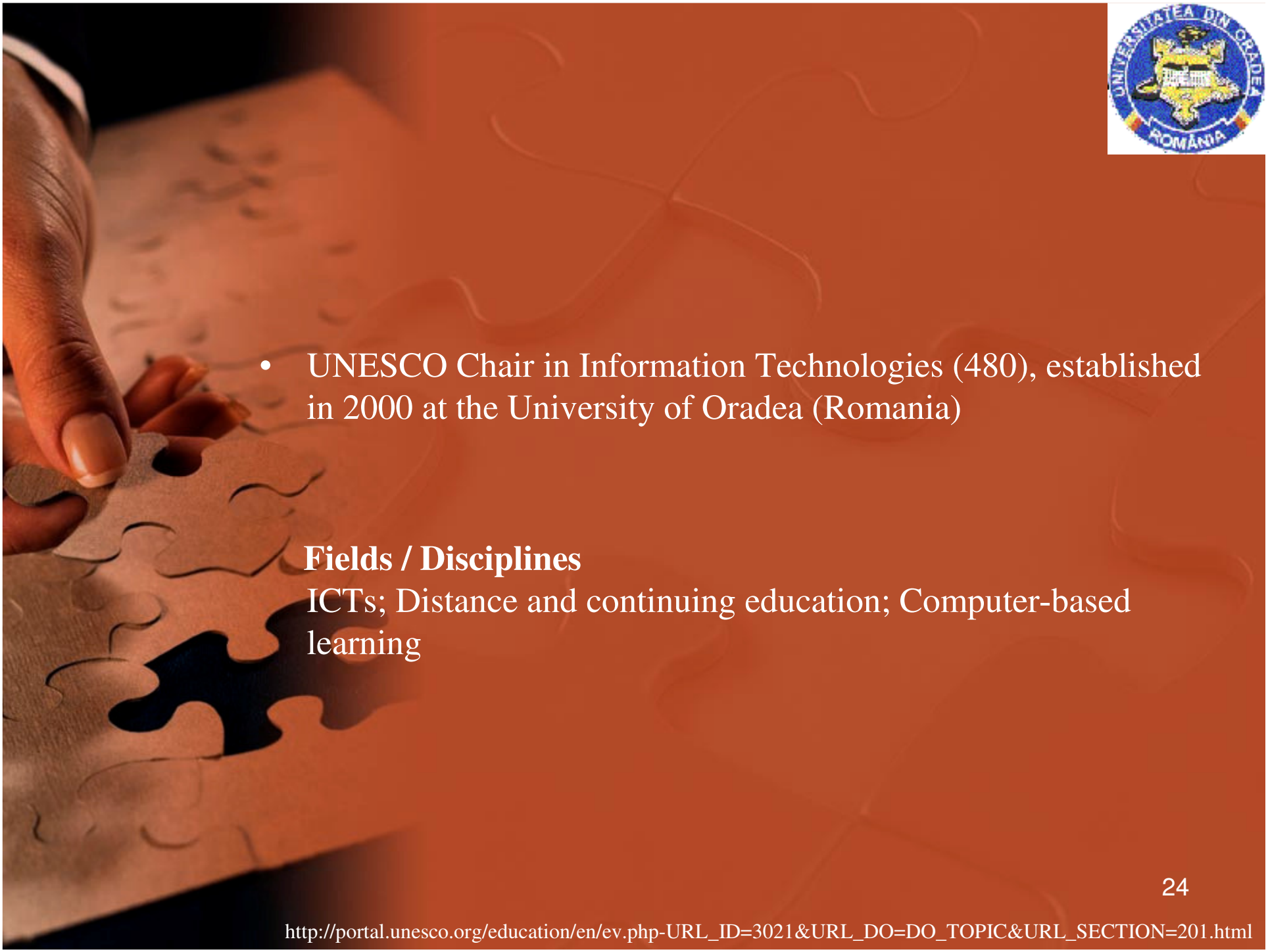
Technical University of Denmark-IMM (Denmark). Website
University of Paris Pierre et Marie Curie, LIP6 (France). Website

Polytechnic University of Bucharest, UNESCO Chair of Energy and Environment (Romania). Webpage
City University London, UNESCO Chair in "Information and Communication Engineering". (U.K.) Webpage

North Atlantic Treaty Organisation (NATO).Webpage

Major Events 2007
Website

http://portal.unesco.org/education/en/ev.php-URL_ID=3021&URL_DO=DO_TOPIC&URL_SECTION=201.html



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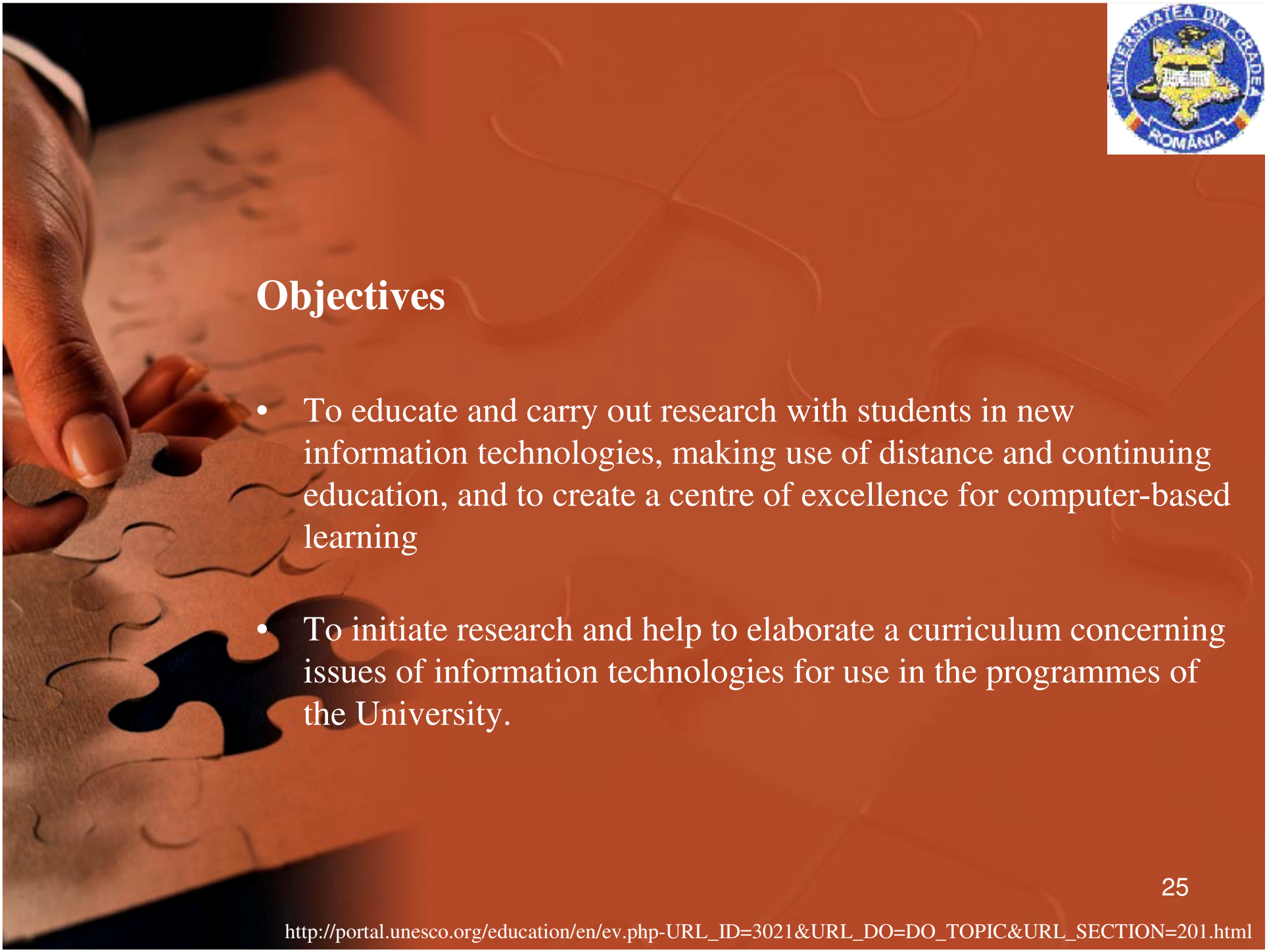
http://portal.unesco.org/education/en/ev.php-URL_ID=3021&URL_DO=DO_TOPIC&URL_SECTION=201.html



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http://portal.unesco.org/education/en/ev.php-URL_ID=3021&URL_DO=DO_TOPIC&URL_SECTION=201.html

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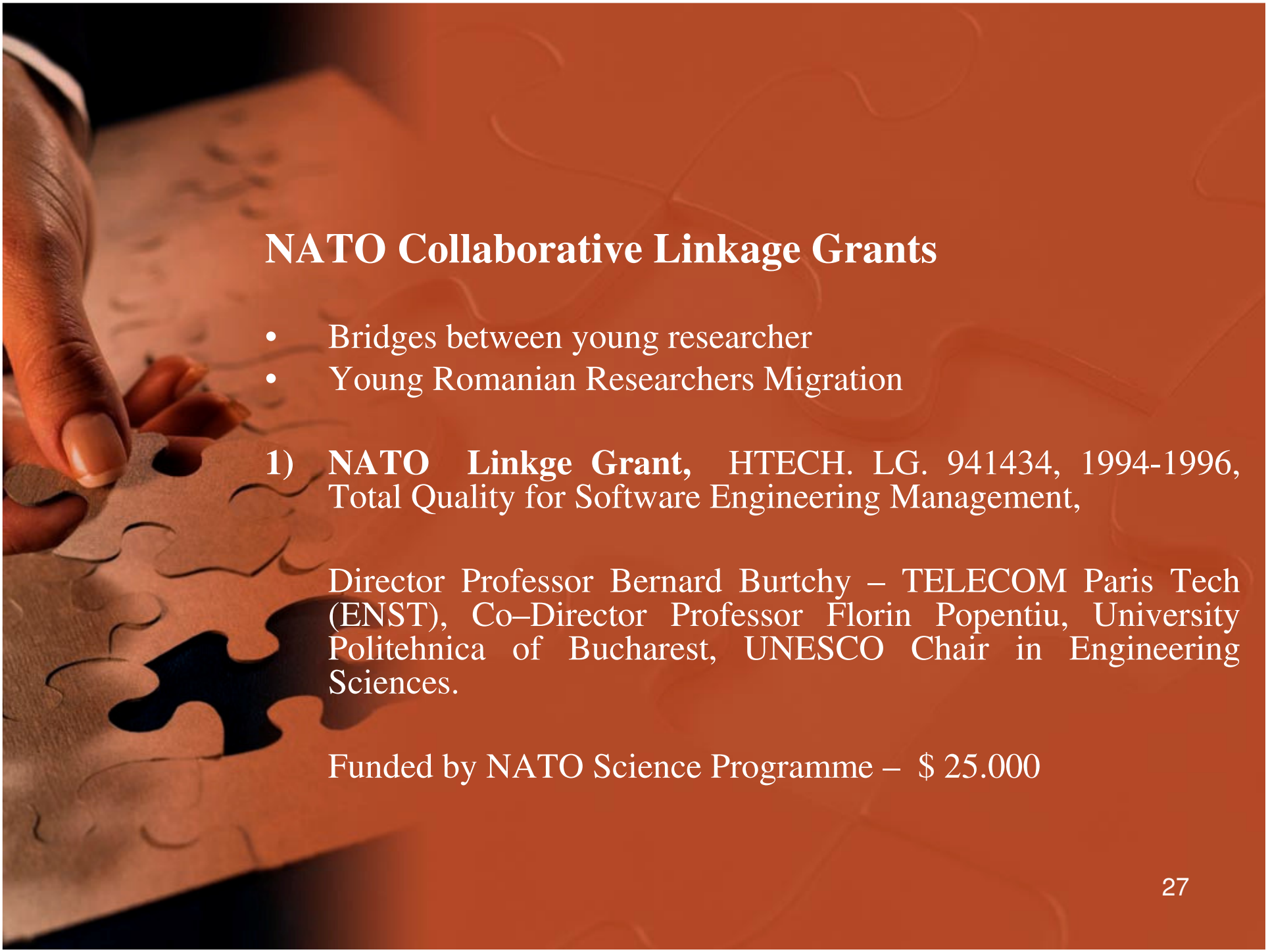
- Technical University of Denmark-IMM (Denmark). Website
- University of Paris Pierre et Marie Curie, LIP6 (France). Website
- Polytechnic University of Bucharest, UNESCO Chair of Energy and Environment (Romania). Webpage
- City University London, UNESCO Chair in "Information and Communication Engineering". (U.K.) Webpage
- North Atlantic Treaty Organisation (NATO).Webpage

UNESCO Sector/Field Office responsible for the Chair/Network

Communication and Information; CEPES

http://portal.unesco.org/education/en/ev.php-URL_ID=3021&URL_DO=DO_TOPIC&URL_SECTION=201.html



NATO Collaborative Linkage Grants

- Bridges between young researcher
- Young Romanian Researchers Migration

1) **NATO Linkge Grant,** HTECH. LG. 941434, 1994-1996, Total Quality for Software Engineering Management,

Director Professor Bernard Burtchy – TELECOM Paris Tech (ENST), Co–Director Professor Florin Popentiu, University Politehnica of Bucharest, UNESCO Chair in Engineering Sciences.

Funded by NATO Science Programme – $ 25.000

2) **NATO Linkge Grant,** EST.CLG.979542. 2003-2005, A Software System for Controling the Pollution Dynamics in the cement plants,

Director Professor Henrik Madsen, The Technical University of Denmark (DTU), Co-Director Professor Florin Popentiu, University of Oradea, UNESCO Chair in Information Technologies, Romania ,

Parteners: University "Politehnica" of Bucharest, UNESCO Chair on Engineering Sciences, National Institute for Cement Bucharest, Romania.

Funded by NATO Science Programme – Euro 15.400.

A software system for controlling the pollution dynamics in the cement plants

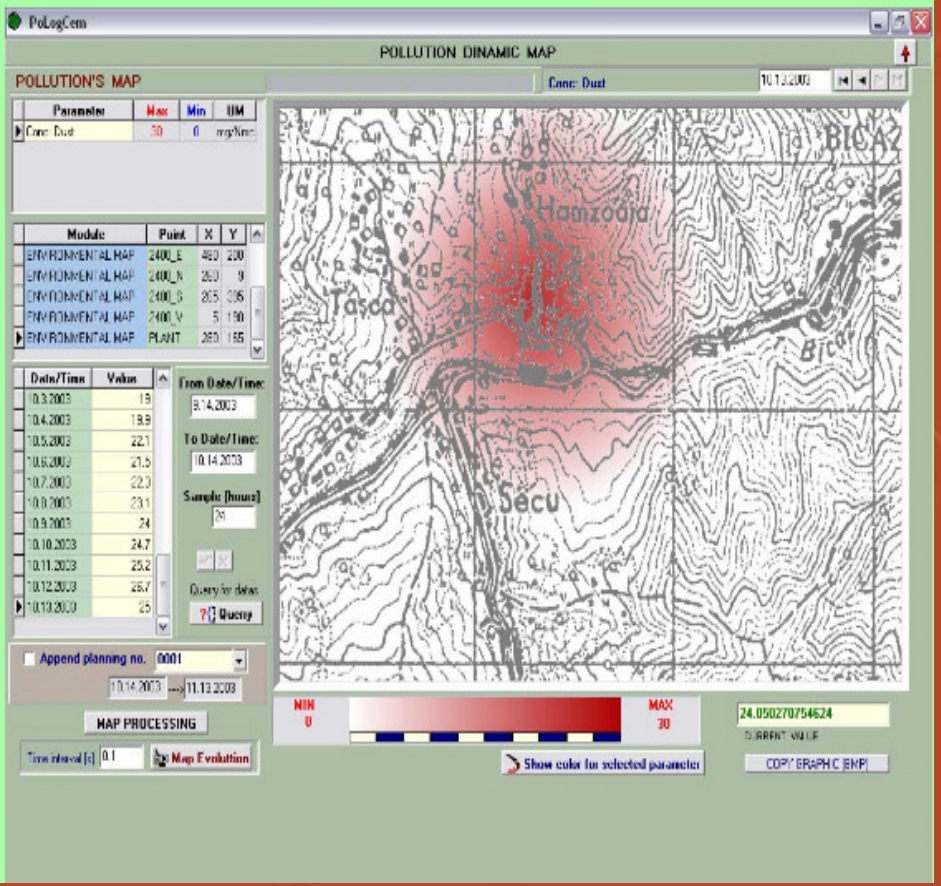
Acknowledgement: NATO SCIENCE PROGRAM - Colaborative Linkage Grant EST.CLG.979542

IMM Department

UNESCO IT Chair

UNESCO Chair

- Investigators
- Publications
- Handbook
- Experimental results
- People and places



3) CORINT/NATO-STI Contract N**r** 4/ 30.X.2003**,** A Software System for Controlling the Pollution Dynamics in the cement plants,

Director Professor Florin Popentiu, University of Oradea, UNESCO Chair in Information Technologies, Romania ,

Parteners: University "Politehnica" of Bucharest, UNESCO Chair on Engineering and National Institute for Cement Bucharest, Romania

Funded by **National Authority for Scientific Research** (NASR) – Euro 15.000

- Introduction
- Research and national innovation systems
- Strategic international cooperation
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- Conclusions

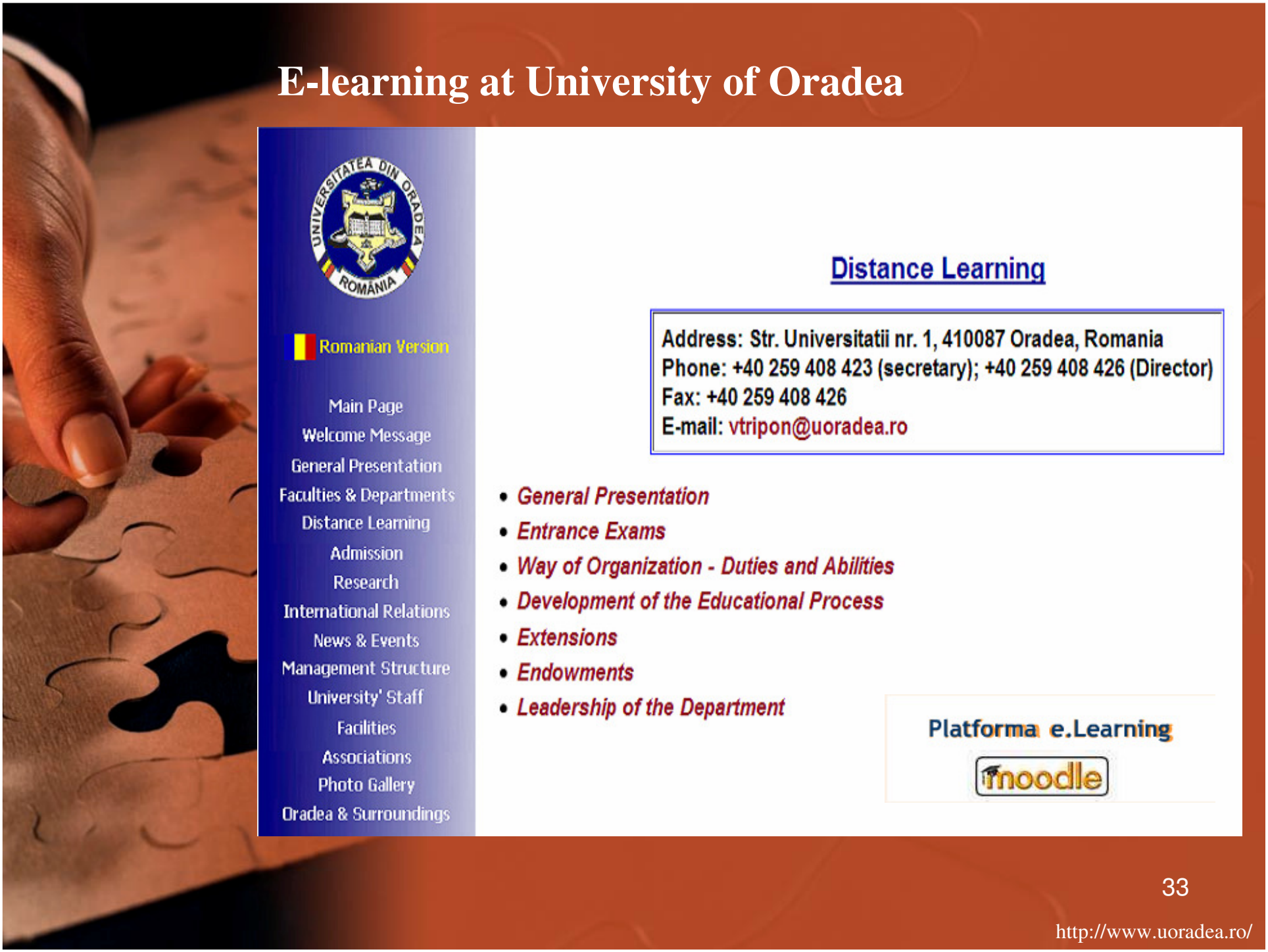
Case studies

1) Distance learning & Doctoral School at University of Oradea

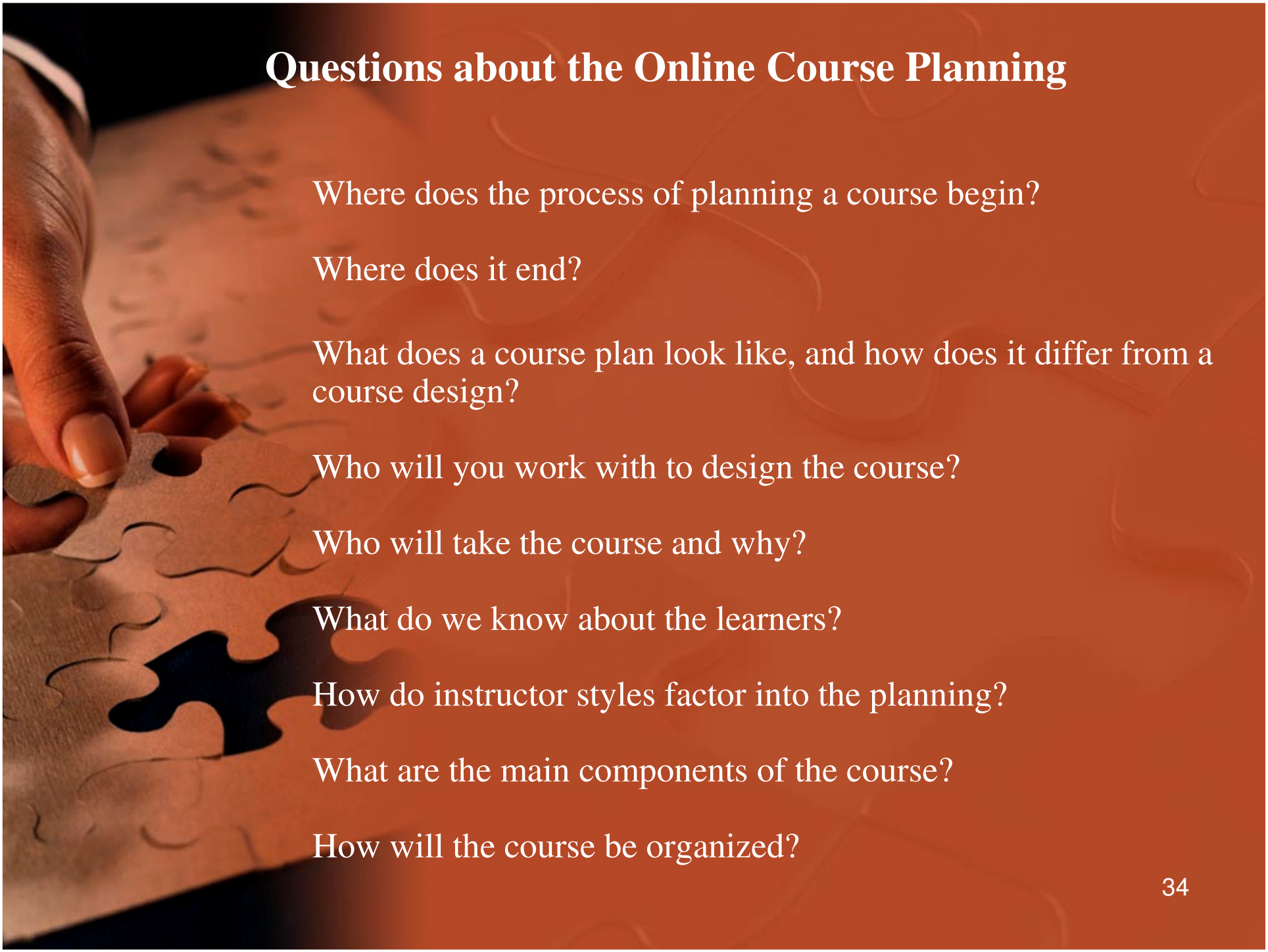
2) CAMPUS NET at the Technical University of Denmark (DTU)

3) Interuniversity Athens programme

E-learning at University of Oradea



http://www.uoradea.ro/



Questions about the Online Course Planning

Where does the process of planning a course begin?

Where does it end?

What does a course plan look like, and how does it differ from a course design?

Who will you work with to design the course?

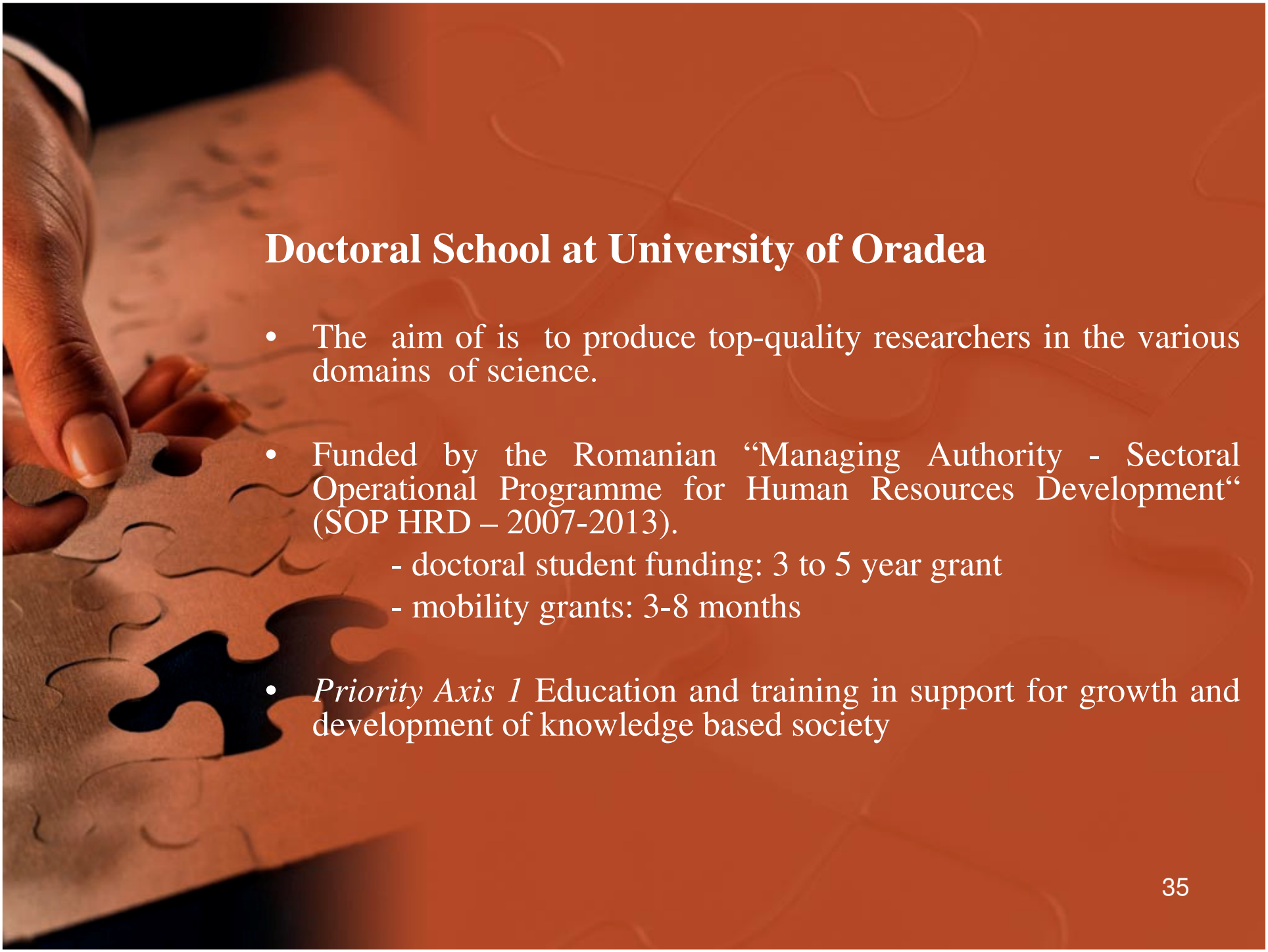
Who will take the course and why?

What do we know about the learners?

How do instructor styles factor into the planning?

What are the main components of the course?

How will the course be organized?



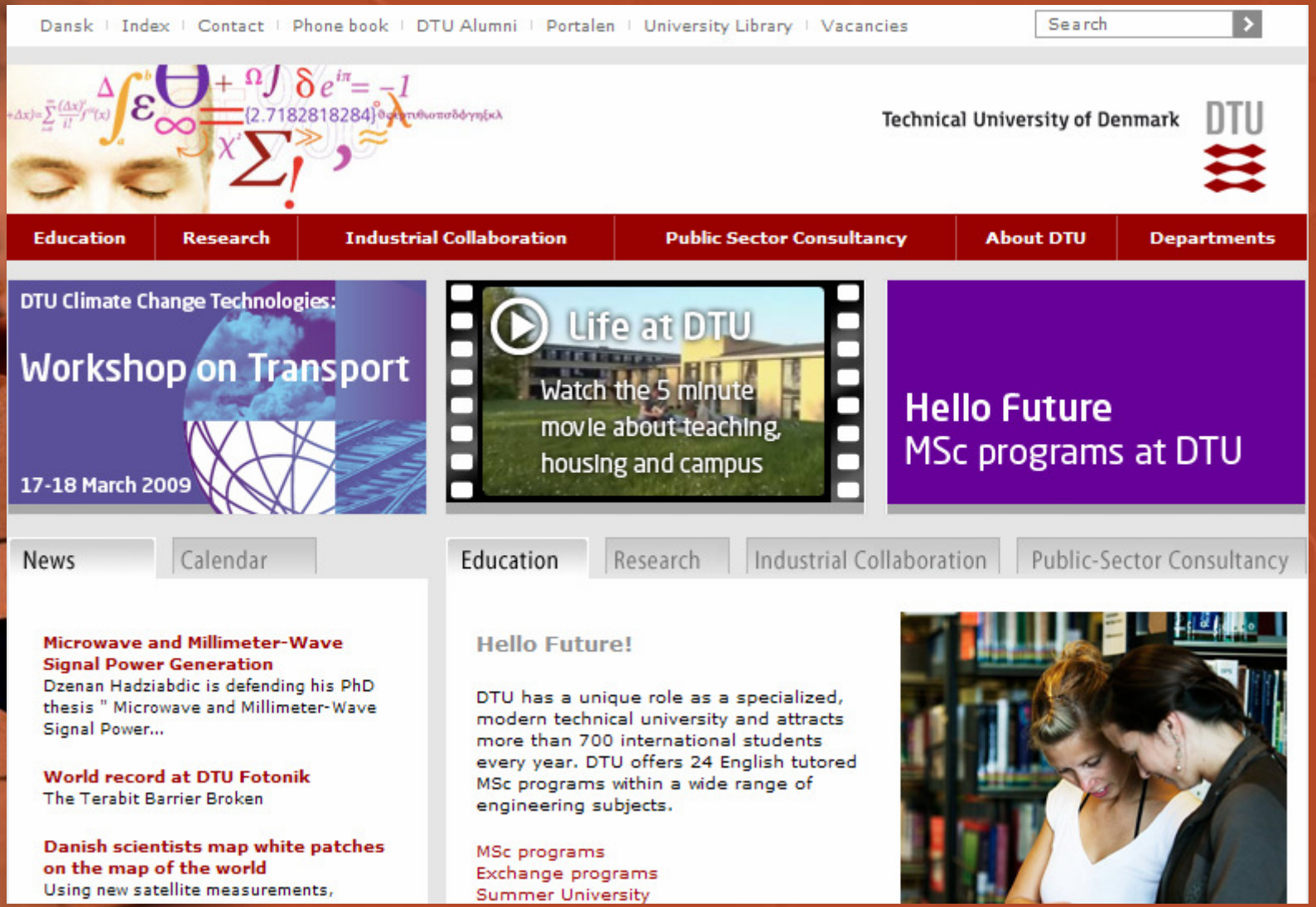
Doctoral School at University of Oradea

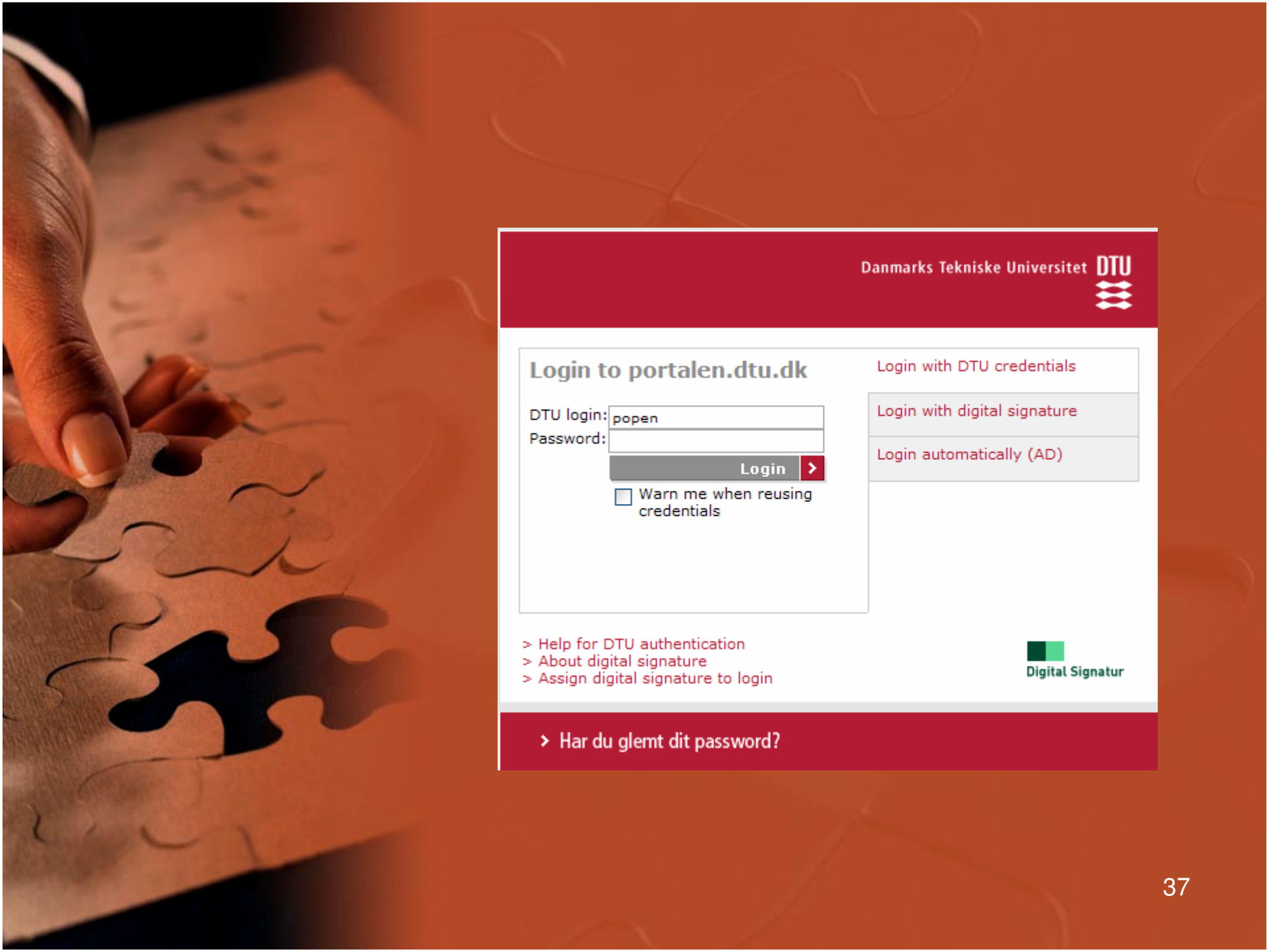
- The aim of is to produce top-quality researchers in the various domains of science.

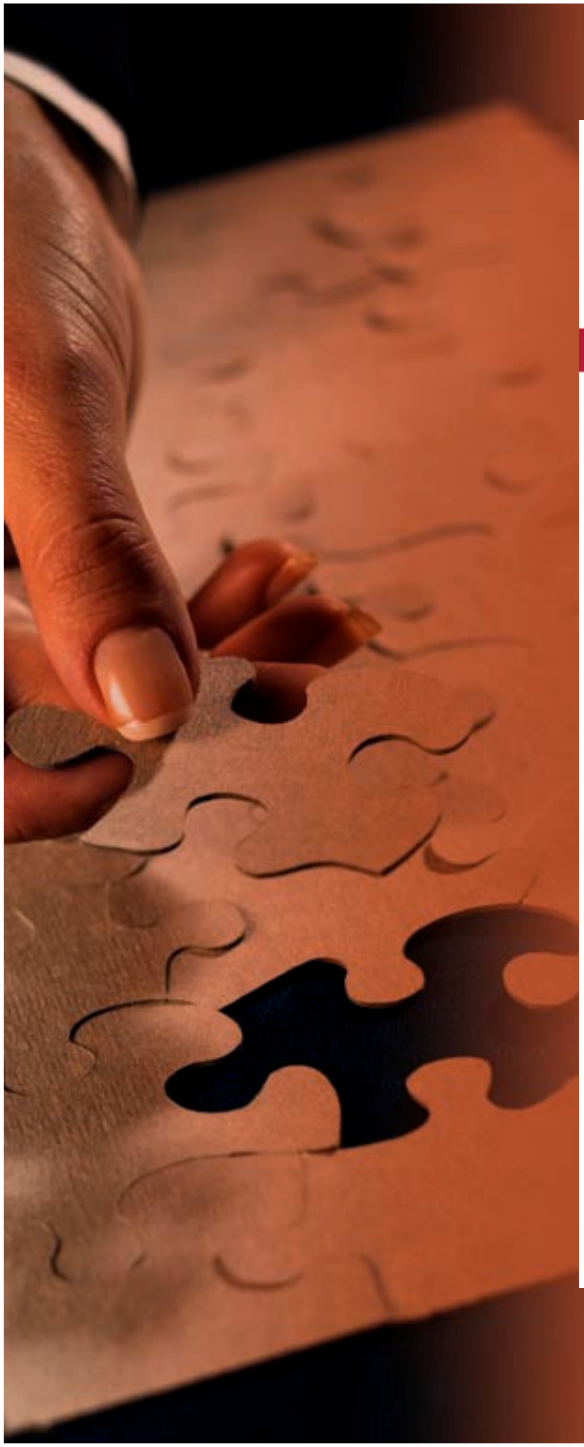
- Funded by the Romanian "Managing Authority - Sectoral Operational Programme for Human Resources Development" (SOP HRD – 2007-2013).
  - doctoral student funding: 3 to 5 year grant
  - mobility grants: 3-8 months

- *Priority Axis 1* Education and training in support for growth and development of knowledge based society

CAMPUS NET at the Technical University of Denmark (DTU)




Danmarks Tekniske Universitet DTU
Login to portalen.dtu.dk
DTU login: popen
Password:
Login
Warn me when reusing credentials
Login with DTU credentials
Login with digital signature
Login automatically (AD)
> Help for DTU authentication
> About digital signature
> Assign digital signature to login
Digital Signatur
> Har du glemt dit password?



Coursebase 2008/2009 Danmarks Tekniske Universitet DTU

Dansk | New Search | Course Basket | Full/ Short format

+put course in basket

Print version

02445 Software Reliability

Danish title:	Software pålidelighed
Language:	English **Point (ECTS)** 5
Course type:	BSc/MSc- Advanced Course Taught under open university
Schedule:	4 August- 24 August 2009, Monday-Friday from 13h-16h.
Scope and form:	Lectures, exercises, and project work
Duration of Course:	3 weeks
Type of assessment:	Evaluation of exercises/reports
Aid:	All Aid
Evaluation:	7 step scale, internal examiner
Previous Course:	02403/02407
Not applicable together with:	02403/02407
Mandatory Prerequisites:	02324 / 02407
Qualified Prerequisites:	02161 / 02162 / 02165

Participants restrictions: Maximum: 20

General course objectives:
At the end of the course, you should have a general understanding of the importance and use of software reliability and should be able to use a number of specific methods and know their capability and limitations.

Learning objectives:
A student who has met the objectives of the course will be able to:

- explain why it is important to measure software reliability
- describe a generic statistical approach
- describe methods for comparing and assessing the accuracy of predictions
- interpret results from applying these methods
- explain the the capability and limitations of software reliability measurement
- argue the need for reliability assessment at all stages of the life-cycle
- identify the role of software reliability models
- apply the principles of measurement to ensure that meaningful sets of statistics are obtained for the assessment of reliability

Content:
Reliability assessment in the life-cycle. Measuring software reliability. Data collection. Generic approach and specific models. Evaluation of the predictions. Capabilities and limitations.

Remarks:
From 5 August - 25 August. You can sign up for the course in the ordinary 3week period.
Home site of Professor Florin Popentiu: http://www2.imm.dtu.dk/~popentiu/

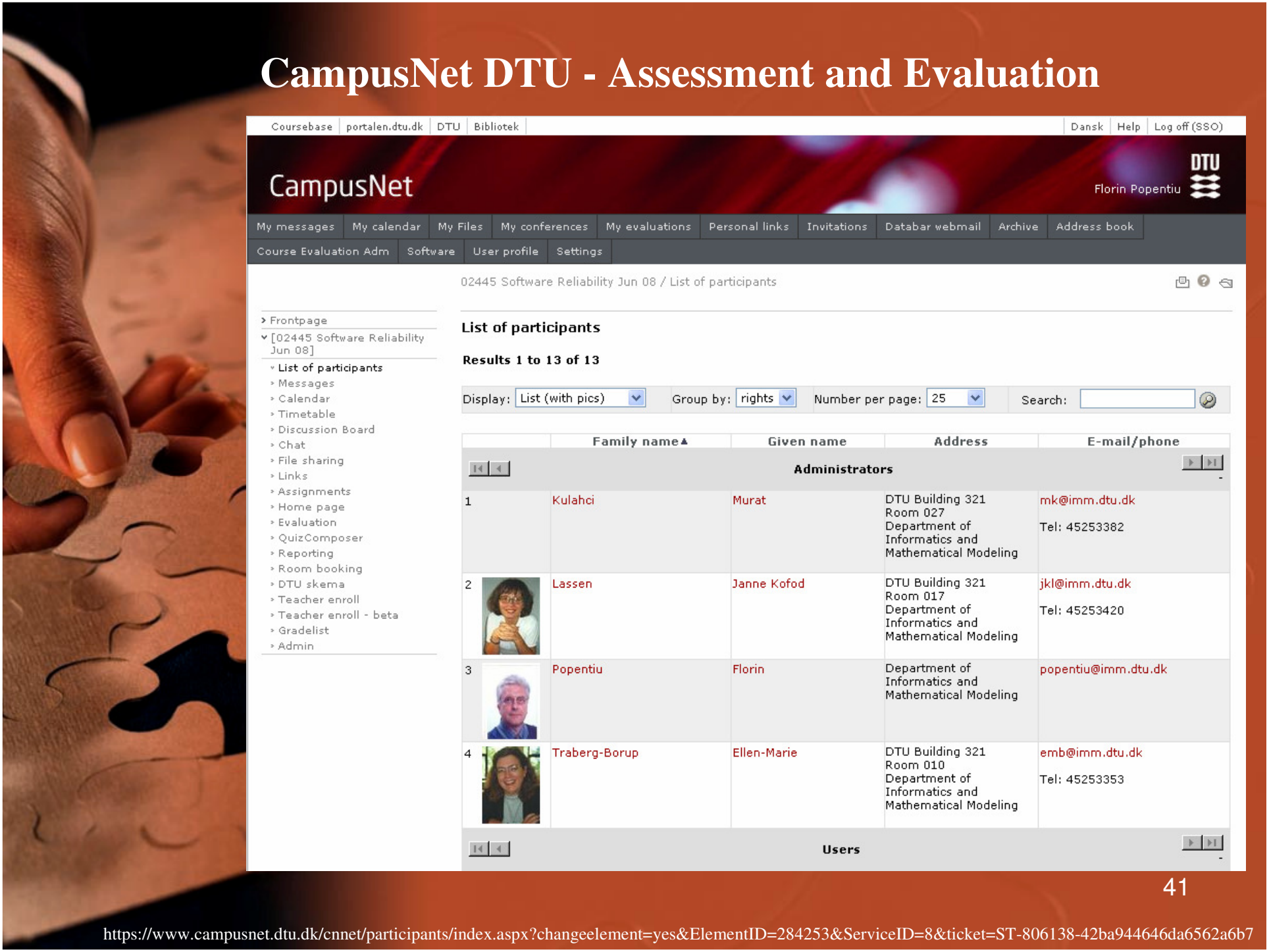
Responsible:
Murat Kulahci, 321, 027, (+45) 4525 3382, mk@imm.dtu.dk
The course is taught by professor Florin Popentiu, popentiu@imm.dtu.dk

Department: 02 Department of Informatics and Mathematical Modeling
Home page: http://www.imm.dtu.dk/~popenti...are_Reliability.html
Registration Sign up: At CampusNet

Mobility & Internationalisation

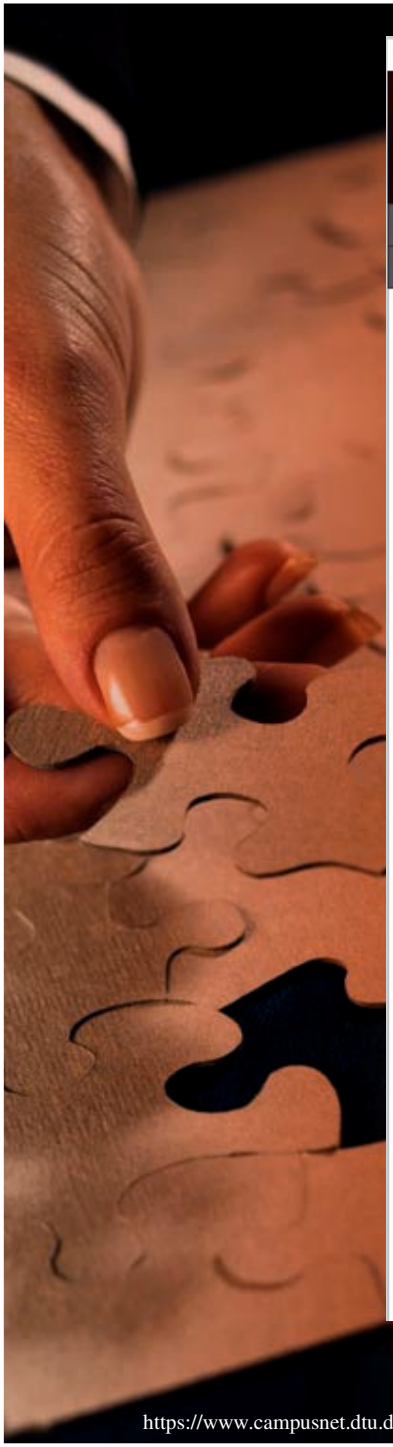
- MSc programmes are increasing taught in English
- The international students appraise and evaluate their programmes

CampusNet DTU - Assessment and Evaluation



https://www.campusnet.dtu.dk/cnnet/participants/index.aspx?changeelement=yes&ElementID=284253&ServiceID=8&ticket=ST-806138-42ba944646da6562a6b7

5		Christensen	Per Thorsø	Ålandsgade 22,st tv 2300 København S	s061733@student.dtu.dk Tel: 32101951 kandidat
6		Christensen	Lasse	Nylandsvej 58 2690 Karlslunde	s052868@student.dtu.dk Tel: 28436121 Master of Science in Computer Science and Technology
7		Derawi	Mohammad	Engvej 158,1 th 2300 København S	s042657@student.dtu.dk Tel: 25470404 Master of Science in Computer Science and Technology
8		Elahi	Touseef Asam Akim		s022354@student.dtu.dk kandidat
9		El-Haj	Rana		s052261@student.dtu.dk Bachelor programme in Medical Engineering
10		Engel	Søren	Kollegiebakken 9,1,-3013 2800 Kgs. Lyngby	s061280@student.dtu.dk Bachelor programme in Software Technology



Coursebase | portalen.dtu.dk | DTU | Bibliotek | Dansk | Help | Log off (SSO)

CampusNet

Florin Popentiu

My messages | My calendar | My Files | My conferences | My evaluations | Personal links | Invitations | Databar webmail | Archive | Address book

Course Evaluation Adm | Software | User profile | Settings

Florin Popentiu / Evaluation

- Frontpage
  - Find DTU-group
  - Find usergroup
  - Make new usergroup
- Courses
  - [02431 Risk Manage...]
  - [02445 Software Re...]
  - [02445 Software Re...]
  - [02445 Software Re...]
  - [02445 Software Re...]
  - [02445 Software Re...]

Show selected

Results: 02445 Software Reliability Jun 08

Schema A

Course evaluation

Statistics

7	could answer this evaluation form
6	have answered this evaluation form
85.71 %	answer percentage: 6 / 7

1 Form A

1.1	**I think I am learning a lot on this course (6 answers)**		
	Strongly agree	3	50.00 %
		1	16.67 %
		2	33.33 %
		0	0.00 %
	Strongly disagree	0	0.00 %
1.2	**I think the teaching method encourages my active participation (6 answers)**		
	Strongly agree	5	83.33 %
		0	0.00 %
		1	16.67 %
		0	0.00 %
	Strongly disagree	0	0.00 %
1.3	**I think the teaching material is good (6 answers)**		
	Strongly agree	2	33.33 %
		2	33.33 %
		0	0.00 %
		2	33.33 %
	Strongly disagree	0	0.00 %

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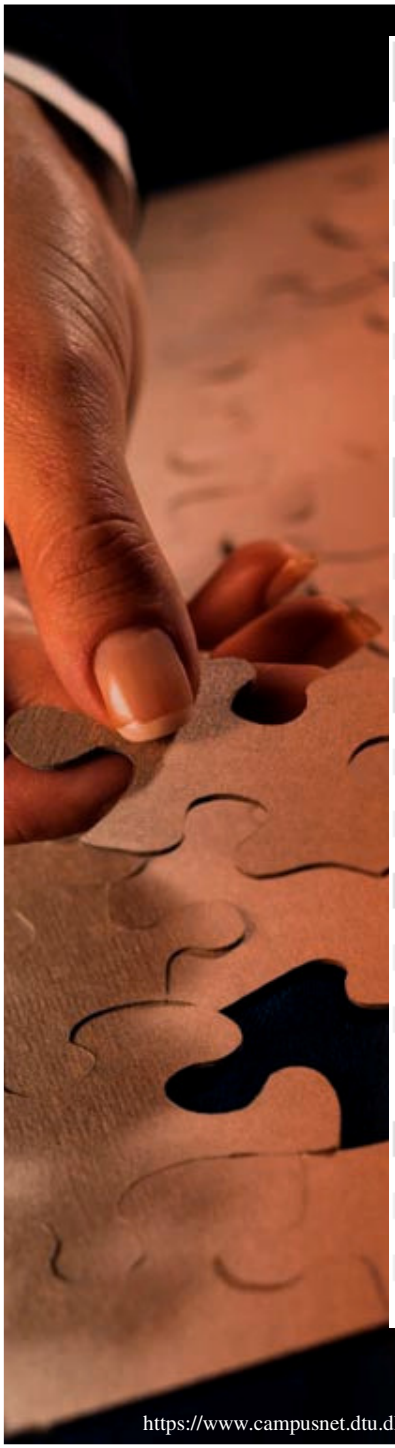
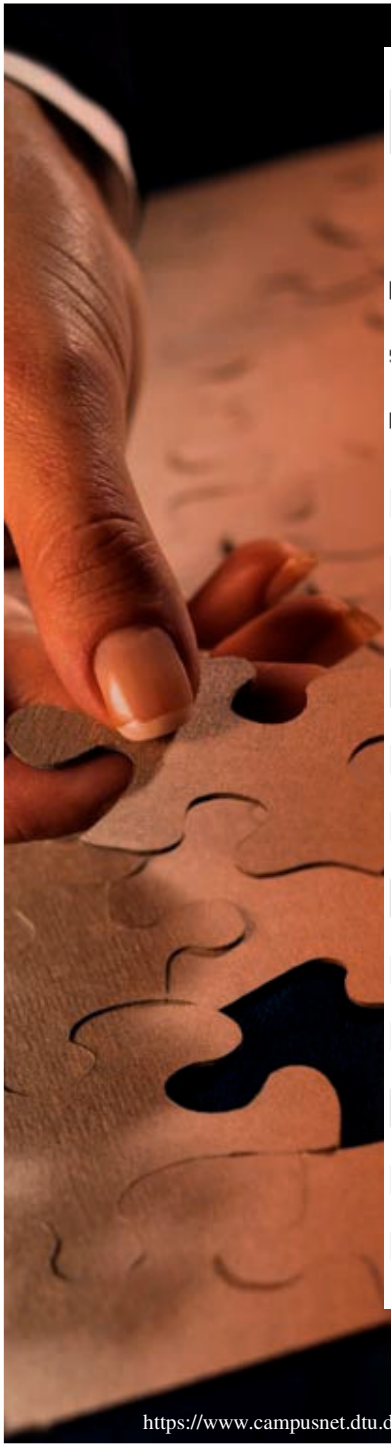


1.4	**I think that throughout the course, the teacher/s have clearly communicated to me where I stand academically (6 answers)**		
	Strongly agree	3	50.00 %
		1	16.67 %
		2	33.33 %
		0	0.00 %
	Strongly disagree	0	0.00 %
1.5	**I think the teacher/s create/s good continuity between the different teaching activities (6 answers)**		
	Strongly agree	3	50.00 %
		1	16.67 %
		2	33.33 %
		0	0.00 %
	Strongly disagree	0	0.00 %
1.6	**5 points is equivalent to 9 hrs./week (45 hrs./week in the three-week period). I think my performance during the course is (6 answers)**		
	Much less	0	0.00 %
		1	16.67 %
		4	66.67 %
		1	16.67 %
	Much more	0	0.00 %
1.7	**I think the course description's prerequisites are (6 answers)**		
	Too low	0	0.00 %
		0	0.00 %
		6	100.00 %
		0	0.00 %
	Too high	0	0.00 %
1.8	**In general, I think this is a good course (6 answers)**		
	Strongly agree	4	66.67 %
		2	33.33 %
		0	0.00 %
		0	0.00 %
	Strongly disagree	0	0.00 %
2	**Form A English skills**		
2.1	**I think my English skills are sufficient to benefit fully from this course (6 answers)**		
	Strongly agree	6	100.00 %
		0	0.00 %
		0	0.00 %
		0	0.00 %
	Strongly disagree	0	0.00 %

https://www.campusnet.dtu.dk/cnnet/FinalEvaluation/ResultsGroupedBy.aspx?ElementId=0&OverviewService=1&ResultSearchId=72846&GroupBy=Question&ticket=ST-433121-490a9d5435bae7094b92



3	Implementation percentage
3.1	**The course responsible has reported that the following percentage of course lectures has been implemented (0 answers)**

- 100%

Results: 02445 Software Reliability Jun 08

Schema B

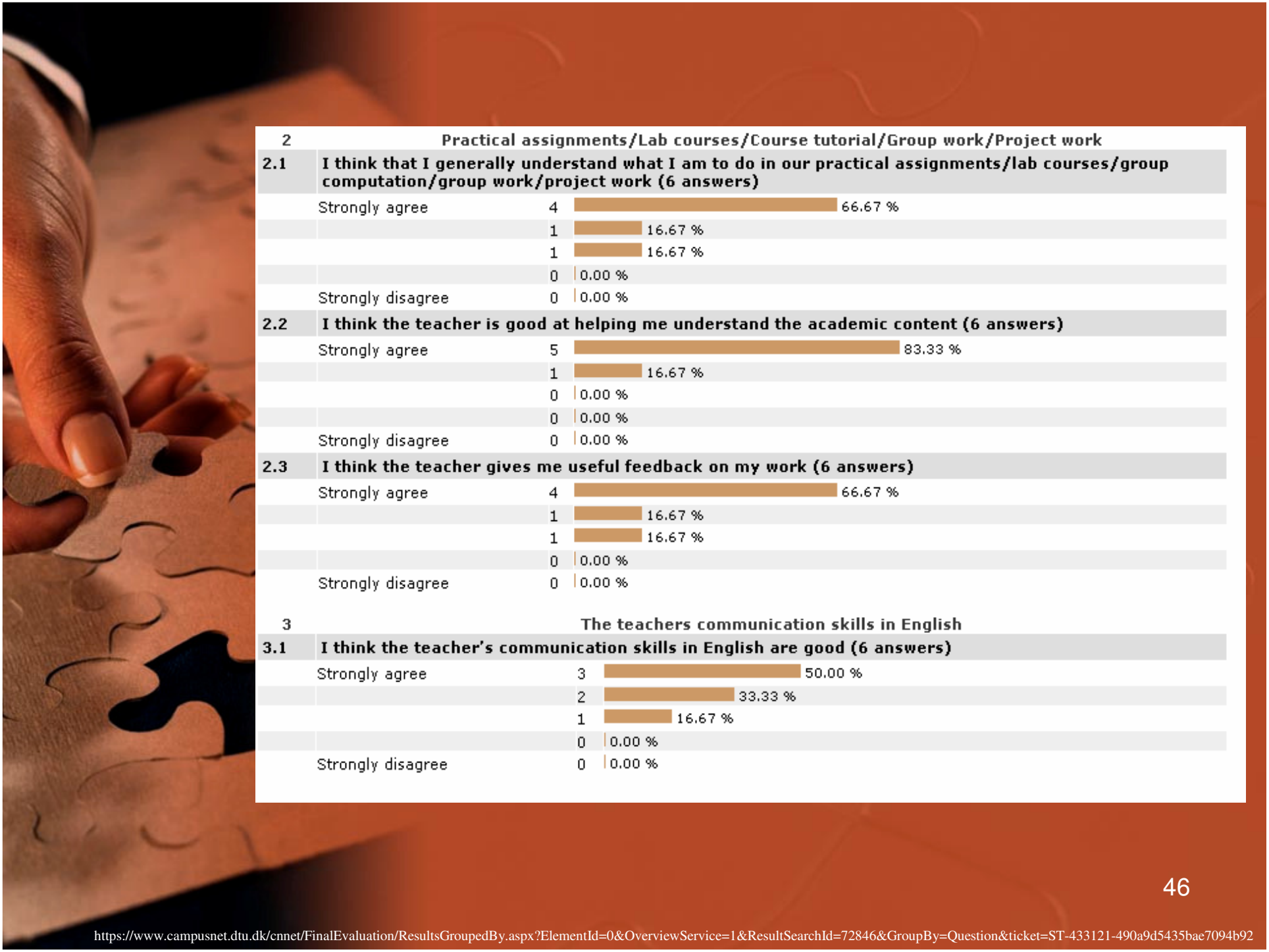
Florin Popentiu

Statistics

7	could answer this evaluation form
6	have answered this evaluation form
85.71 %	answer percentage: 6 / 7

1	Lecture/Classroom instruction		
1.1	**I think that the teaching gives me a good grasp of the academic content of the course (6 answers)**		
	Strongly agree	4	66.67 %
		1	16.67 %
		1	16.67 %
		0	0.00 %
	Strongly disagree	0	0.00 %
1.2	**I think the teacher is good at communicating the subject (6 answers)**		
	Strongly agree	4	66.67 %
		2	33.33 %
		0	0.00 %
		0	0.00 %
	Strongly disagree	0	0.00 %
1.3	**I think the teacher motivates us to actively follow the class (6 answers)**		
	Strongly agree	3	50.00 %
		2	33.33 %
		1	16.67 %
		0	0.00 %
	Strongly disagree	0	0.00 %

https://www.campusnet.dtu.dk/cnnet/FinalEvaluation/ResultsGroupedBy.aspx?ElementId=0&OverviewService=1&ResultSearchId=72846&GroupBy=Question&ticket=ST-433121-490a9d5435bae7094b92



2	Practical assignments/Lab courses/Course tutorial/Group work/Project work		
2.1	I think that I generally understand what I am to do in our practical assignments/lab courses/group computation/group work/project work (6 answers)		
	Strongly agree	4	66.67 %
		1	16.67 %
		1	16.67 %
		0	0.00 %
	Strongly disagree	0	0.00 %
2.2	I think the teacher is good at helping me understand the academic content (6 answers)		
	Strongly agree	5	83.33 %
		1	16.67 %
		0	0.00 %
		0	0.00 %
	Strongly disagree	0	0.00 %
2.3	I think the teacher gives me useful feedback on my work (6 answers)		
	Strongly agree	4	66.67 %
		1	16.67 %
		1	16.67 %
		0	0.00 %
	Strongly disagree	0	0.00 %
3	The teachers communication skills in English		
3.1	I think the teacher's communication skills in English are good (6 answers)		
	Strongly agree	3	50.00 %
		2	33.33 %
		1	16.67 %
		0	0.00 %
	Strongly disagree	0	0.00 %

https://www.campusnet.dtu.dk/cnnet/FinalEvaluation/ResultsGroupedBy.aspx?ElementId=0&OverviewService=1&ResultSearchId=72846&GroupBy=Question&ticket=ST-433121-490a9d5435bae7094b92

Results: 02445 Software Reliability Jun 08

Schema C

Comments

	Statistics
7	could answer this evaluation form
6	have answered this evaluation form
85.71 %	answer percentage: 6 / 7

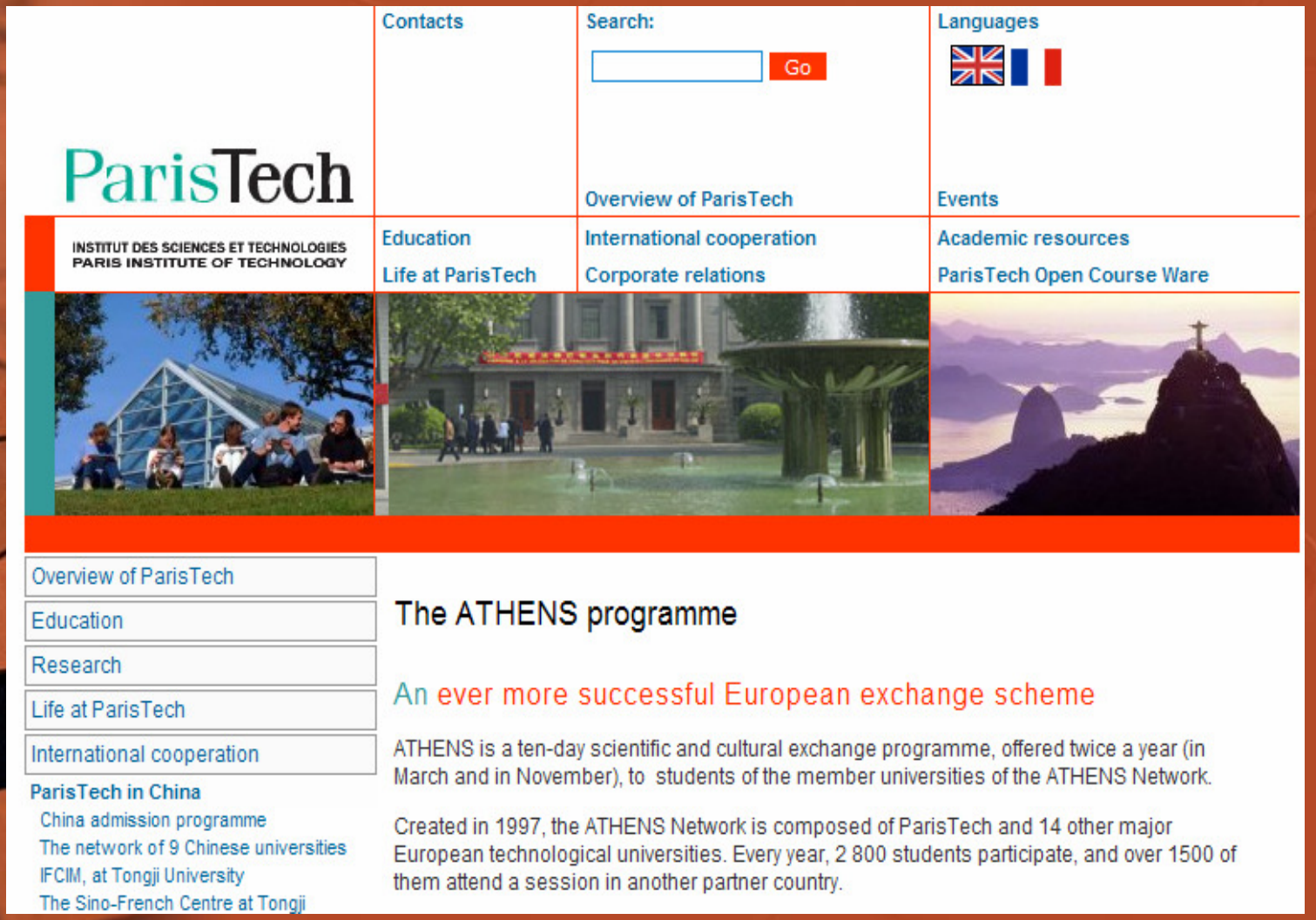
1.1. What went well – and why? (6 answers)

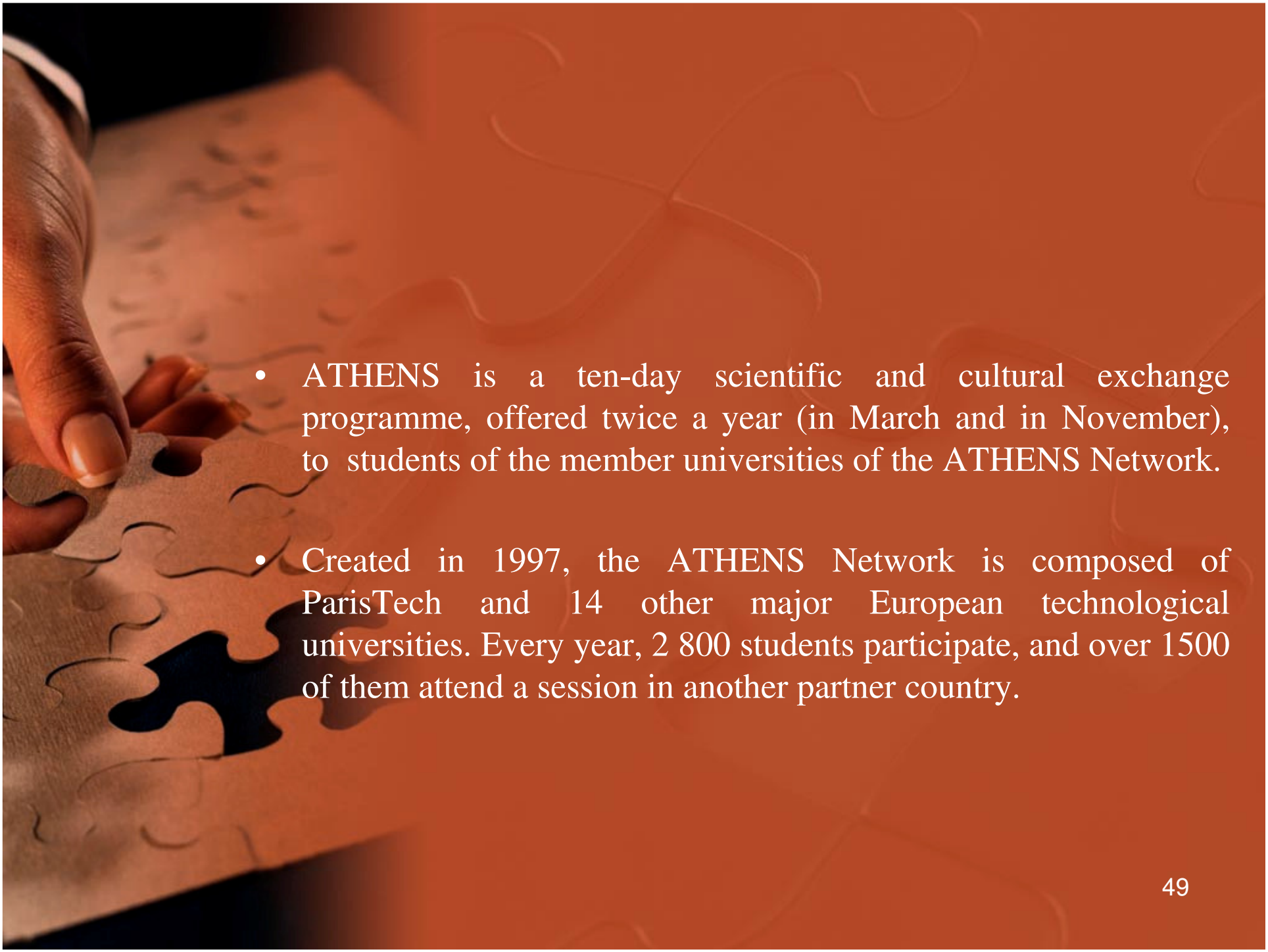
1.2 What did not go so well – and why? (6 answers)

1.3 What changes would you suggest for the next time the course is offered? (6 answers)

https://www.campusnet.dtu.dk/cnnet/FinalEvaluation/ResultsGroupedBy.aspx?ElementId=0&OverviewService=1&ResultSearchId=72846&GroupBy=Question&ticket=ST-433121-490a9d5435bae7094b92

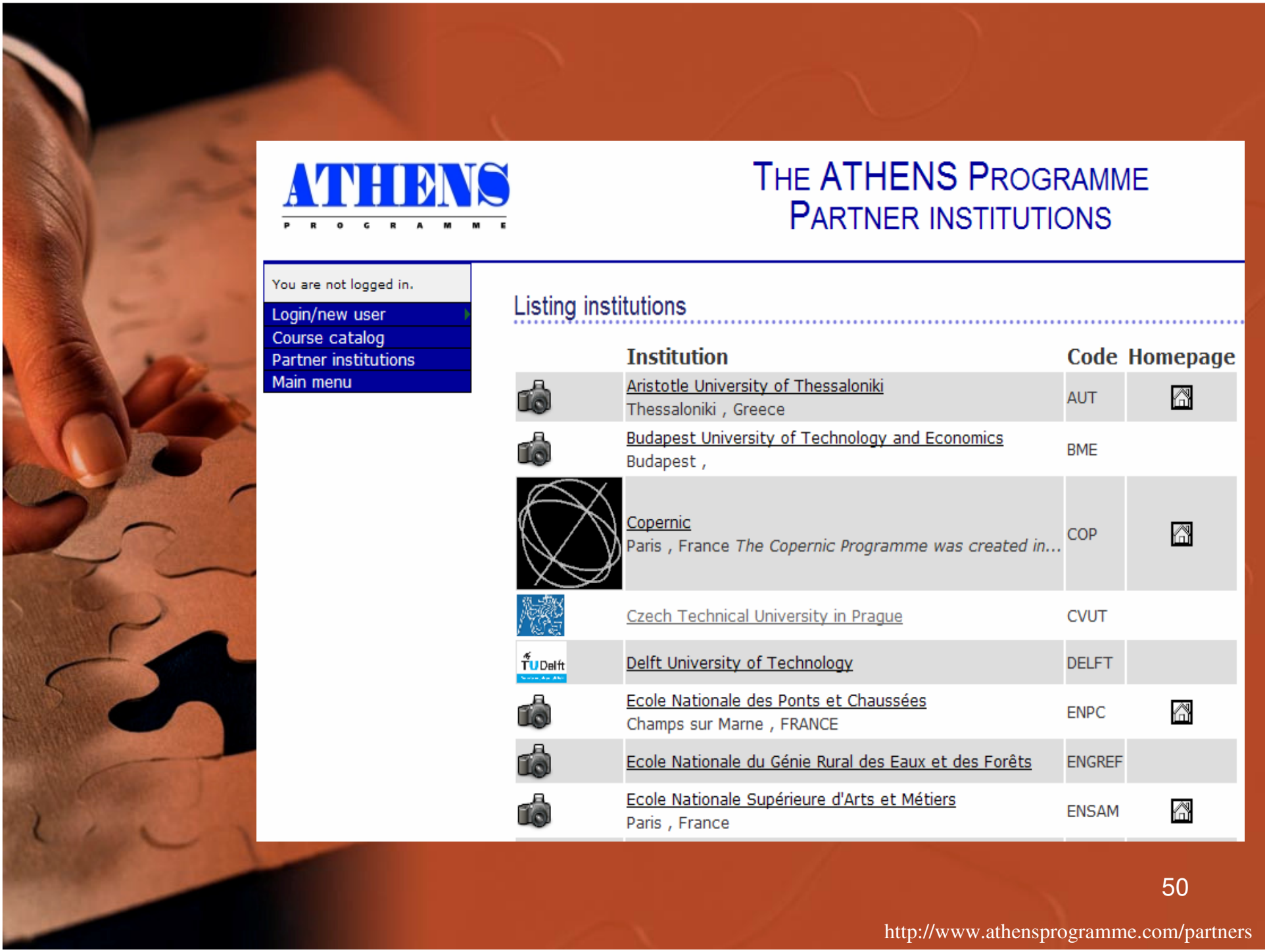
Interuniversity ATHENS Programme





- ATHENS is a ten-day scientific and cultural exchange programme, offered twice a year (in March and in November), to students of the member universities of the ATHENS Network.

- Created in 1997, the ATHENS Network is composed of ParisTech and 14 other major European technological universities. Every year, 2 800 students participate, and over 1500 of them attend a session in another partner country.



ATHENS PROGRAMME

THE ATHENS PROGRAMME PARTNER INSTITUTIONS

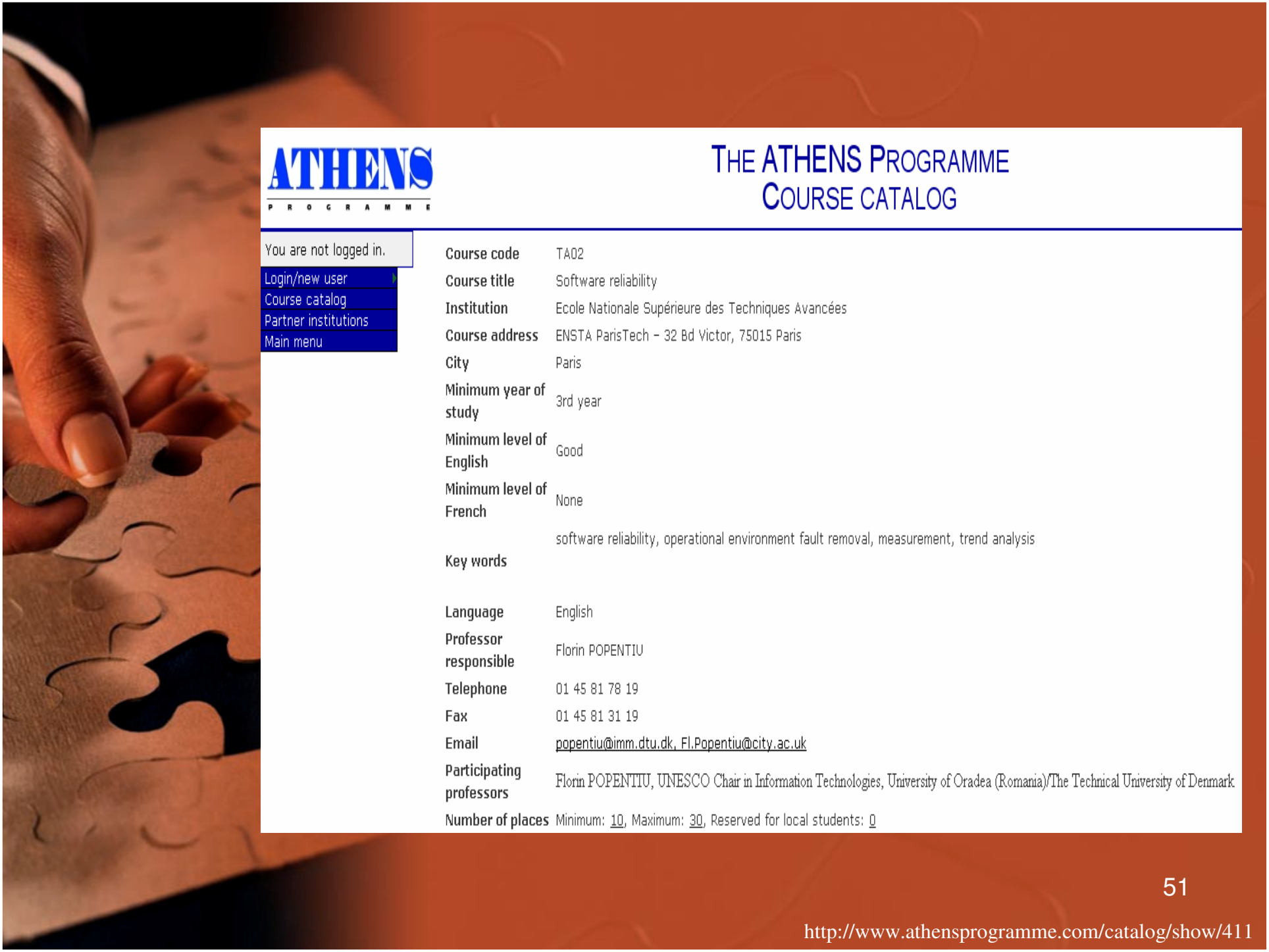
You are not logged in.

- Login/new user
- Course catalog
- Partner institutions
- Main menu

Listing institutions

	Institution	Code	Homepage
	Aristotle University of Thessaloniki Thessaloniki , Greece	AUT	
	Budapest University of Technology and Economics Budapest ,	BME	
	Copernic Paris , France *The Copernic Programme was created in...*	COP	
	Czech Technical University in Prague	CVUT	
TU Delft	Delft University of Technology	DELFT	
	Ecole Nationale des Ponts et Chaussées Champs sur Marne , FRANCE	ENPC	
	Ecole Nationale du Génie Rural des Eaux et des Forêts	ENGREF	
	Ecole Nationale Supérieure d'Arts et Métiers Paris , France	ENSAM	

http://www.athensprogramme.com/partners



ATHENS PROGRAMME

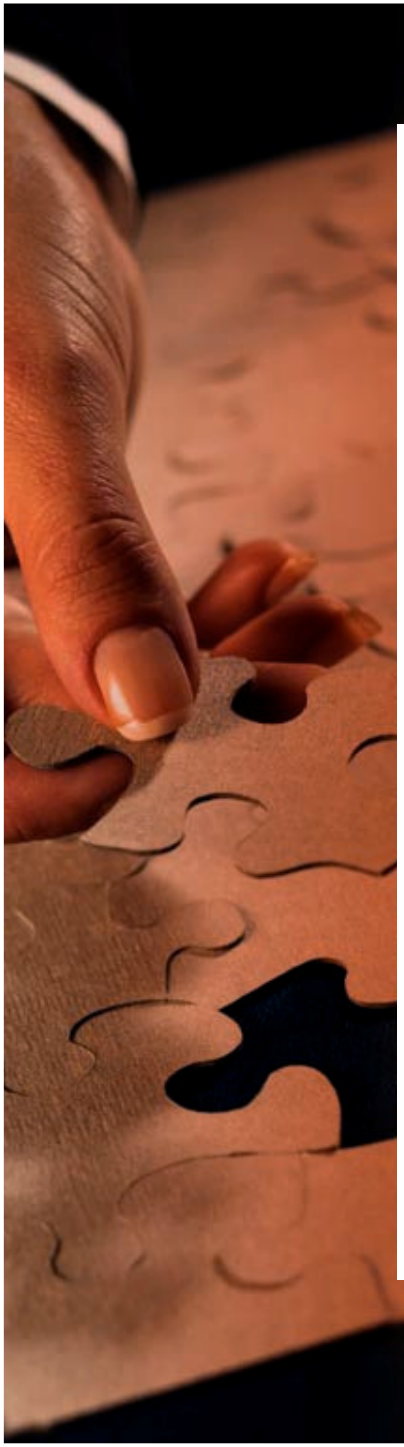
THE ATHENS PROGRAMME
COURSE CATALOG

You are not logged in.

- Login/new user
- Course catalog
- Partner institutions
- Main menu

Course code	TA02
Course title	Software reliability
Institution	Ecole Nationale Supérieure des Techniques Avancées
Course address	ENSTA ParisTech - 32 Bd Victor, 75015 Paris
City	Paris
Minimum year of study	3rd year
Minimum level of English	Good
Minimum level of French	None
Key words	software reliability, operational environment fault removal, measurement, trend analysis
Language	English
Professor responsible	Florin POPENTIU
Telephone	01 45 81 78 19
Fax	01 45 81 31 19
Email	popentiu@imm.dtu.dk, Fl.Popentiu@city.ac.uk
Participating professors	Florin POPENTIU, UNESCO Chair in Information Technologies, University of Oradea (Romania)/The Technical University of Denmark
Number of places	Minimum: 10, Maximum: 30, Reserved for local students: 0

http://www.athensprogramme.com/catalog/show/411



Objectives

Motto: "Prediction is very difficult especially of the future" (Niels Bohr)
The objective of this course is to answer the following questions:
What is software reliability?
Why are the statistical methods necessary?
How do you measure and predict the software reliability?
A computer is a deterministic machine - why can't we predict when it will fail next?
If software is such a problem why not build it in hardware?
There is evidence that defects have their origin in design errors. It becomes difficult or impossible to ensure that software contains no faults. The software reliability is currently a very sensitive area in telecommunications for example the introduction of new services.
The course presents opportunities in the field of prediction of software reliability and the tools allowing to characterize the accuracy and quality forecasts.
The theory is the best practice!
Various methods and techniques that we approach based on collected data: the software reliability growth models, statistical tests, among which trend tests (graphic and statistics methods).

Programme to be followed

Day 1: Key features of software systems
Day 2: Measuring software reliability
Day 3: Models for analysis of the software reliability growth.

Day 4: Evaluation of software reliability predictions
Day 5: Accuracy and quality of forecasts; Capabilities and limitations, Unanswered Questions, Case studies.

Delivered documentation

Copy of slides and of attached documents presented on the Web.

http://www.kurser.dtu.dk/02445.aspx?menulanguage=en-gb
Course URL: http://www2.imm.dtu.dk/~popentiu/Software_Reliability.html

Prerequisites

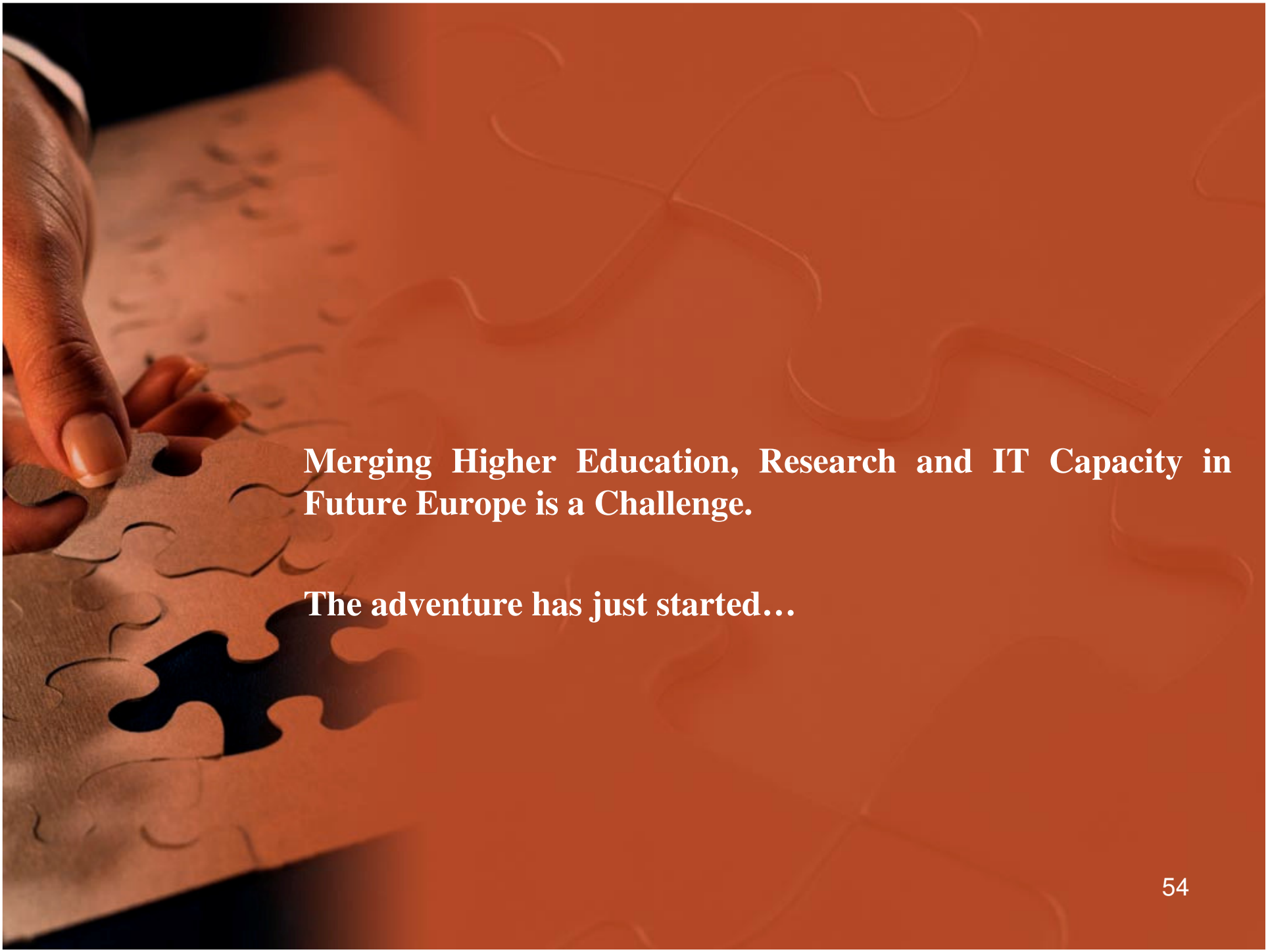
Basic knowledge in programming and statistics.

Course exam

Exam based on a mini-project programmed during the computer based sessions

http://www.athensprogramme.com/catalog/show/411

- Introduction
- Research and national innovation systems
- Strategic international cooperation
- Case studies
- Conclusions



Merging Higher Education, Research and IT Capacity in Future Europe is a Challenge.

The adventure has just started…

THANK YOU
FOR YOUR ATTENTION!

Research and Information Technology Connectivity - Opportunities for Innovation and Issues for Africa

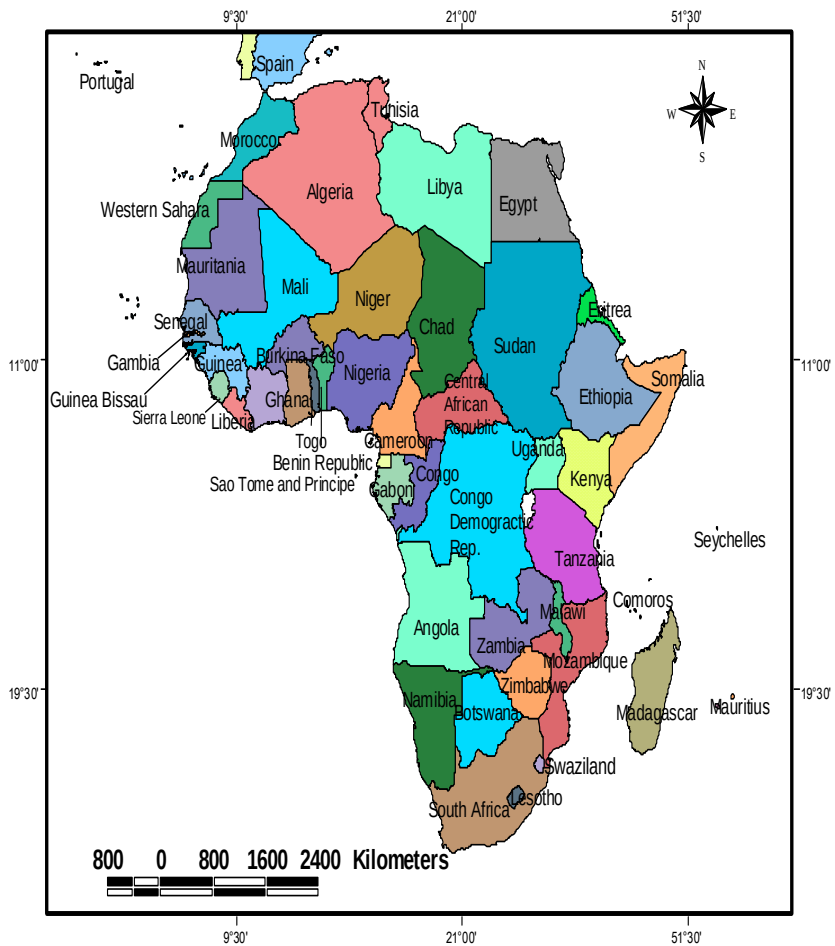
Olusola Oyewole,
Coordinator,
Mobilizing Regional Capacity Initiatives
Association of African Universities (AAU)
Accra, Ghana.

Introduction

- knowledge as a critical element of sustainable development ;
- Nations to be challenged to create, access and employ knowledge .
- Higher Education Institutions constitute an important research space in many countries.

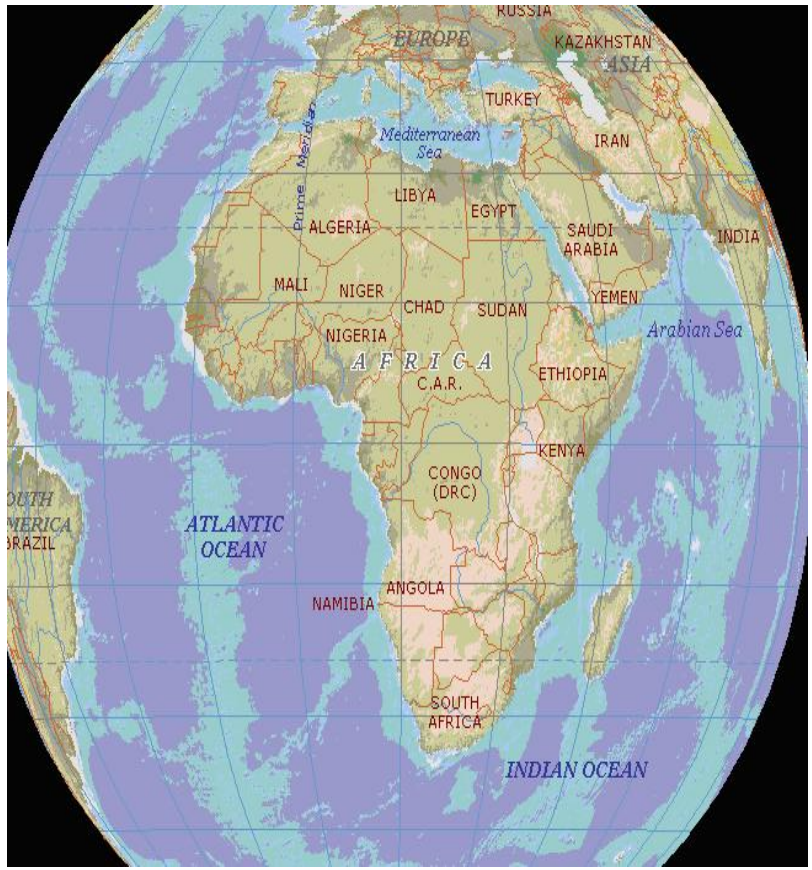
Focus on Africa

- Long period of neglect and stagnation;
- Research set-backs
- Research not accorded good priority.



Some Statistics

- Over 2300 tertiary institutions
- 6.2 m students
- Gross enrolment – 5%
- Less than 0.3% of GNP on research
- 0.3-0.5% world research outputs
- Less than 1.5% of research publications



Problems of Research

- Poor infrastructures,
- Ill-motivated staff,
- Incessant and inadequate power and water supply,
- Out-dated equipment, poor funding and
- Poor connectivity to the rest of the world.

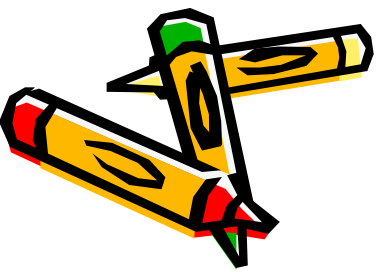
Status of IT Connectivity

"With a population of 955 million, representing approximately 14% of the world population, Africa has a telephone penetration of 3.8% (world average :19%), only 5.3% Internet penetration (world average: 22%; North America:73%) and has only -.2% of world's total internet capacity".

Barry (2008)

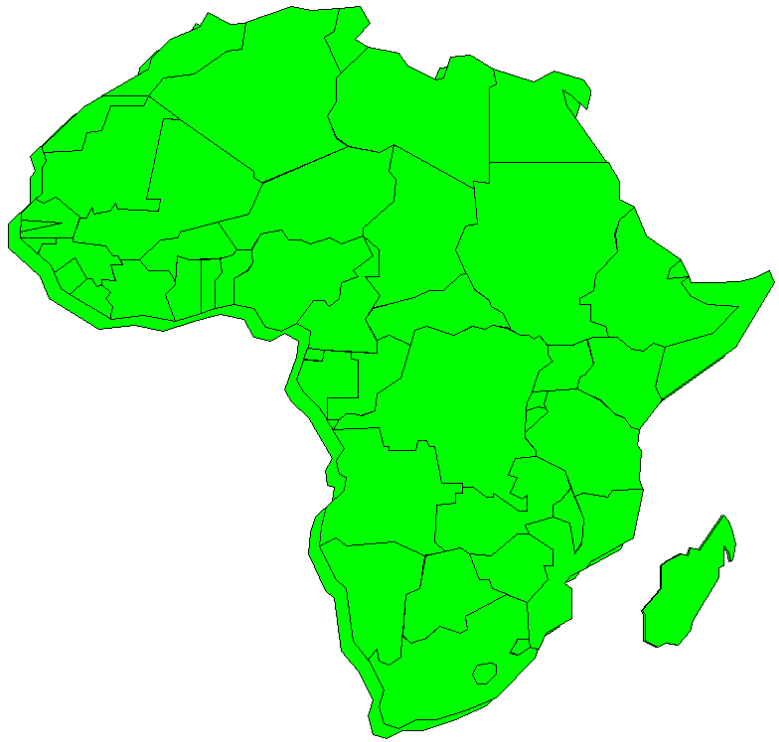
State of ICT Infrastructures in Africa

- Average African University has bandwidth capacity equivalent to a broadband residential connection in Europe;
- Pays 50 times more for their bandwidth than their educational counterparts in the rest of the world.

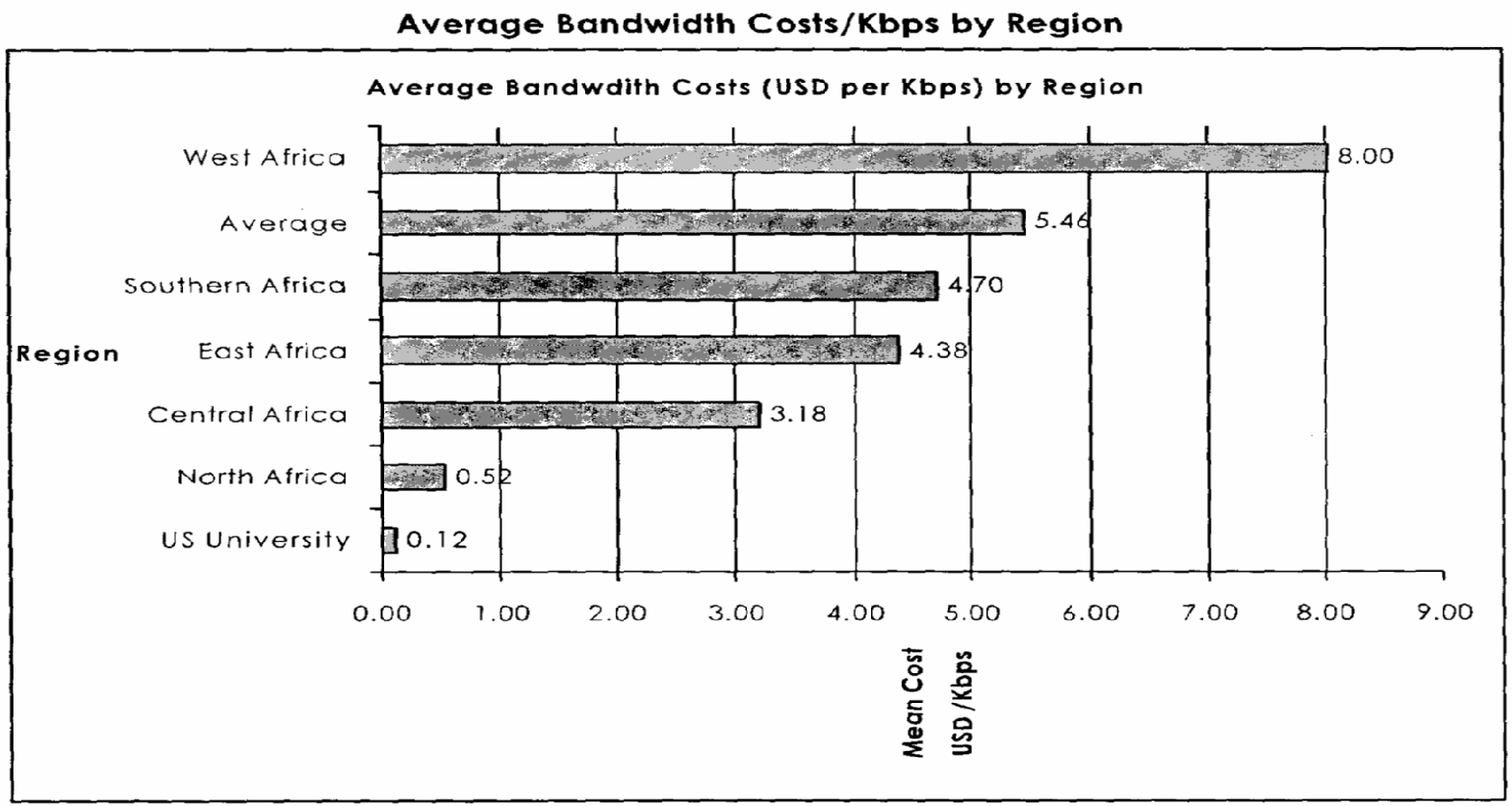


AAU Institutional Survey

- Bandwidth deficit;
- Price and availability problems;
- North African and better than the rest



Bandwidth Availability and Cost



Source: ATICS 2005

Challenges : Bandwidth Limitation

- The absence of connectivity to fibre backbone makes many of the countries to be dependent on low bandwidth and costly satellite links.
- The Bandwidth challenge is currently being met by the various Academic and Research Networks which are evolving in Africa. - (a) Tertiary Education Networks (TENET) in South Africa; (b) Kenya Education Network(KENET) in Kenya; (c) EUMEDCONNECT in North Africa; (d) EUN, Egypt; (e) ENERGI, Egypt; (f) MARWAN2 in Morocco; (g) TUNET in Tunisia; (h) GHARNET in Ghana; (i) MAREN in Malawi; (j) MoRENet in Mozambique; (k) RENU in Uganda; (l) SUIN in Sudan; (m) ZAMREN in Zambia and RWEDNET in Rwanda. New ones are currently evolving.

Challenges- Bandwidth Management

- Ineffective utilization of existing bandwidth , due to absence of bandwidth management strategies promotes bandwidth wastage on unwanted traffic
- Institutions therefore need to put in place necessary policies for optimizing the available bandwidth in academic and research institutions.

Other Challenges

- Human Resources
- Policy and Regulatory Challenge
- Poor Networking and lack of regional collaborations and Cooperation

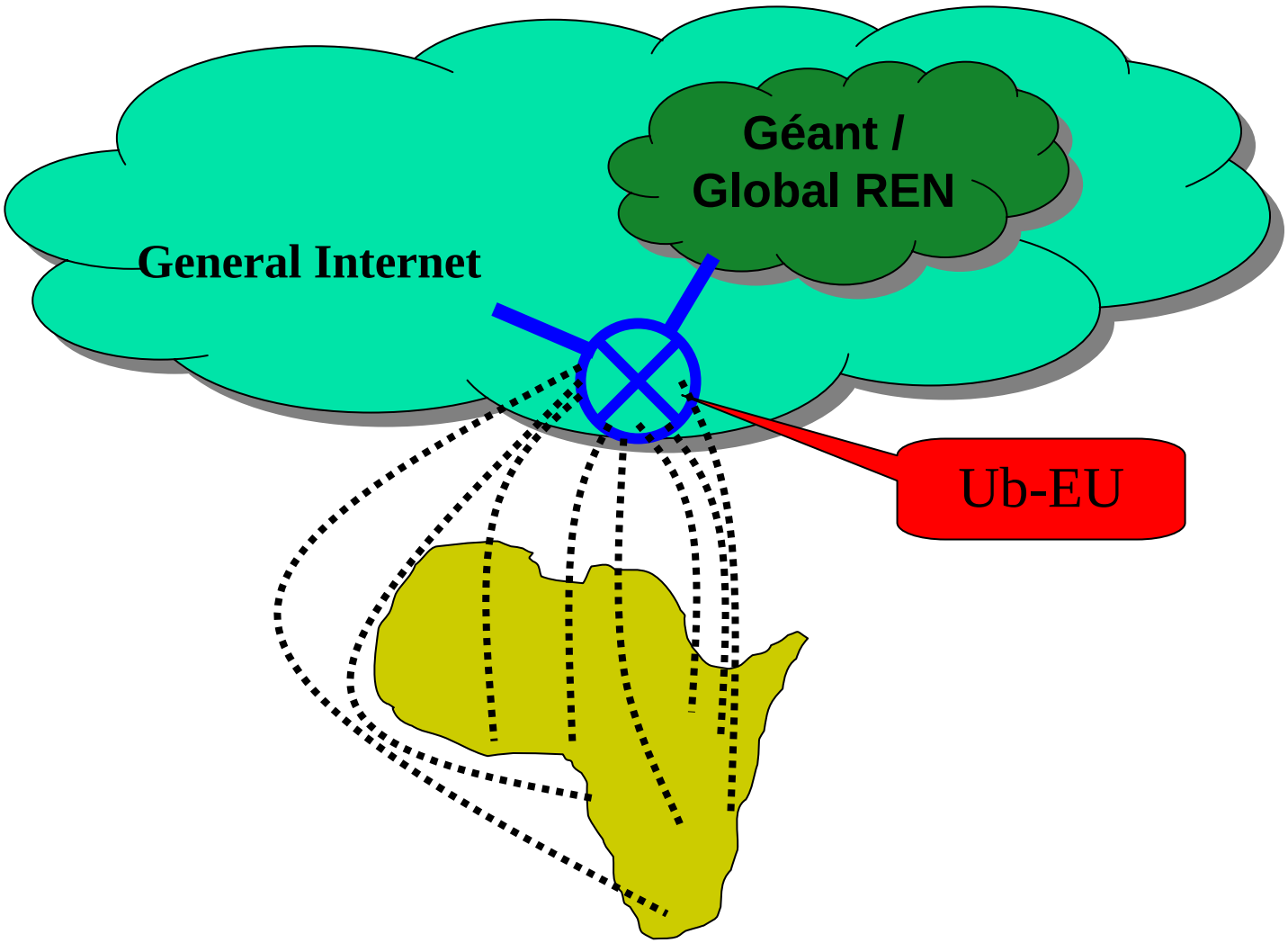
Challenges – Human Resources

- Human Resources
- Policy and Regulatory Challenge
- Poor Networking and lack of regional collaborations and Cooperation

1. Promote Global, Regional Links and Collaborations:

- Create economy of scale for building and sharing high speed networks;
- Contribute to inter-institutional collaboration, research and human networking;
- Promote joint institutional content development, access to large database and sharing of research results;
- Provide centralized training, capacity-building and advisory services to their member institutions.

Enabling connections to Géant

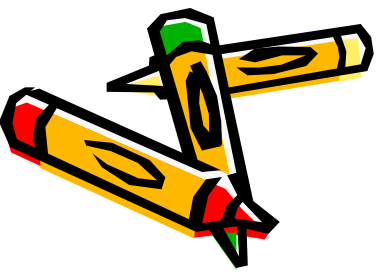


2. **Address problems of energy generation in many countries of Africa**

- Connectivity has failed in many African countries due to the poor national power situations.
- Absence or lack of electricity in many countries limits ICT utilization for research.

3. **Leadership education:**

- There is need to promote and facilitate institutional leadership education on the management of ICT facilities.
- The institutional leadership will need to be educated on the need to standardize policies in network and service deployment.



4. **Improved funding for research:**

- For ICT to benefit research in Africa, there will be need for African countries and institutions to improve their funding for research.
- Current low financial commitment to research in Africa will not help to improve ICT connectivity for research.

Thank you.

The UNESCO Forum for Higher Education, Research and Knowledge

Research in Diverse SustainableContexts:
Tensions, Challenges and Dynamics

Research in the Knowledge Society: Global and Local Dimensions

International Experts Workshop
(UNESCO, Paris, 19-21 March 2009)

Higher Education Research and Innovation a GSSD perspective

Nazli Choucri(*) and Jean-François Mascari(**)

(*)Department of Political Science
MIT USA
nchoucri@mit.edu

(**)Istituto per le Applicazioni del Calcolo and
Complex Systems Institute
National Research Council, Italy
mascari@iac.cnr.it

Overview

- Our purpose is to provide a method for mapping knowledge systems
- Based on scale-free knowledge organization principles we focus on the fundamental structures and functions critical to the domain of higher education and research.
- By providing internal consistency, we isolate the generic features critical to performance across diverse situations and cases.
- By placing higher education systems in the context of sustainable development, on the one hand, and strategy and policy, on the other, we provide a way of framing the domain and the mapping strategy.
- Our strategy is built on two analytical foundations:
  - Knowledge representation method
    (i.e. the *Global System for Sustainable Development*) and
  - *Lateral Pressure Theory* in the social sciences.
- The following slides focus on the elements and unfolding of the mapping strategy for higher education and research.

Introduction: **HERI *Contexts* and *Systems* (*HERICS*)**

Research in Diverse Sustainable Contexts
as Interaction
of
Higher Education, Research and Innovation (HERI)
with
Sustainable Development

Sustainable Development

GSSD MIT

- Ontology Model
- Scale Free e-Knowledge System

(work in progress)

HERI

Global Synthesis Report
Mouton-Waas

- Narratives
- Descriptors
- Indicators

But
no Ontology Model

Our Objective: HERICS

Mapping Knowledge on

Sustainable Development of Knowledge Economies and Societies

within an extended GSSD approach

Mapping Research Systems

Strategy

We pursue an incremental and integrated approach consisting of three components:

- **Template**: Structure and Dynamics
  UNESCO Forum Special Initiative project
- **Ontology** à la GSSD
- **Complex Networks** approach
  (work in progress)

HERICS

Lateral Pressure Theory

- **Architecture**

  Contexts and Systems

- **Domains**

  Resources, Population and Technology

- **Dynamics**

  Needs/Objectives, Demand/Processes and Use/Components

- **Management**

  Governance and Tensions

HERICS
Domains

- **Architecture**

  Contexts and Systems

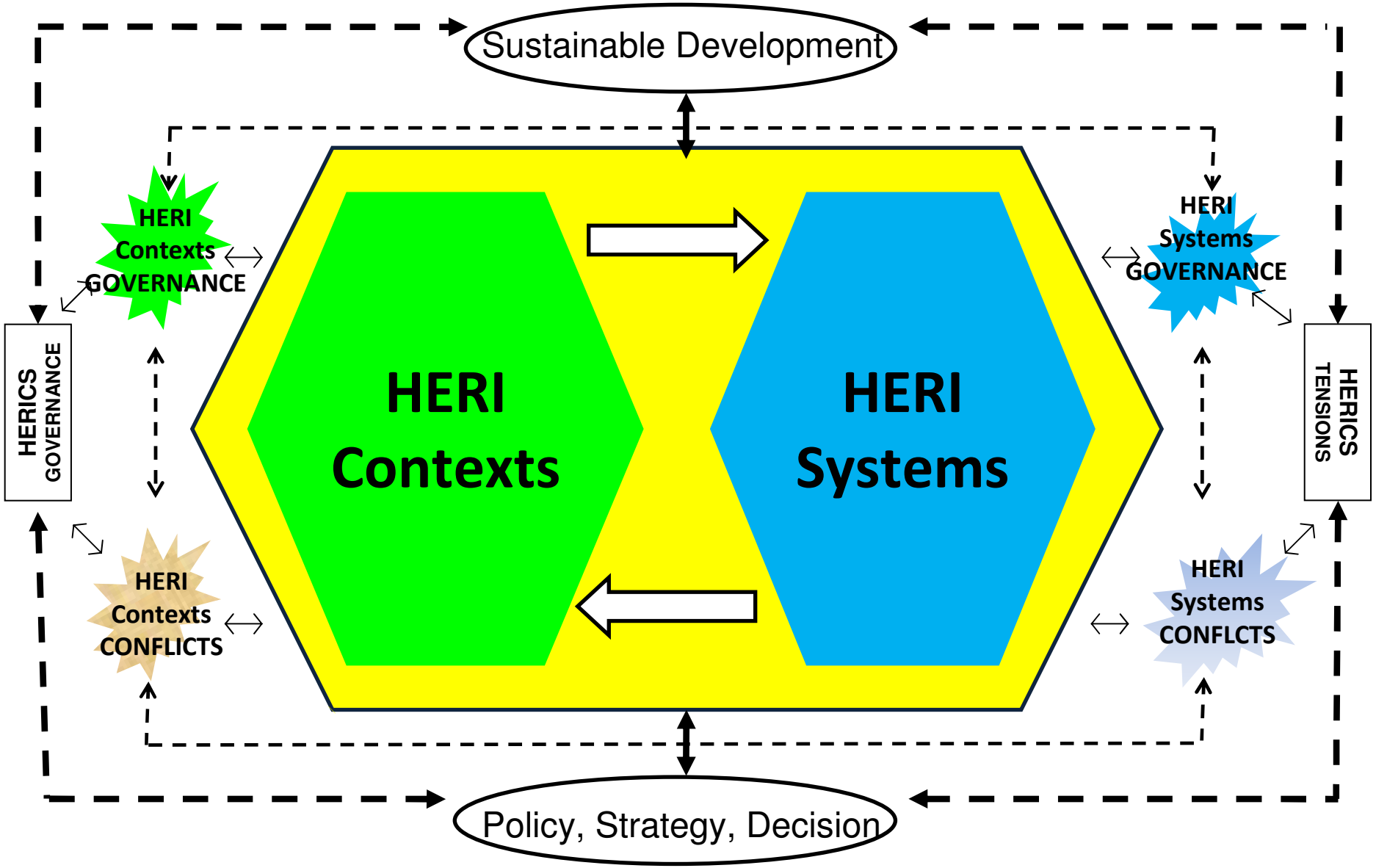
- **Domains**

  Resources, Population and Technology

- **Management**

  Governance and Tensions

HERICS Architecture



HERICS Domains from GSSD

RESOURCES Natural Resources & Energy

- Energy use & sources
- Forests & land uses
- Water uses & sources
- Agricultural & rural activities

RESOURCES Research and Knowledge

- Knowledge use & sources
- Basic research & Applied
- Innovation

POPULATION Demographic Domain

- Population dynamics
- Urbanization
- Migration & dislocation
- Consumption patterns
- Unmet basic needs

POPULATION Human Resources Domain

- Knowledge agents dynamics
- Researchers collaborations
- Migration & dislocation
- Consumption patterns
- Unmet basic needs

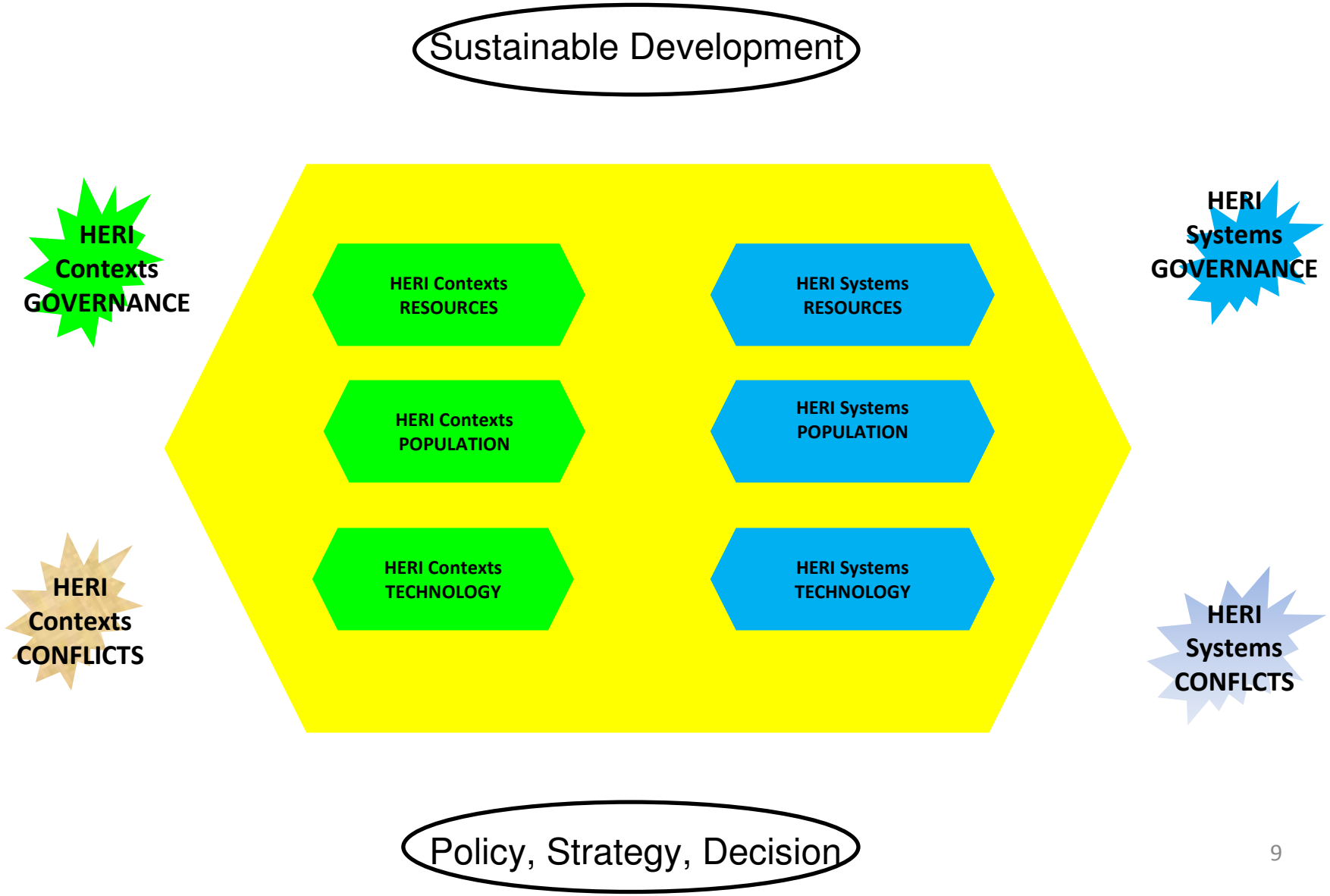
TECHNOLOGY

- Trade & finance
- Industry & manufacturing
- Mobility & transport

TECHNOLOGY

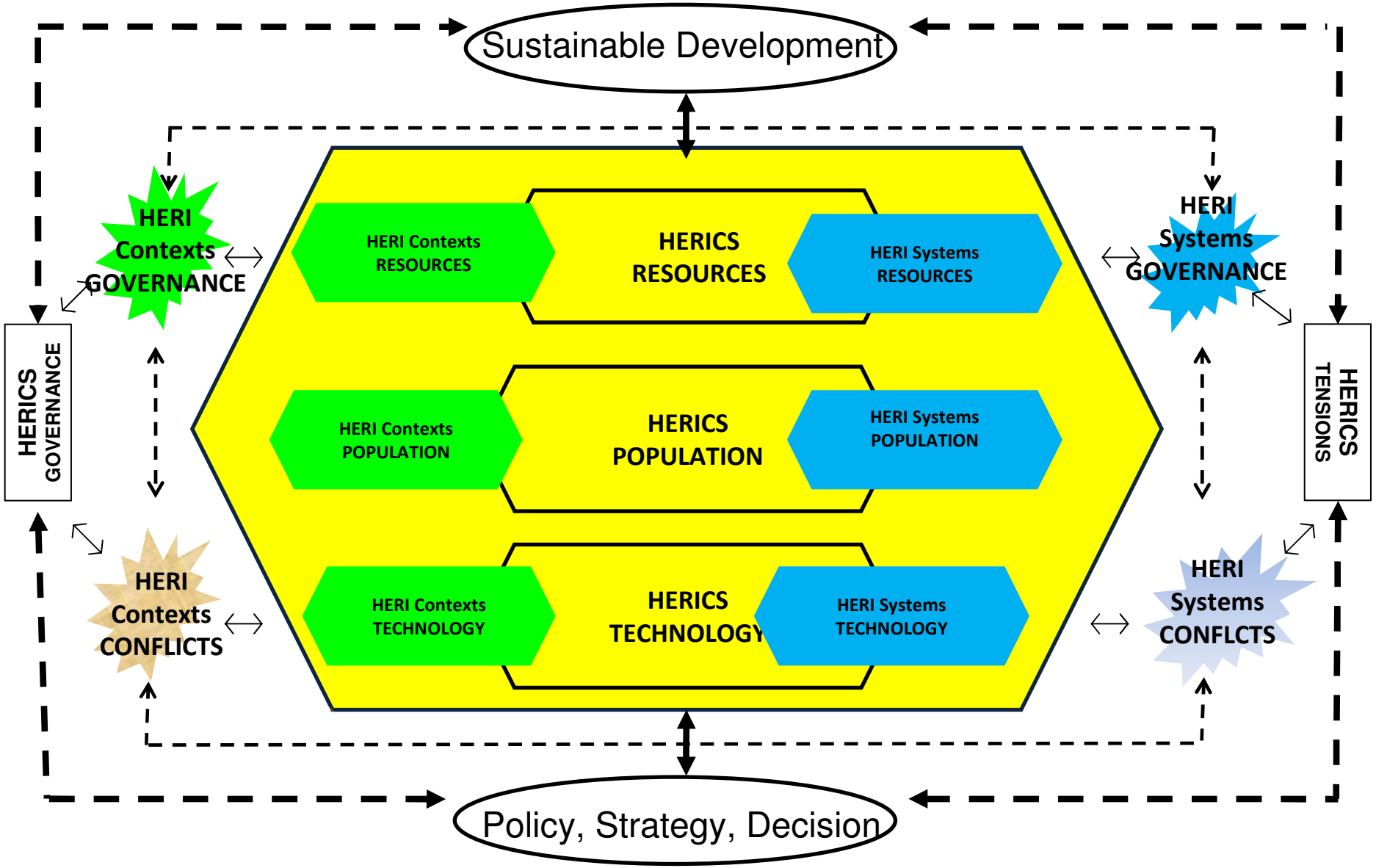
- Research infrastructures
- Education Environments
- Dissemination and Awareness

HERICS Domains



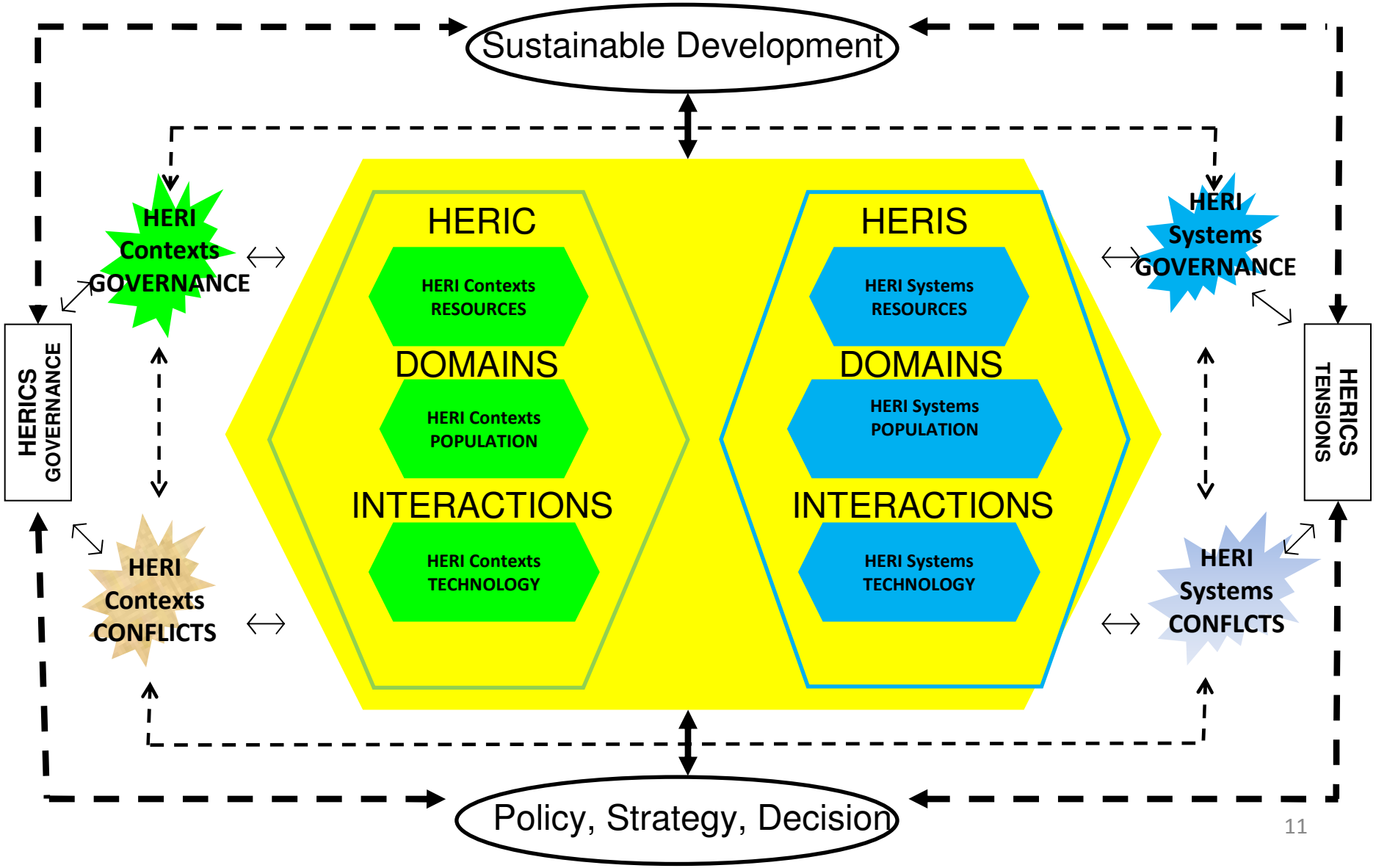
HERICS Domains

Horizontal Interactions



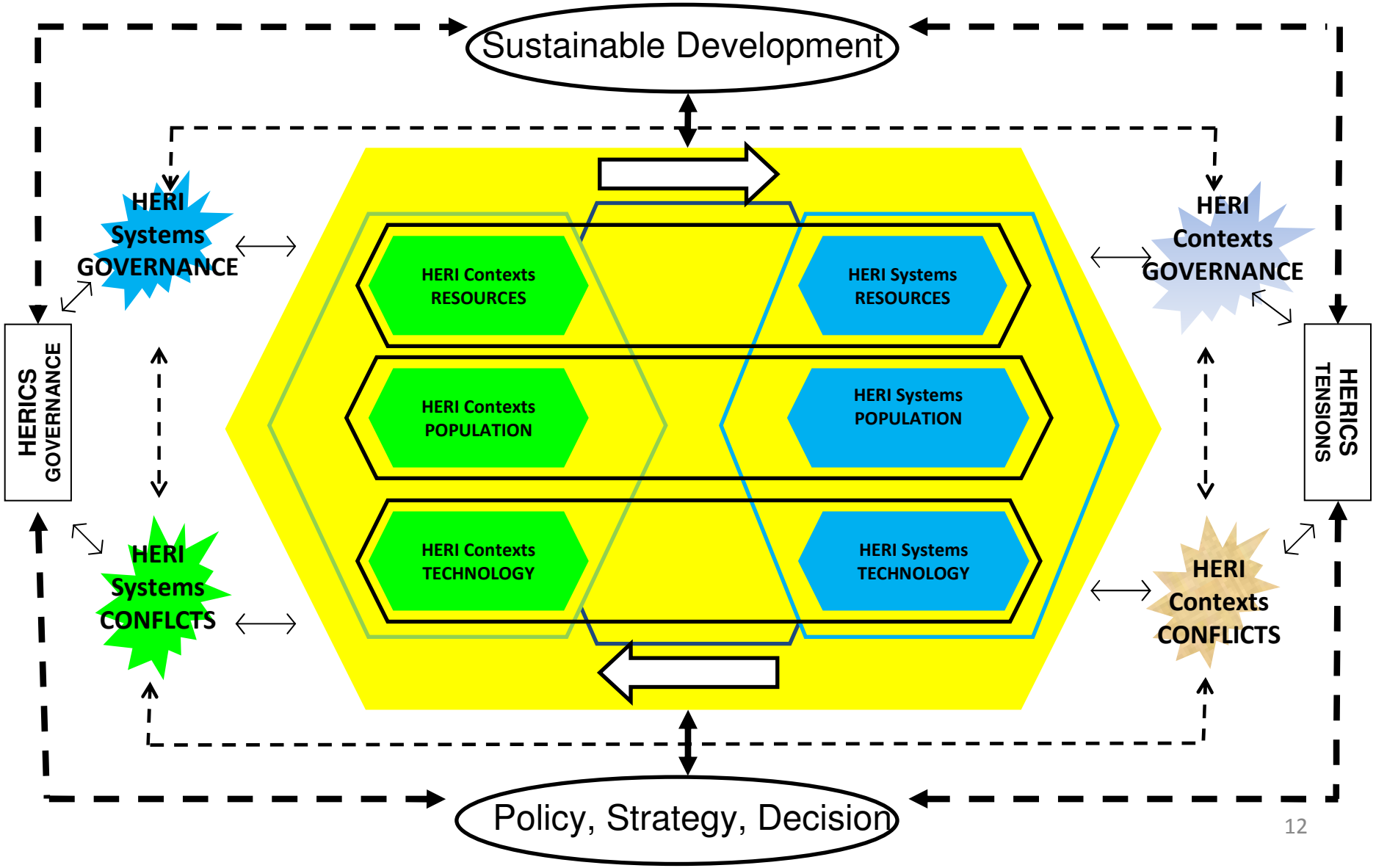
HERICS Domains

Vertical Interactions



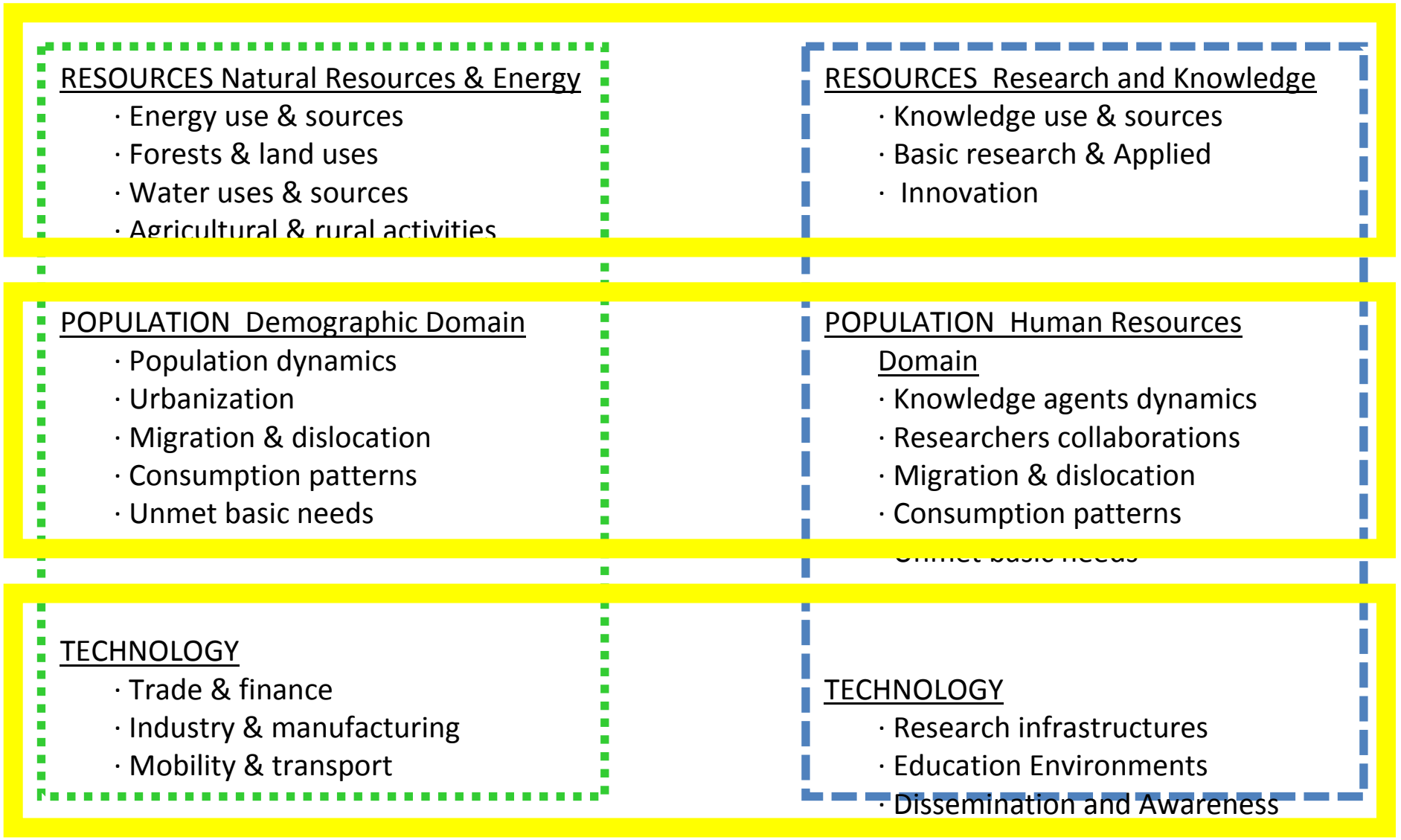
HERICS Domains

Emerging Interactions
from horizontal and vertical interactions



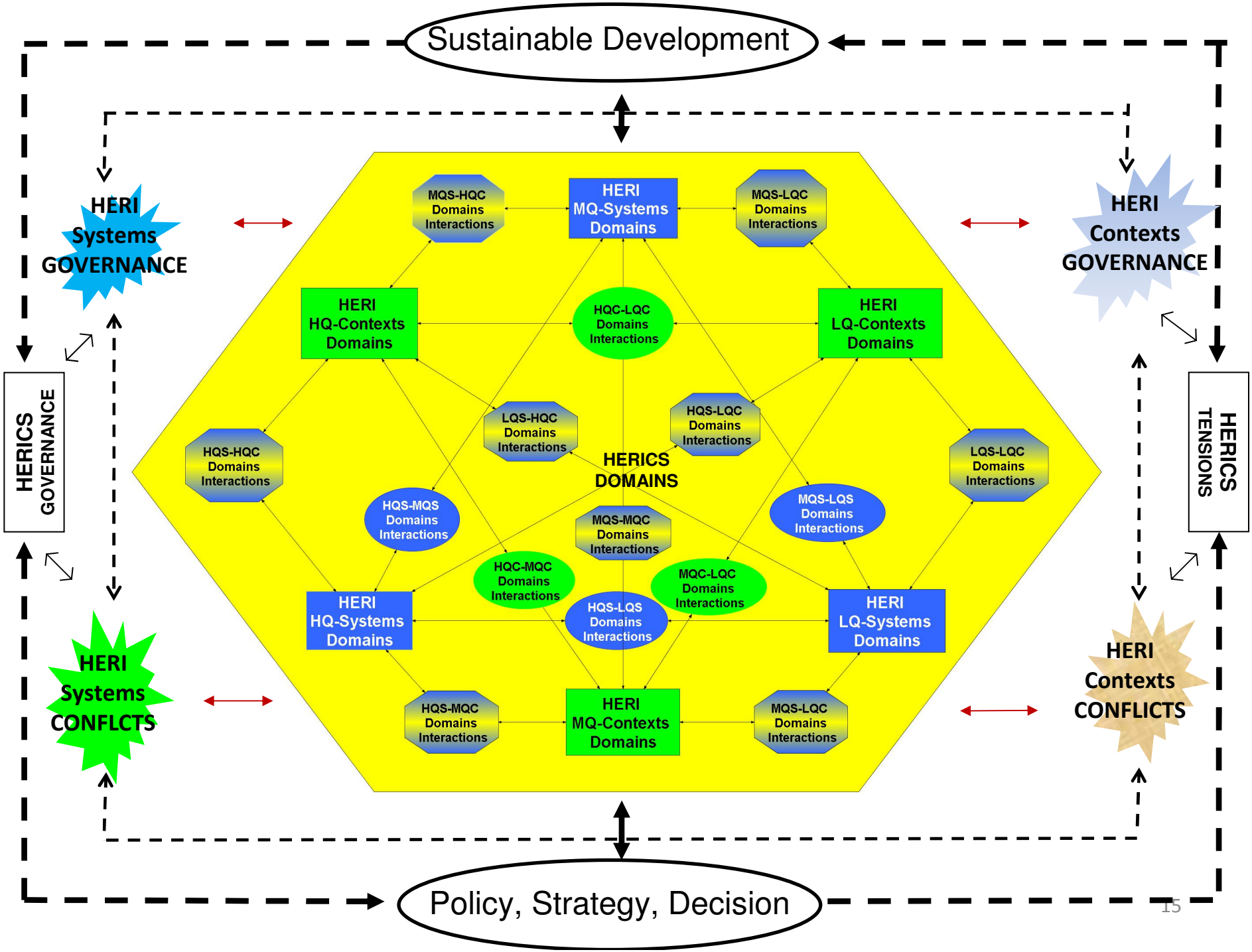
HERICS Domains

Emerging interactions: Double CoEvolution



HERICS Domains Profiles

		High Quality	Medium Quality	Low Quality		
HERI Contexts (C)	**Resources**	HQ-C-R / HQ-S-R	MQ-C-R / MQ-S-R	LQ-C-R / LQ-S-R	**Resources**	**HERI Systems (S)**
	Population	HQ-C-Pop / HQ-S-Pop	HQ-C-Pop / MQ-S-Pop	LQ-C-Pop / LQ-S-Pop	**Population**	
	Technology	HQ-C-T / HQ-S-T	HQ-C-T / MQ-S-T	LQ-C-T / LQ-S-T	**Technology**	


Sustainable Development
HERI Systems GOVERNANCE
HERI Contexts GOVERNANCE
HERICS GOVERNANCE
HERICS TENSIONS
HERI Systems CONFLCTS
HERI Contexts CONFLICTS
Policy, Strategy, Decision
MQS-HQC Domains Interactions
HERI MQ-Systems Domains
MQS-LQC Domains Interactions
HERI HQ-Contexts Domains
HQC-LQC Domains Interactions
HERI LQ-Contexts Domains
LQS-HQC Domains Interactions
HQS-LQC Domains Interactions
HQS-HQC Domains Interactions
LQS-LQC Domains Interactions
HERICS DOMAINS
HQS-MQS Domains Interactions
MQS-MQC Domains Interactions
MQS-LQS Domains Interactions
HQC-MQC Domains Interactions
MQC-LQC Domains Interactions
HERI HQ-Systems Domains
HQS-LQS Domains Interactions
HERI LQ-Systems Domains
HQS-MQC Domains Interactions
HERI MQ-Contexts Domains
MQS-LQC Domains Interactions

HERICS
Dynamics

- **Architecture**

  Contexts and Systems

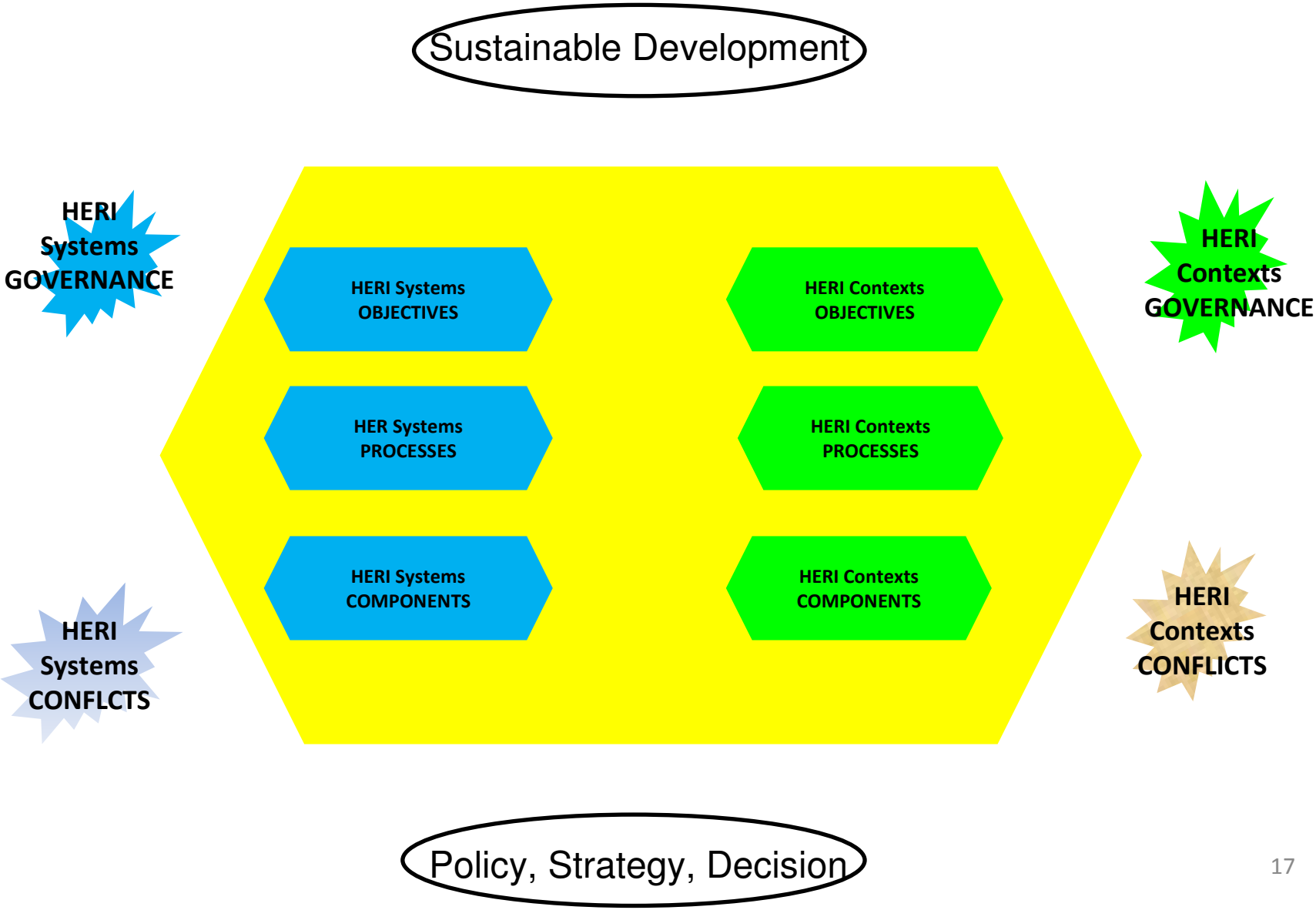
- **<u>Dynamics</u>**

  Needs/Objectives, Demand/Processes and Use/Components

- **Management**

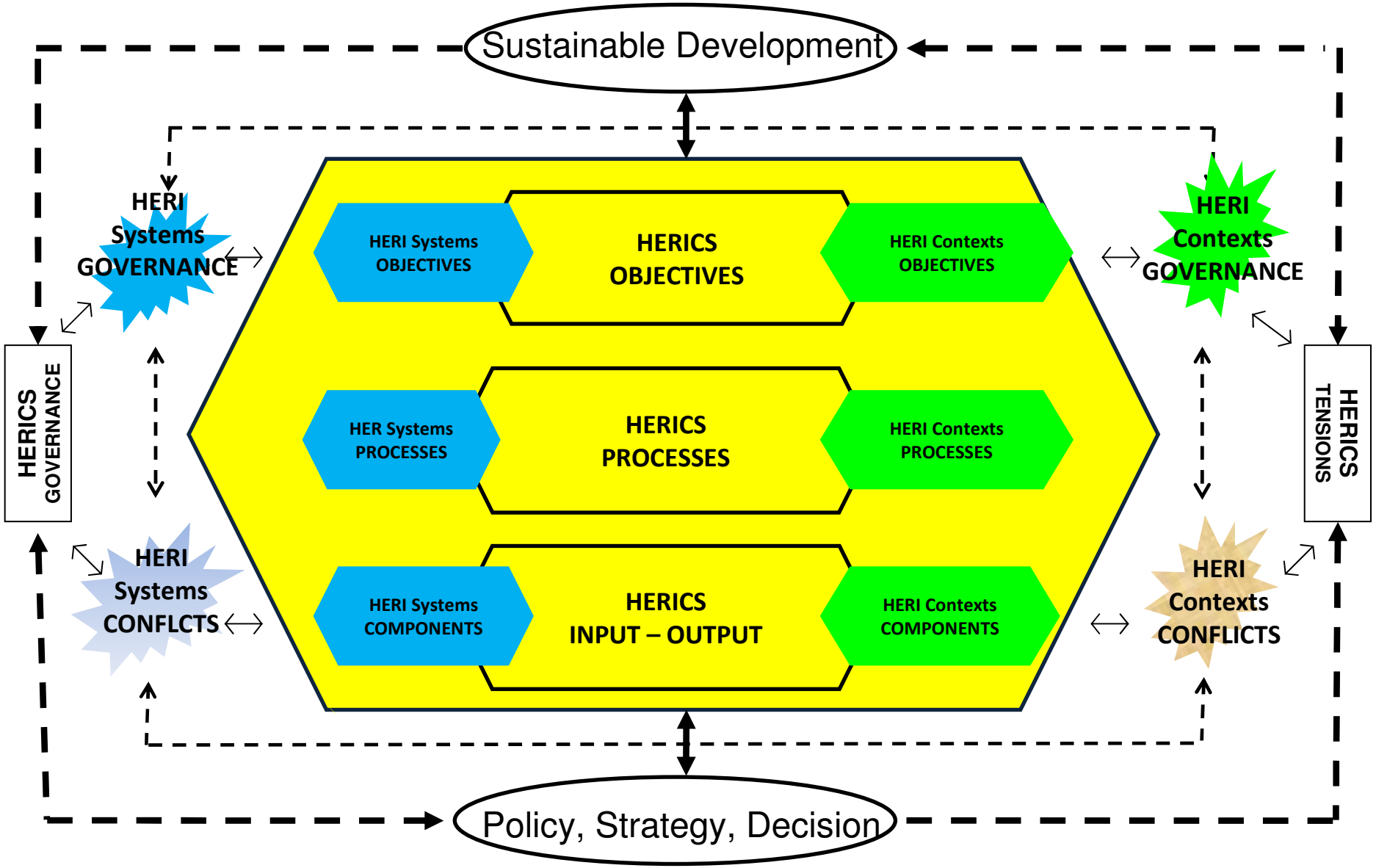
  Governance and Tensions

HERICS Dynamics



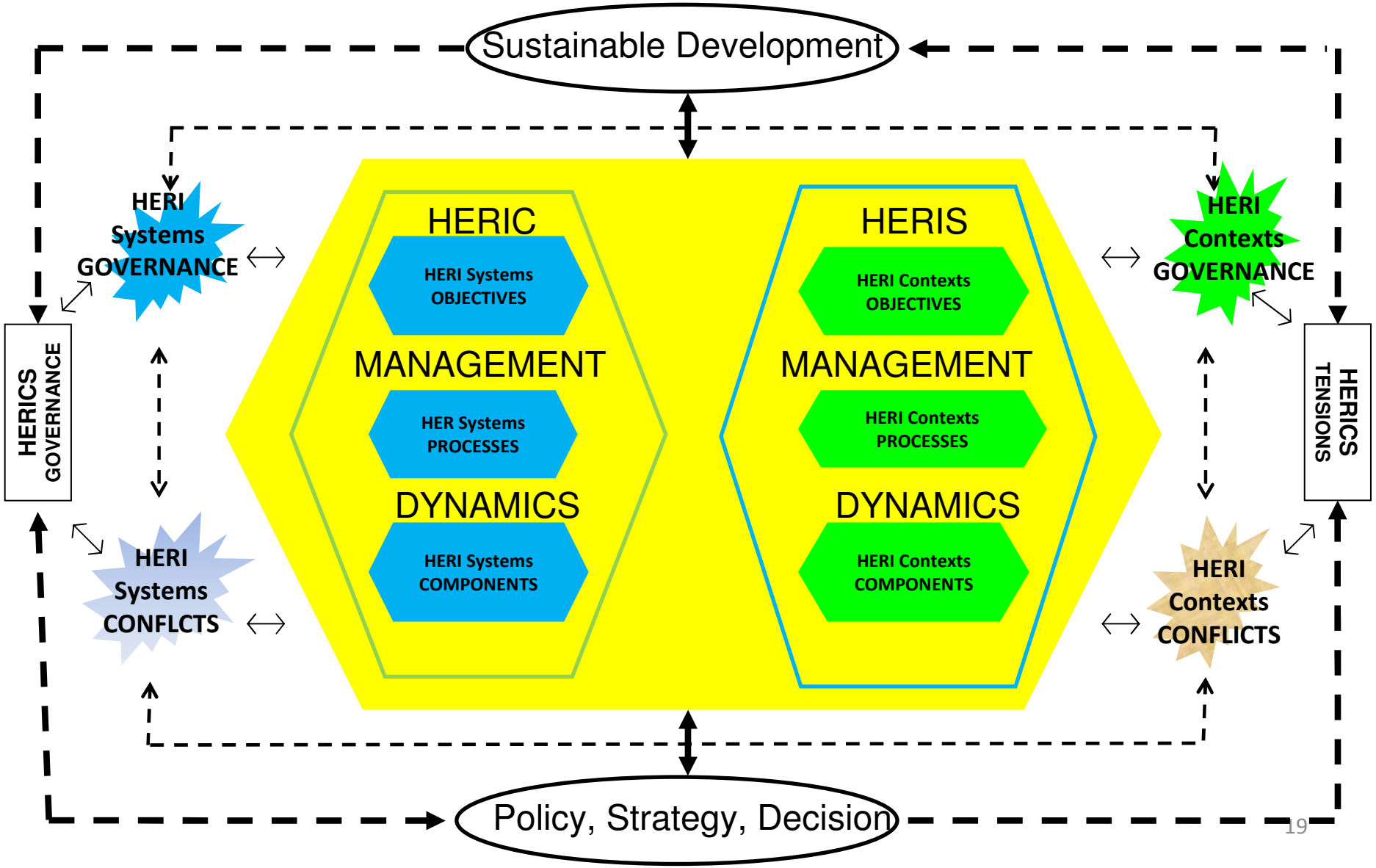
HERICS Dynamics

Horizontal Dynamics



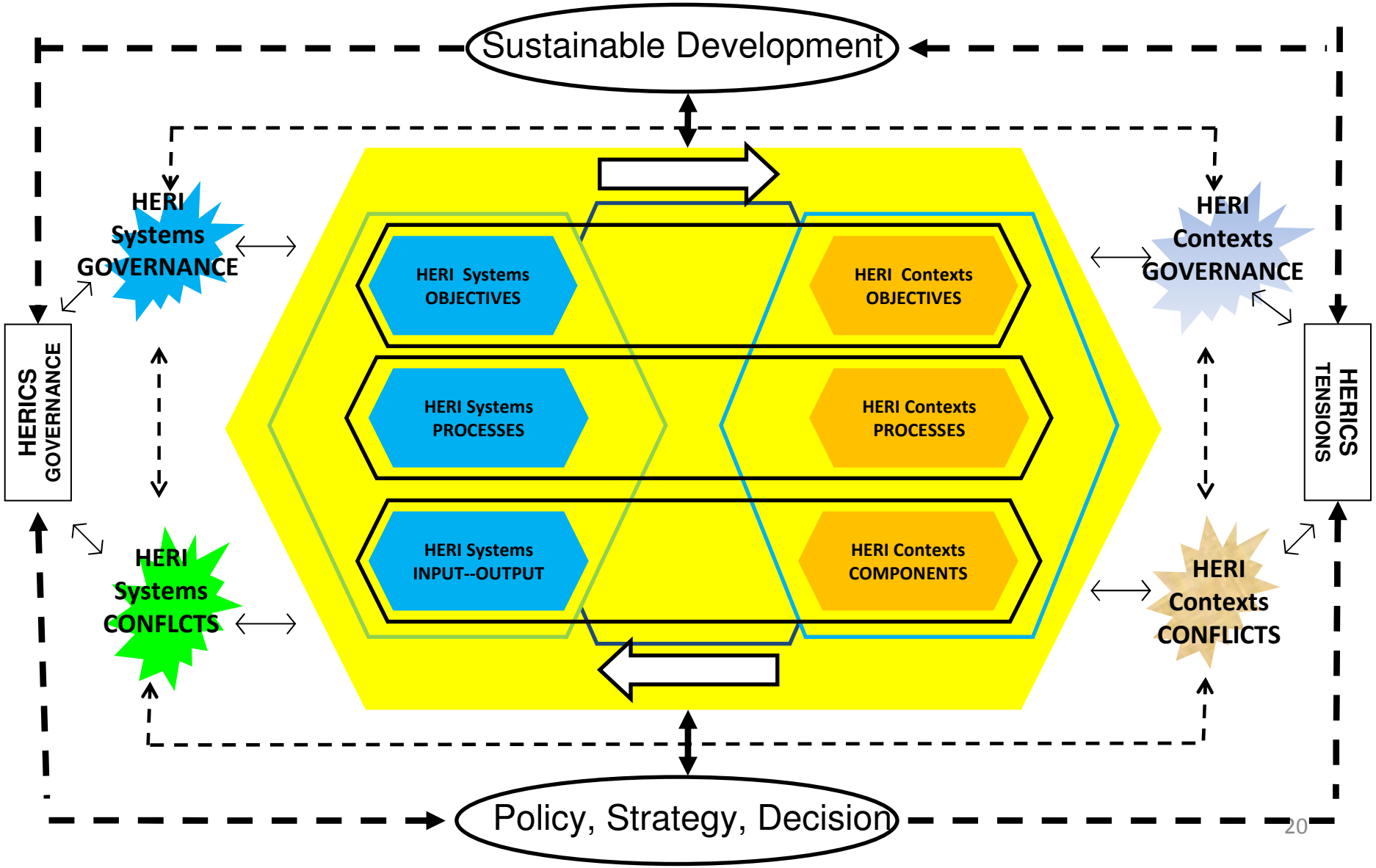
HERICS Dynamics

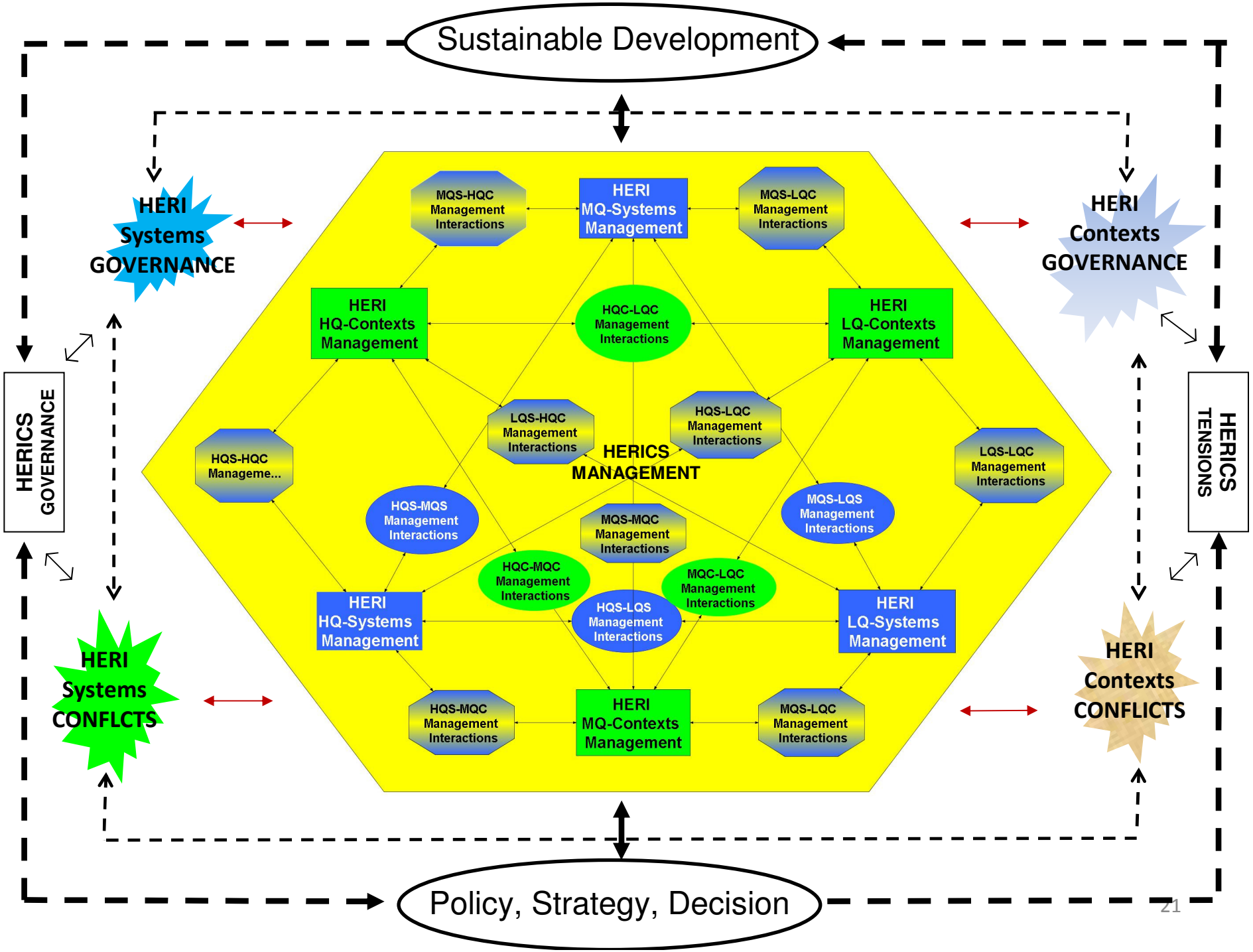
Vertical Dynamics



HERICS Dynamics

Emergent Dynamics




Sustainable Development
HERI Systems GOVERNANCE
HERI Contexts GOVERNANCE
HERICS GOVERNANCE
HERICS TENSIONS
HERI Systems CONFLCTS
HERI Contexts CONFLICTS
Policy, Strategy, Decision
MQS-HQC Management Interactions
HERI MQ-Systems Management
MQS-LQC Management Interactions
HERI HQ-Contexts Management
HQC-LQC Management Interactions
HERI LQ-Contexts Management
LQS-HQC Management Interactions
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HERICS MANAGEMENT
LQS-LQC Management Interactions
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HERI HQ-Systems Management
HQS-LQS Management Interactions
HERI LQ-Systems Management
HQS-MQC Management Interactions
HERI MQ-Contexts Management
MQS-LQC Management Interactions

HERICS Dynamics Profiles

		High Quality	Medium Quality	Low Quality		
HERI Contexts	**Contexts Objectives**	HQ-C-O / HQ-S-O	MQ-C-O / MQ-S-O	LQ-C-O / LQ-S-O	**Systems Objectives**	**HERI Systems**
	Contexts Processes	HQ-C-Proc / HQ-S-Proc	HQ-C-Proc / MQ-S-Proc	LQ-C-Proc / LQ-S-Proc	**Systems Processes**	
	Contexts Components	HQ-C-C / HQ-S-C	HQ-C-C / MQ-S-C	LQ-C-C / LQ-S-C	**Systems Components**	

Next steps
HERICS Profiles

HERIS	**Resources**	**Population**	**Technology**	
Objectives				**Objectives**
Processes				**Processes**
Components				**Components**
	Resources	**Population**	**Technology**	**HERIC**

Work in progress

Unveiling the GSSD and HERI*CS* interactions complexity: The Geometry of Higher Education, Research and Innovation Roles, Symmetries and Scale-Free Networks

HERI Contexts	*STRUCTURED Interactions*	*SCALE FREE Interactions*	*UNSTRUCTURED Interactions*	*HERI Systems*
Energy RESOURCES	!	empirical	?	***Knowledge RESOURCES***
POPULATION	!	empirical	?	***POPULATION***
TECHNOLOGY	!	empirical	?	***TECHNOLOGY***
	Unrealistic	**Realistic and Manageable**	**Unmanageable**	

HERI Contexts	*STRUCTURED Interactions*	*SCALE FREE Interactions*	*UNSTRUCTURED Interactions*	*HERI Systems*
Objectives	!	empirical	?	***Objectives***
Processes	!	empirical	?	***Processes***
Components	!	empirical	?	***Components***
	Unrealistic	**Realistic and Manageable**	**Unmanageable**	

Work in progress
GSSD.2@MIT

- N. Choucri, J.-F. Mascari "*Mapping Sustainability of States and Societies: GSSD Scale Free Network of Interactions*", Poster (forthcoming), International SustainableScience Council - World SustainableScience Forum May 2009
- N. Choucri, "Global Knoweldge e-Netowrking Sustainability" in N. Choucri et. al. Eds. *Mapping Sustainability: Knowledge e-Networking and the Value Chain.* New York: Springer Publishing Company, 2007, 37-58.
- N. Choucri and C. Mathieu, **"**Basic vs. Complex Logic in International Relations" in Nazli Choucri, et al. eds. *Mapping Sustainability: Knowledge e-Networking and the Value Chain.* New York: Springer Publishing Company, 2007, 415-429
- J.F Mascari., G. Cavarretta, "Complex Adaptive Services", *International Journal Business Process Integration and Management*, 2007, 2 (1), pp. 3-8.
- J.F. Mascari, M. Mautone, L. Moltedo, P. Salonia, "Landscapes, Heritage and Culture", *Journal of Cultural Heritage*2009 (forthcoming)

Research Imperatives for Emerging Economies: The Case of Ireland

UNESCO Forum: Research in Diverse Contexts

Paris, March 19th to 21st, 2009

Peadar Kirby

University of Limerick

Introduction

- Republic of Ireland can be seen as an ‘emerging economy’ or a NIC:
  - Colonialism left it with few industries
  - Tried policy of ISI from 1930s to 1950s
  - Moved to EOI in early 1960s
  - ‘Celtic Tiger’ boom from mid 1994 to 2007
    - Two phases:
      - FDI led (1997-2001)
      - Internal demand (2001-2007)

This lecture

- Introduces role of research in Irish development
- Traces emergence of a research culture and infrastructure
- Profiles investment in research
- Critically assesses the Irish state's approach to research
- Learns the lessons of the Irish case

Research in Irish development

- Ireland achieved its boom through winning high levels of FDI in targeted sectors:
  - ICT, pharmaceuticals, chemicals, financial services
- Active policy on research emerged as a consequence:
  - Recognising the vulnerabilities of the Irish success

An emerging research culture

- Objectives:

'Ireland by 2013 will be internationally renowned for the excellence of its research, and will be to the forefront in generating and using new knowledge for economic and social progress, within an innovation driven culture.'

- Strategy for Science, Technology and Innovation 2006-13

- Two key sectors identified in 1998:
  - ICT and biotechnology

An emerging research culture

- Infrastructure:
  - Establishment of three entities:
    - Programme of Research in Third-Level Institutions (PRTLI), 1998
    - Two research councils in 2000:
      - Irish Research Council for Science, Engineering and Technology (IRCSET)
      - Irish Research Council for the Humanities and Social Sciences (IRCHSS)
    - Science Foundation Ireland, 2000

An emerging research culture

- Role of private philanthropy:
  - Atlantic Philanthropies of Irish American businessman, Chuck Feeney
    - Identified low level of government funding and lack of political commitment
    - Decided on strategy of partnering government in developing research culture
    - Helped establish PRTLI and co-funded first three rounds of funding

Profiling research in Ireland

- Spending:
  - From €73m in 1992 to €601.4m in 2006
  - R&D expenditure of universities increased from €169m in 1998 to €568m in 2006
  - 85% of all research funds from government
    - Other sources:
      - €38m from EU
      - €27m from private or individual sources
      - €11m from Irish business; €5m from foreign business

Profiling research in Ireland

- Researchers and areas of work:
  - From 1,886 in 1992 to 4,689 in 2006
    - Establishment of permanent career paths for researchers
    - Areas of research:
      - Natural sciences: €205.5m, 1,398 researchers
      - Medical and health: €118m, 820 researchers
      - Engineering, technology: €115m, 1,108 researchers
      - Social sciences (mostly business): €102m, 767 researchers
      - Humanities: €43m, 483 researchers
      - Agricultural science: €18m, 101 researchers
    - 55.1% on basic, 36.5% on applied, 8.4% on experimental

Profiling research in Ireland

- Ireland's comparative standing:
  - OECD ranking of HERD spending:
    - Ireland moved from 22nd place (2000) to 14th (2006)
  - EU ranking of R&D expenditure:
    - From 1.43% of GNI (1996) to 1.53% in 2006
    - In 11th place among EU27
    - Compares to:
      - EU average of 1.84% of GDP
      - Sweden (3.82%)
      - Finland (3.45%)
      - Austria (2.45%)
      - Denmark (2.43%)

Assessment

- Strengths:
  - Ireland has moved from marginal position to being in middle rank position
  - Now an active participant in international research networks, particularly in cutting-edge issues in science and technology
  - Big increase in profile of research in Ireland:
    - Research as a career path is now well established

Assessment

- Causes for concern:
  - Government is very concerned at the weak outcomes in job creation and company growth
  - Irish business is still largely inactive in R&D
    - Low rate of patent applications
    - Business R&D heavily concentrated among MNCs
  - Why has it not had a bigger impact?
    - Evidence of product and process innovation low
    - Poor interaction between research and industry innovation (Jordan and O'Leary)

Assessment

- Lack of consistency in public policy:
  - o Concern at failure of core spending on third-level education to maintain itself in real terms:
    - Fall of one-third in real terms since 1995
    - Gap widening with levels of spending in comparable countries
  - o Fears that core capabilities of universities being eroded

Lessons of Irish case

- Irish state has belatedly been convinced of the importance of research spending:
  - Major increase over past decade:
    - Impressive research infrastructure put in place
  - But major concerns:
    - Policy too fragmented:
      - Weakening investment in core capabilities
      - Indigenous industry still too weak to avail of research
  - What will happen in present recession?

RESEARCH IN DIVERSE SOCIAL CONTEXTS: Changing demographics & social outreach

Merle Jacob, Oslo University , Lund University

Why is the governance of research a new policy imperative

- Research has been reaffirmed as a critical input to economic growth and innovation
- University research is now recognised as a tradeable service, this means that countries could conceivably decide to expand their investment in HER with the specific purpose of becoming a major service provider
- Even the most basic economic activities are increasing in knowledge intensity thus reinforcing the need to have a highly educated workforce

The governance of research: Changing demographics

- Aging scientific workforce in developed countries
- Migration of new recruits to the scientific workforce away from traditional natural science and technical areas
- Increasing proportion of available new labour for science is coming from developing and transition countries
- Geopolitics of the war on terror has changed the direction of student flows

The governance of research: Changing demographics

- The academy has for a long time been a predominantly Western institution despite its success in inspiring non Western countries to adopt its model. In order to be successful developing country universities have to embrace these values.

The governance of research: Changing demographics

- The critical knowledge interest of the social and human sciences coupled with their tendency to champion problematic issues such as democracy, equity, etc. makes policymakers unsure of their ability to support instrumental goals.

- Social and human science input to technological knowledge development and application is de emphasised while its reflexive contributions are emphasised

The governance of research through impact: research in diverse social contexts

- Requirement that research should be evaluated in terms of impact has profound consequences for science on several levels. These include:
  - Resource allocation (national, local, organisational)
  - Type and content of collaborations between research performing institutions and other actors
  - What type of knowledge is created and who are the potential beneficiaries
  - Focus of research agendas (individual and institutional)

Why governance through impact is gaining popularity

- Science and innovation policy has always been a black boxed activity for those who are charged with its governance
- Science and innovation policy has traditionally had a democratic deficit as a result of the opaque nature of its components and the lack of understanding of the relationship among the constituent elements of science policy

Impact and steering mechanisms

- State of the art science and innovation policy uses two types of impact based steering
  - Impact as a measure of quality
  - Impact as a measure of relevance

Impact as a mechanism for ensuring quality

- Using citation counts and other bibliometric indicators to assess research performance of individuals, groups and organisations

- Bibliometric indicators are however indications of quality at best not equivalent to quality
  - Imperfection at this level is related to problems in the methods used to calculate these figures

Impact and relevance

- Impact as a measure of relevance: a crude yet complex policy tool
  - Ex ante relevance: incorporation of specific stakeholders and/or their knowledge needs in research agendas/proposals as evidence of the relevance of research
  - Ex post relevance: Evaluation of research in terms of its application to different non research goals as an indicator of its relevance

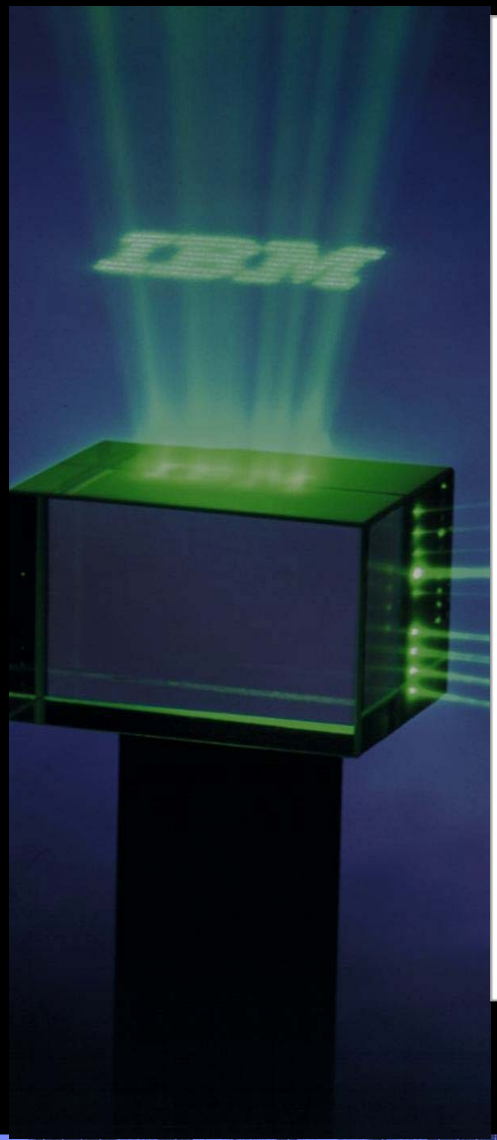
THE BOTTOM LINE FOR GOVERNANCE & FOR THOSE GOVERNED

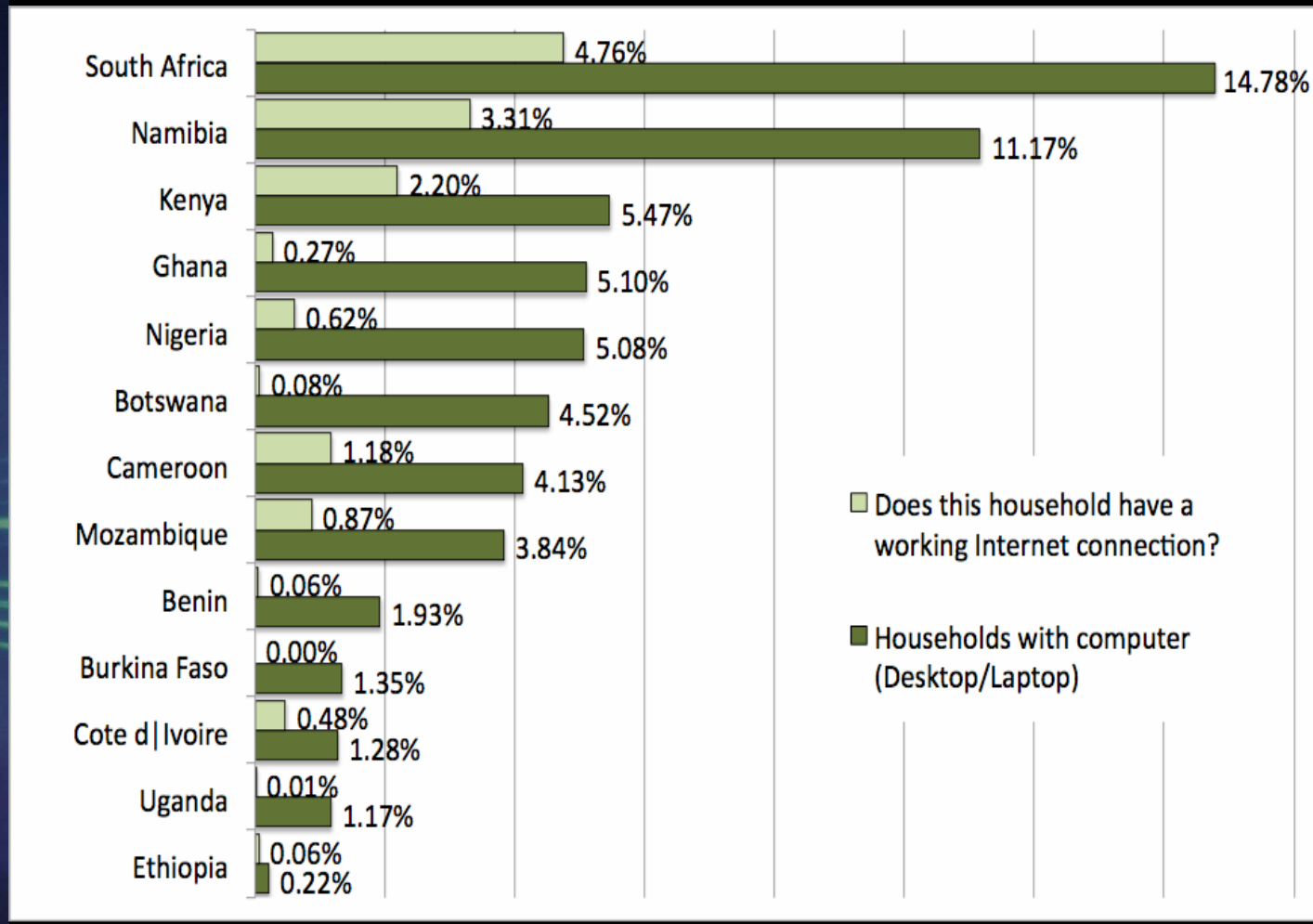
- The scientific community needs to toe a fine line between selfprotection and resisting the temptation to make unrealistic promises in exchange for funding
- Policymakers need to be reminded that while S&T are important, they cannot in themselves provide the answer to the most pressing questions on the policy agenda today
- World class excellence is not a phenomenon that is restricted to developed countries, there are world class groups and individual researchers everywhere.

Research and IT Connectivity: Opportunities for Innovation and Issues for Africa

Dr Diem Ho
Member of the IBM Academy of Technology
UNESCO Forum, Paris, March 19-21, 2009
diem_ho@fr.ibm.com

Research and IT Connectivity Update





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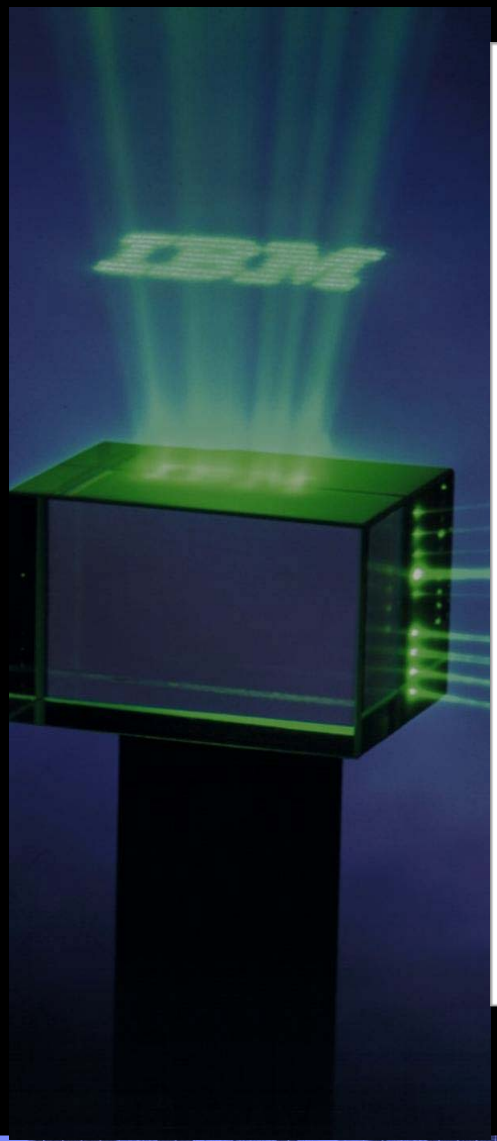
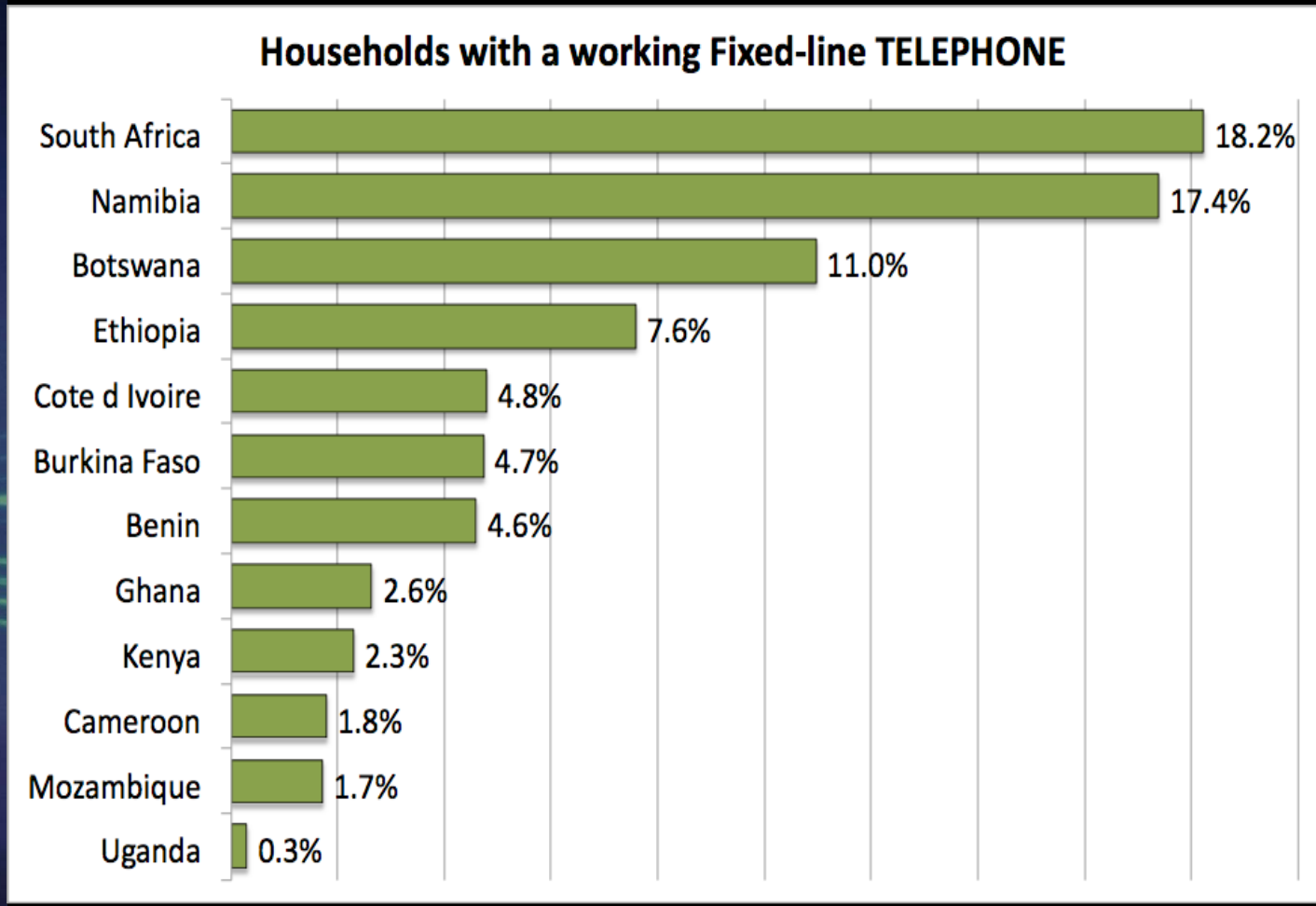
Research and IT Connectivity Update





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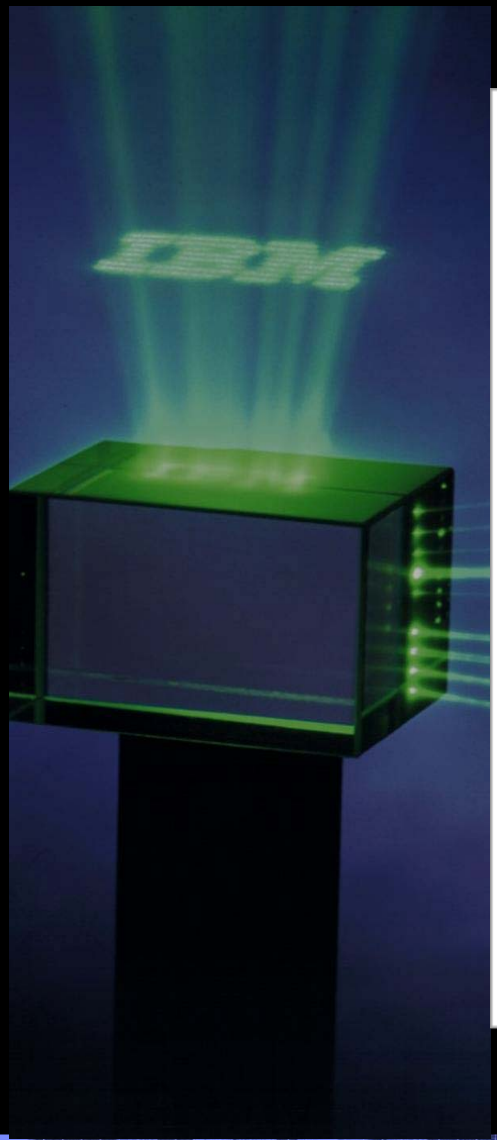
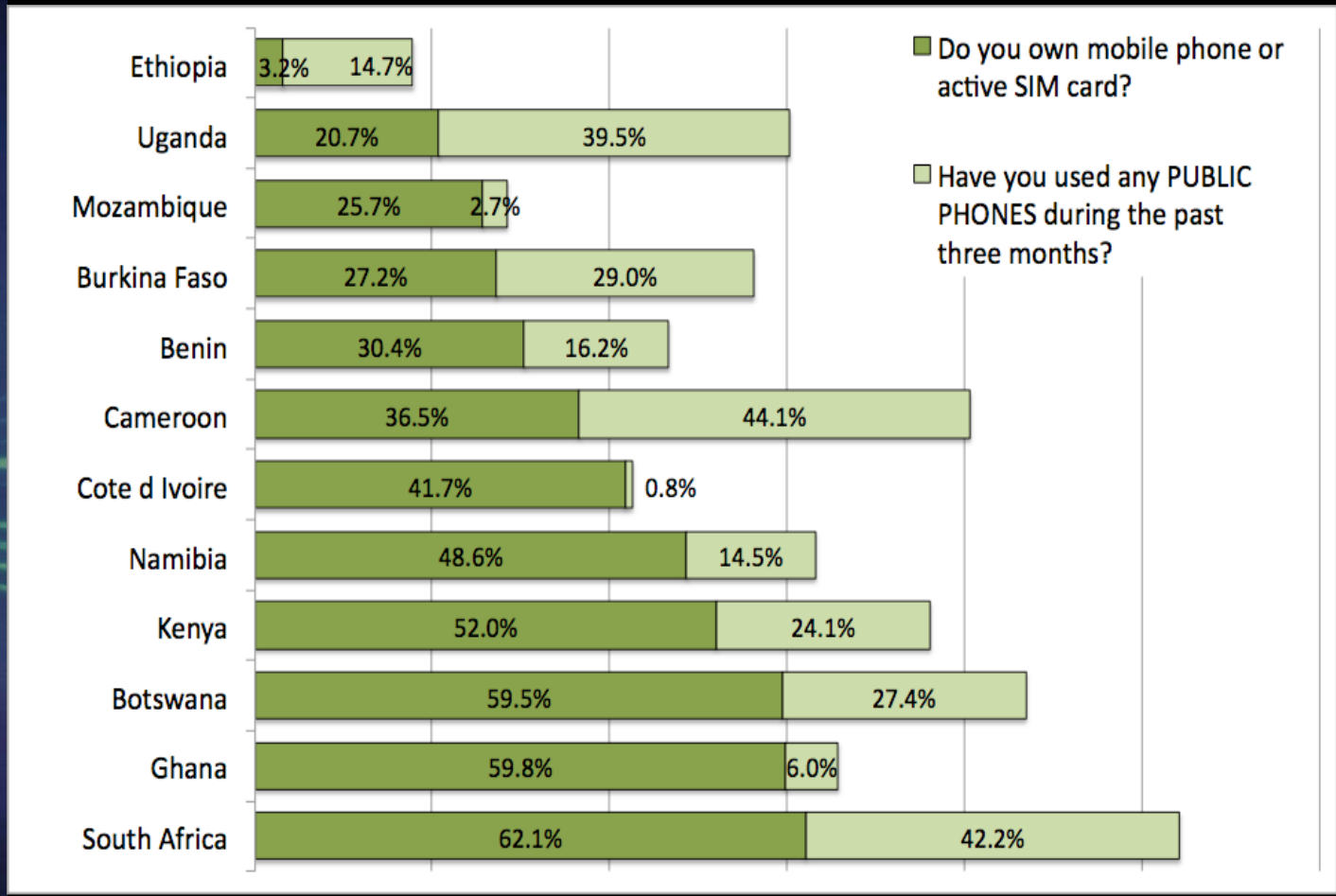
Research and IT Connectivity Update





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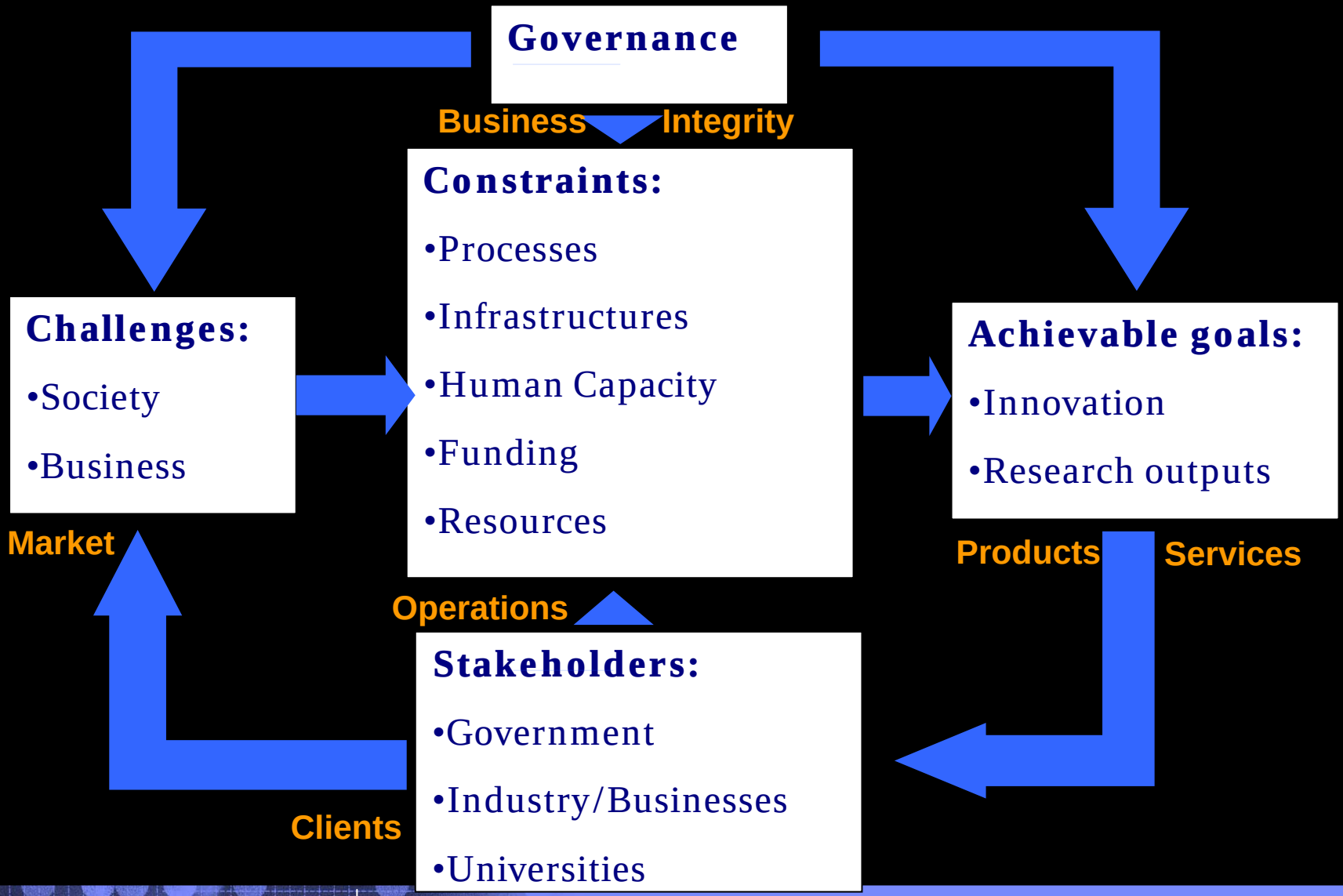
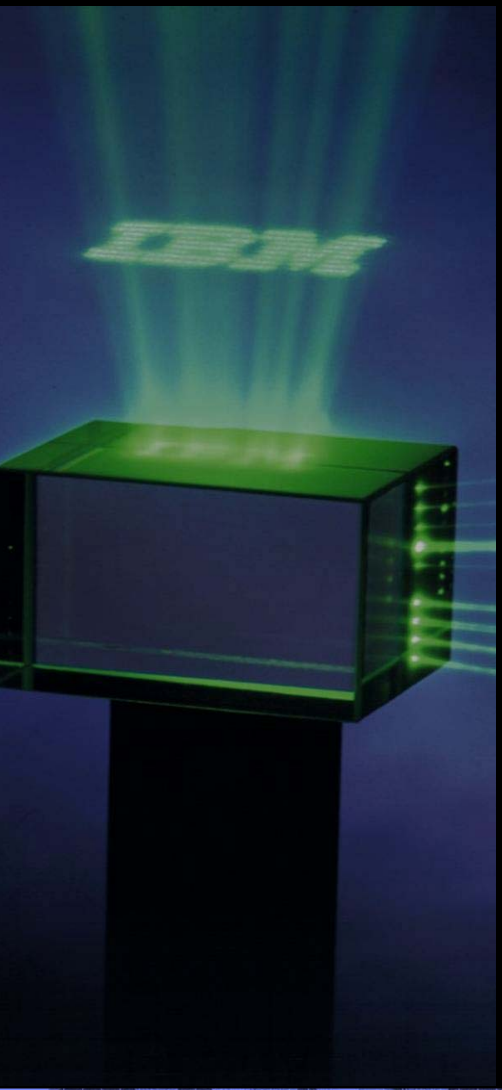
Research and Innovation Ecosystem



Opportunities and Challenges

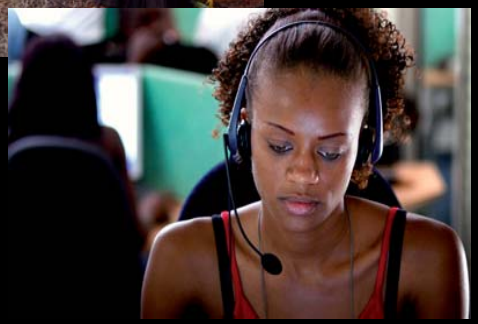


- Eco-system: Value Chain Beneficiation.
- Human Capacity: Skills Development
- Infrastructure
- Societal and Business Challenge: Wireless

See more at http://domino.watson.ibm.com/comm/www_innovate.nsf/pages/world.gio3.africa.html

Moving Up the Value Chain

- Africa's raw materials are extracted, exported, and refined overseas and the finished goods are marked up and sold for hefty profits all over the world



- A strong desire exists within Africa to move from being consumers / suppliers to producing societies
- African nations can parlay the value in their natural resources into diversified economies, infrastructure, and more value-added business:

Rwanda: Coffee Beans to Designer Coffee Roasts

Botswana: Rough Diamonds to Diamond Cutting

Uganda: Cotton to Textiles

Opportunities: Beneficiation and more

- Develop processing capabilities for raw materials
- Reinvest profits from commodity boom into infrastructure for high-value products and services industries

Skills Development

- Africa's youth are the key to future economic development, but as a resource they currently not being cultivated to full potential
- Most non-profit groups concentrate funding on basic education, creating even more demand for higher learning but less capacity at the university level
- Inconsistent or nonexistent partnerships between African education system and the private sector is limiting growth in the talent pool
- Technology and entrepreneurial skills development can be fostered with assistance from the private sector and African Diaspora

Opportunities

- **Mentoring/Internships**
- **Distance learning**
- **Curriculum development**
- **Sponsored training programs**

e.g. Agronomy: CSS (Sugar Company) and Uni. Gaston Berger of Saint Louis, Senegal;

Cisco Networking Academy program.

Infrastructure

- The foundations for business, especially the knowledge economy, are still lacking throughout many regions of Africa

- Africa's ICT infrastructure investment totaled $8 billion in 2005; development of lower cost broadband access for landlocked countries is critical
- Opportunities like 2010 FIFA World Cup are driving physical infrastructure investment
- Chinese firms building out roads, bridges, stadiums and schools as good-will gestures

Opportunities

- **Cost effective and collaborative partnerships for infrastructure development**
- **Linking economic strategies to infrastructure investment plans**

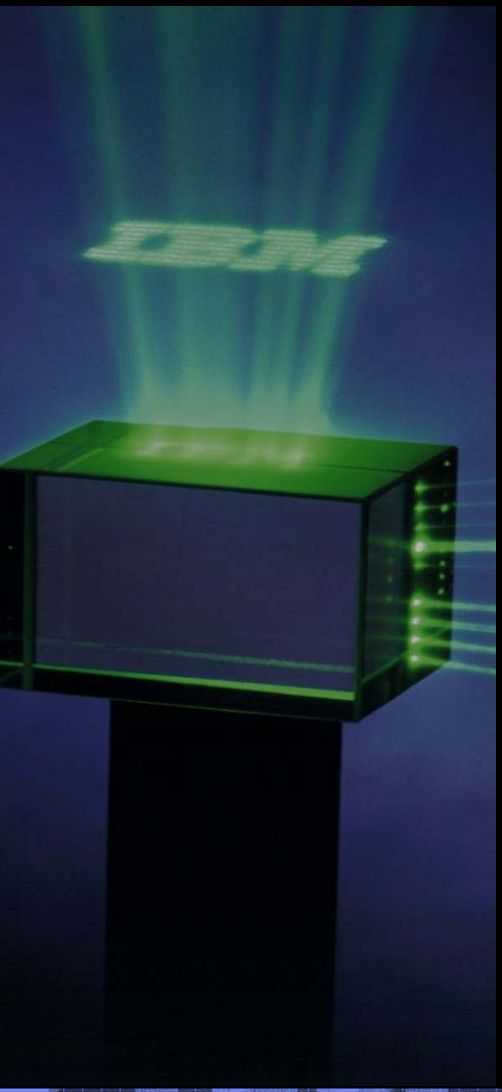
Wireless

- Lack of legacy infrastructure is fuelling multiple “leapfrog” opportunities
- The many challenges unique to Africa – huge geographic distances, widely dispersed populations, little existing telecommunications infrastructure – have conspired to create a wireless hotbed
- African use of mobile phones has been far more innovative than in Europe, largely because the specific needs of Africa require innovation

Opportunities

- o Transaction and Payments
- o Content Distribution
- o Market Pricing
- o Health care & Disease Management
- o News, Entertainment, Democratic Participation

To meet the Challenges and create the Opportunities

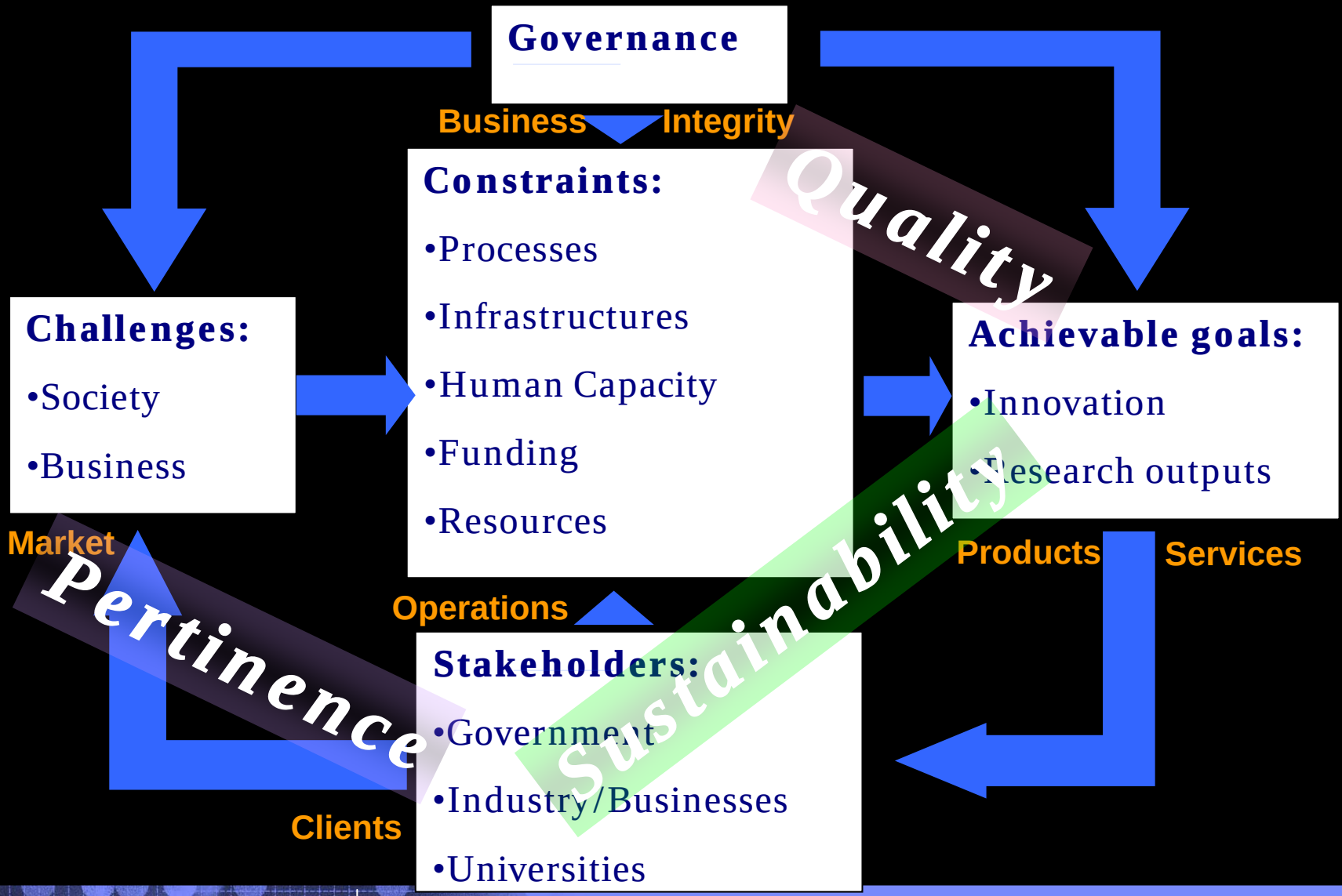


IBM recent contributions:

- Software Donation to all universities: the Academic Initiative

  http://www-304.ibm.com/jct01005c/university/scholars/academicinitiative
- Donation of a Blue Gene supercomputer to the Meraka Institute
- Creation of the mentoring program: Makocha Minds, involving IBM top technologists with students in 19 universities in 8 countries and expanding
- Launching the Africa's first Cloud Computing Center and the continent first High Performance on Demand Solutions Lab (HiPODS) at the Africa Innovation Center http://www-05.ibm.com/za/aic/ http://www.sacities.net/2008/june26_innovation.stm

Research and Innovation Ecosystem



About the speaker: Dr Diem Ho is Manager of University Relations for IBM Europe, Middle East and Africa (EMEA).

His mission is to build and manage relationships of mutual value for IBM and the academic community.

Diem's past research interests covered many disciplines in Science, Technology and Finance/Economics. He has published widely in physics, mathematics, image processing, remote sensing, engineering, optimization and finance.

He recently co-edited/authored a special issue of the *Computational Economics* on Stochastic Process and Data Analysis published by Springer.

In recent years, he has lectured intensively on Higher Education Reform and is a member of the peer review teams for the EFMD-EQUIS and EPAS accreditation programs and a member of the EPAS committee.

He is an associate editor of the journal of *Computational Economics* and is a member of the IBM Academy of Technology.

Before assuming his current position, he was an EMEA practice leader with the IBM Management Technologies Consulting Group, specializing in using Technologies to address Business Challenges in Banking and Finance sector.

Before joining IBM, Diem was a university professor and he continues to supervise PhD thesis to-date.

Diem obtained two Master degrees and a PhD in Magnetospheric Physics at Stanford University, California.

ETHNIC AND NATIONAL IDENTITIES IN MULTICULTURAL CONTEXTS
Considerations and Challenges

Saran Kaur Gill
NATIONAL UNIVERSITY OF MALAYSIA
(Universiti Kebangsaan Malaysia)

RESEARCH IN DIVERSE SOCIAL CONTEXTS:
TENSIONS, DYNAMIC AND CHALLENGES

UNESCO, PARIS
19 – 21 March 2009

The main challenge for multi-ethnic nations

Ensuring political, sociocultural and economic security amongst its citizenry so that "national allegiance takes precedence over all other claims which may be made upon them when they are confronted by alternative choices of allegiance ..." (Emerson, 1960: 97)

THE ROLE OF LANGUAGE IN NATION-BUILDING AND IDENTITY FORMATION IN A MULTI-ETHNIC SOCIETY

- The concept of nationalism
- the role of national languages,
- what constitutes ethnic linguistic identity and;
- whether a pursuance of it reflects an ethnocentric stand that contributes to the divisiveness of a nation or does a multi-lingual population contribute to the strength of the plurality of the population?

Rupert Emerson in his seminal work "From Empire to Nation" (1960: 95) draws in the sociocultural authenticity as a defining factor in his definition of a nation

"a community of people who feel that they belong together in the double sense that they share deeply significant elements of a common heritage and that they have a common destiny for the future.

“ … we cannot understand nations and nationalism simply as an ideology or form of politics, but must treat them as cultural phenomena as well. That is to say, nationalism, the ideology and movement, must be closely related to national identity, a multidimensional concept, and extended to include a specific language, sentiments and symbolism.” (Smith, 1991: vii)

“A particularly important point in the politics of recognition or equal worth is the suggestion that ontological differences stemming from culture and religion are often deeply incompatible, especially when survival of a culture or religious formation is at stake.” (Saravanamuttu, 2004: 107)

Ethnic Linguistic Identity – Pluralism Or Divisiveness?

To belong to an ethnic group means possessing a common descent, cultural heritage, religion, language and a distinctive history and destiny and to feel a sense of collective uniqueness and solidarity. (Smith, 1981: 66; Joseph, 2004: 162)

"advocates for minority language equality ... (who) speak in the language of justice, while proponents of national unity speak in terms of national good."

"Its partisans often appear to be speaking past each other – participating in parallel discourse – rather than to each other, seemingly motivated by differing concerns." (Schmidt, 2000: 42)

Major Challenge of the 21st Century

The sustenance of ethnocultural and national identities in our multicultural societies.

BROAD DEMOGRAPHY OF MALAYSIA'S POPULATION

- Total population of 25 million
- Dominant ethnic group – the Malays – 65.1% of the population, 16,275,000
- Of immigrant ancestry:
  - Chinese – 26%, 6,500,000
  - Indians – 7.7%, 1,925,000 (http://www.statistics.gov.my)
  - Punjabi-Sikhs – 100,000 – 0.4 %

"You are born into a specific ethnic group, and this circumstance decides what your mother tongue ... will initially be. But what happens later to your ethnicity, your identity, and your language (s) and how they are shaped and actualized is influenced by economic and political concerns and by your social circumstances and later life. These things also influence to what extent you are aware of the importance of your ethnicity and your mother tongue and the connection between them."

(Skutnab-Kangas in Fishman, 1999: 55).

“lost generation”

POLITICAL VIEWPOINT: MAHATHIR AND MINORITY LANGUAGES

- **Interview part of two-year research project on "Language Policy and Planning in Higher Education in Malaysia: Responding to the Needs of the Knowledge Economy"**

Question:

Should the government support or enhance the teaching of minority languages in this country?

MAHATHIR'S RESPONSE

You want to learn you own language ... no country has been as liberal as Malaysia. If you look at other countries in the region, you will find that they give no support at all except to the language of that country. Other immigrant communities they are certainly not allowed *(to be educated in their own language) (my inclusion)*..... That is why we see some of them coming to study in Malaysia. Other communities do not have their own school. They go to their national school or not at all. That is the policy but we are liberal. We have Tamil schools, Chinese schools and the government pays."

(Interview conducted by Gill on the 16 June, 2005)

MAHATHIR'S IDEOLOGY
Support for Minority Languages will Negate the Development of a Collective National Identity

- "That will end us into a lot of problems because we have about 30 different dialects in Malaysia including Tamil. We cannot do for one minority without doing for the rest. In the end, of course we will become vegetable soup .... such a mixture that we find ourselves being divided.

- We are liberal but to keep on chipping away at the national policy will end in us being so mixed up that we really cannot identify ourselves."

(Interview conducted by Gill on the 16 June, 2005)

- “... an accepting and unconflicted view of one’s own culture may be a building block of and a pre-condition for accepting unconflicted views of other cultures. Security begets security.”

(Fishman, 1991: 31)

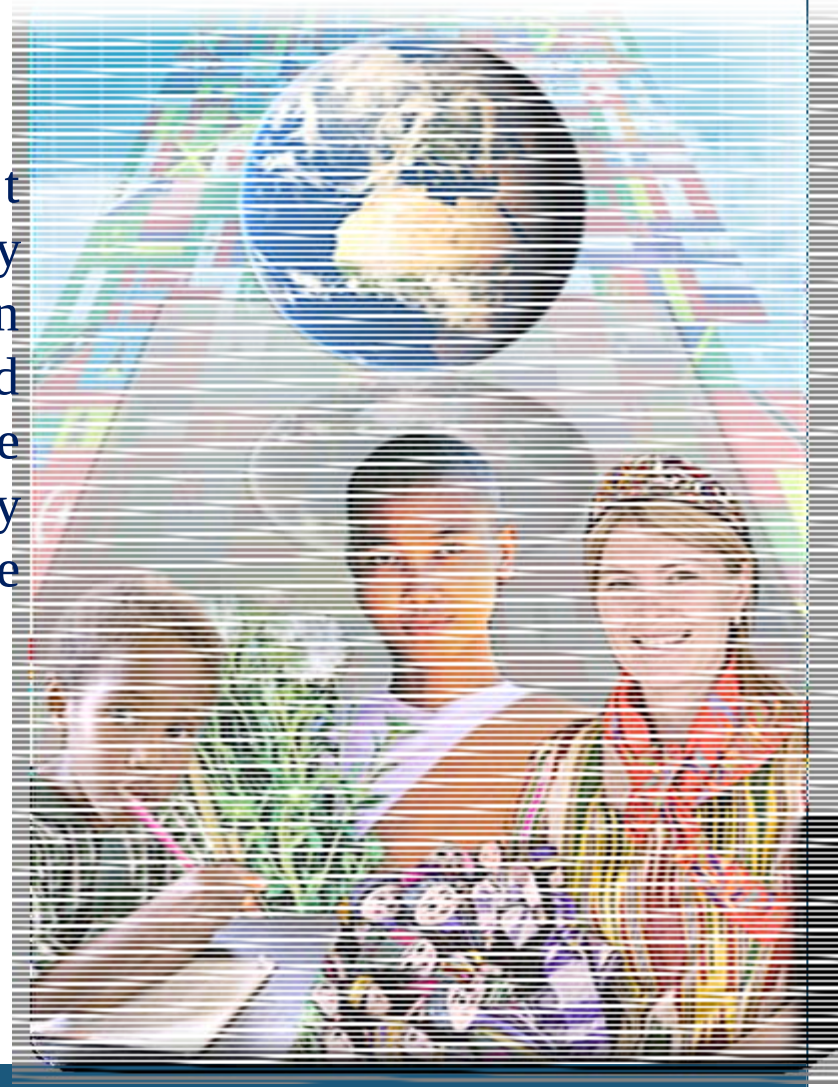
- “Such a position considerably understates the possibilities of holding dual or multiple identities, except oppositionally. And yet it is clear that many of us can and do hold multiple and complementary identities – social, political and linguistic – at one and the same time .... Certainly, one can hold both a regional and national identity without these necessarily being conflictual. Why then should this not also be the case for ethnic and national identities.”

(Stepan, 1998; Taylor, 1998) (cited in May, 2001:106)

Why International Mother Language Day?

Linguistic and cultural diversity represent universal values that strengthen the unity and cohesion of societies. The recognition of the importance of linguistic diversity led to UNESCO 's decision to celebrate International Mother Language Day on 21 February every year throughout the world.

(http://www.un.org/depts/dhl/language/ accessed on 8th March 2009)



Words from a RLS Activist

- “it is easy for a community to organize and overcome a problem like education if it has the backing of the government.”

(Randhawa, 2004)

The Fruits of Community Labour

- The committee first established the now famous Punjabi Education Trust Malaysia (PETM).
- After many discussions, group dynamics and negotiations, the PETM, by November 2000, was ready to launch the new Punjabi education programme.
- There are now 20 Punjabi Education Centres nationwide with more than 3000 students and 220 teachers.

Ensuring Sustainability of Community's Efforts

- The Punjabi Education Trust Malaysia (PETM) has submitted a special memorandum, (25th February 2004) titled, "Development and Growth of the Punjabi Language in the Malaysian Education System" to the Prime Minister, Datuk Seri Abdullah Badawi, seeking a meeting to present budget details and plans to carry out Punjabi language teaching for the long-term.

WHERE DO WE GO FROM HERE?

- Politicians do not read academic papers
  Awareness-building through mainstream media

- Political support – dominant ethnic group

- Resort to international charters and documents and seminars to draw higher-level attention to this issue

(personal communication with Prof. Gudmunder Alfredsson,
Director of Raoul Wallenberg Institute and
an expert in human rights and humanitarian law)

Higher Education Community Collaboration in Malaysia: Strategies and Opportunities for the Future

Research in Diverse Social Contexts

A Case Study

Saran Kaur Gill
Deputy Vice-Chancellor
(Industry and Community Partnerships)
Universiti Kebangsaan Malaysia

"Human capital will be the key thrust in the Ninth Plan Period. Human capital development will be holistic; encompassing the acquisition of knowledge and skills or intellectual capital including science and technology (S&T) and entrepreneurial capabilities …"

(9th Malaysia Plan)

For industry stakeholders

- Even more important than the hard-skills (mastery of the discipline particularly technical knowledge) are the soft-skills.

Essential soft skills

- The ability to communicate and the confidence to articulate viewpoints and have opinions, the ability to be pro-active and to plan and organize work demands.
- Overall, the aim is to reduce the on-the-job training requirements so that they can become effective and productive to their respective organizations much sooner than is usual for fresh graduates.

University

Industry

University-Industry Partnership

- “How do we work out joint strategies to ensure that universities develop capacities for graduates to enable them to obtain the jobs that they are interested in and that they are employable and how do we ensure that these capacities are relevant and meet with the needs of industry?”

Increase in length of workplace attachment

- The Faculty of Engineering, the Faculty of Information Technology and the Faculty of Accounting - 6 months
- The other faculties – it could range from 3-6 months (the faculties are discussing this presently).

Objectives of Industrial Attachment Programme

- Provide opportunities for the students to translate and build on theories learnt in classrooms and perform assignments in an actual working environment.

- Instill in the students the right kind of work attitudes and professionalism through interaction with people in the organizations, and observation of their future roles in industry.

Effective structural & delivery systems

- To initiate policies and their implementation
- To ensure that both undergraduates and industry benefit from this crucial need and experience.

Deputy Vice-Chancellor (Industry and Community Partnerships)

- To strengthen relationships and establish partnerships between university, industry and community

Universiti Kebangsaan Malaysia
National University of Malaysia

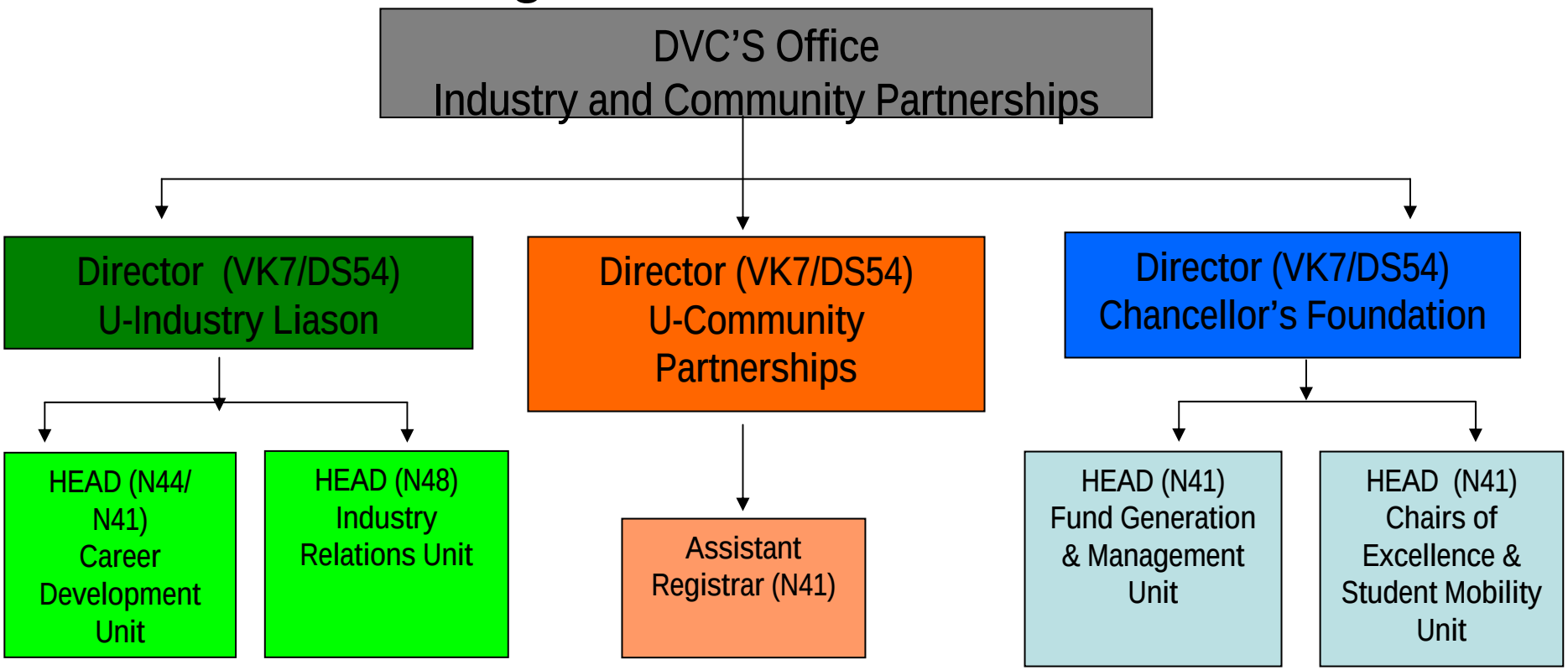
ILMU PUNCHA KEMAJUAN

Universiti Teknologi MARA

Universiti Sains Malaysia

Universiti Putra Malaysia

Organisational Structure



Industrial Training for Students

- To obtain new training avenues for industrial training to include into existing databases.
- To outline the requirement, and implementation procedure of industrial attachment

Industry Liaison Office

Allied Health Sciences
Economics & Business
Education
Engineering
Information Science and Technology
Islamic Studies
Law
Science and Technology
Social Sciences and Humanities

Industrial Training Coordinator (Faculty Level)

Function:

i. Briefing to students on industry attachment
ii. Updating database at Faculty level
iii. Issuing letters to industry
iv. Monitoring industrial attachment of students
v. Coordinating students post attachment presentation and evaluation
vi. Communicating with industry on objectives of industrial attachment and other matters related to attachment

Output from industrial placement workshop

- Develop a common on-line system at university level for all students and industry players to access.
- Ensure that students gain not just quantitatively (6 month period) from their industrial placement, but even more important that they gain qualitatively from their experience.
- *S*tandardizing the monitoring processes of student performance by both the Industrial Training Coordinator and “employer” whilst they are undergoing industrial placement.

Problems faced by universities for industrial training

- Obtaining new attachments avenues with increasing number of students
- Delayed response from industry
- Objectives of industrial training not clearly understood by students and industry
- Objectives of industrial training not clearly defined
- Industry does not articulate grievances and thus reduces chances of implementing improvement

New Trends in Industrial Training at UKM

i. Simulated workplace experience

Programmes that would be relevant and help develop society

Eg. : Combining sports (football academy) with multi-ethnic cultural awareness – for both advantaged and disadvantaged children

Creating interest through fascinating science

Periuk Kera

New Trends in Industrial Training at UKM

i. Simulated workplace experience

We will have to work out the mechanisms, the criteria and the supervision that will need to be put in place to ensure that the scope and demands of the planning and implementation of these programmes enable students to qualify for the credits that other students would get through actual workplace attachment.

New Trends in Industrial Training at UKM

ii. Placement in NGOs

Interesting career opportunities

Monetary value and Food for the Soul

New Trends in Industrial Training at UKM

iii. **Research-based Industrial Training**

Real life industry problems for the students to work on for their final year research project.

Student Development Activities

- Inviting industry players to provide training courses for the undergraduates

  Effective Communication Skills – Shell

  Shaping the Leader in You – GE

  Are You a Team Player? – MISC

  Proper Etiquette for Social Functions – PHI

  Personal Grooming – Agilent Technologies

Entrepreneurship Activities

- Tripartite agreement between SMIDEC – SME Bank – UKM and UKM - UKM Holdings Sdn Bhd – SME Bank to conduct entrepreneurial activities
- To promote self-employment as a means of reducing unemployment levels

SME Bank
Grow.

SMIDEC
Official Website
Small and Medium Industries Development Corporation
1-300-88-1801

UKM HOLDINGS SDN BHD

UKM Career Fair

National Career Convention 2008 @ UKM

- 26 – 29 July 2008, co-organised by the Ministry of Higher Education and UKM
- 300 programmes involved (career and motivational talk, entrepreneurial and career workshops, interviews and booths)

Academic Placement in Industry

- Challenges in promoting attachment of academics doing work/ research in industry
  1) To ensure that they will give back to the university after they have experienced life in industry
  2) To recognize both quantity and quality of time spent for annual appraisal purposes

Corporate Advisors on Curriculum Board

- Closer ties with industry to get feedback on the relevance of academic programmes in producing employable graduates

The nature of collaborative relationships between university, industry and community are related only by the degree of our imagination, the matching of common interests and the willingness to plan and implement the opportunities.

RECREATING RESEARCH CAPACITY IN RWANDA

Joseph GAHAMA (Rwanda)

International Experts' Workshop on Research in Diverse Social Contexts: Tensions, Dynamics and Challenges

UNESCO, Paris, 19-21 March 2009

Introduction

- Rwanda still bears the scars of its painful past characterized by political and ethnic violence which culminated in the genocide of Tutsis in 1994.
- Slowly but surely, the country is currently recovering from its injuries.
- This contribution would like to examine the step already done in scientific research, considering in turn the institutions involved in this sector, the priorities put forward by the Government and the challenges it faces.

1.Restarting from zero

- Everyone can still remember the war in Rwanda in 1990 and the genocide of Tutsis in 1994 that claimed over one million dead according to the political authorities of the country.
- This tragedy has not only caused great loss of life, but also and especially the destruction or paralysis of economic and social infrastructure. Indeed, schools and health centers were in ruins and had been looted, communications were inoperable, and the administrative systems devastated, and so on.
- Reconciliation and reconstruction seemed very difficult, but Rwandans had still necessary spirits to quickly build up speed again on the path of peaceful coexistence and economic development.

- On the political level, a transition period was necessary to put the country on the path of democratization. It ended in 2003 with the adoption of a new constitution by referendum, presidential and parliamentary elections by universal suffrage.
- Over the past decade, Rwanda has made significant progress in economic and enjoys the confidence of donors both multilateral and bilateral. Since 2003 it has recorded excellent results and its annual growth rate remains over 6%.
- In many respects, Rwanda appears to many analysts as a dynamic country that is promised bright future in the East African Community, where it has enrolled and where it will soon emerge

3.Scientific research institutions

- The current organisation of Scientific research in Rwanda is tributary of the Belgian colonial heritage. It is done mainly in specialized institutes of research subsidized by Government on the one hand and the higher education on the other hand
- In Rwanda, four institutes were created to do research in a professional manner. In order of their foundation, we have the Institute of Scientific and Technological Research (IRST), l'Institut des Sciences agronomiques du Rwanda (ISAR), the Karisoke Research Centre (KRC) and the Institute for Research and Dialogue for Peace (IRDP)

- Scientific research is also in all higher education institutions, whose number has increased over the past ten years. In principle, all lecturers in their work must not only ensure high quality science, but also conduct research to improve their knowledge, that of the students and the community.
- Although their career depends largely on their scientific output, many academics are reporting a worrying weakness in the field of publications for various reasons on which we shall return below.
- If lecturers are generally not very much interested in research, they are, however, very much fond of consultancies in which they intervene a lot and where they earn a lot of money.

3. Revitalizing the scientific research sector

- Rwanda has undertaken actions to revitalize sicentific research in creating in 2006 in the Presidency of the Republic a Ministry of Science, Technolgy and Scientific Research and in giving in very clear manner priorities in this area.
- .Four priorities based on the Millennium Development Goals and the 2020 Vision, an ambitious long- term development plan
- i) agriculture: Rwanda wants to transform its economy based on agriculture into a knowledge-based economy.

  Strategies have been adopted to preserve food security, natural resources management, conservation of water and soil, the appropriate use of marshlands, the design of new technologies in irrigation.

  ii) human resources: having no mineral resources, Rwanda wants to develop competent and competitive human resources in the Great Lakes region

- iii)heath: a particular emphasis is put on maternel and child healh, family planning, malaria, infectious diseases, especialy HIV/AIDS
- iv)Environmental protection ans sustainable management of natural resources
- In the priority research supported by the Ministry, social sciences and humanities seem to be marginalized

4. Challenges

- Rwanda, like most African countries has huge gaps and weaknesses in scientific research. A study conducted in 2007 shows that the number of publications in that year does not exceed one thousand (S. Esau - Bailey, 2007). Many factors explain this
- First, the lack of human resources: expatriate personnel, Nationals are young and have no experience, the teaching-research is not attractive, isolation of researchers
- Secondly, scientific research faces a shortage of funds. Almost all institutions of research and higher education are funded at more than 90% by the Government
- Thirdly, it should be noted the lack of real research infrastructures: the few university libraries meaningful range of books and magazines obsolete, essential materials needed to laboratories lacking, access to electronic resources is not guaranteed

Conclusion

- Like all other sectors of socio-cultural development, scientific research has been much affected by the disaster that befell Rwanda in 1994.
- The revival of this activity has benefited from genuine willingness by the Government to make the sector a springboard for economic development. Political authorities continue to declare their firm intention to convert their short-term agricultural economy into a knowledge-based economy.

- Priority areas to retain the necessary attention have been identified and are reflected in policy documents such as Vision 2020 and the Economic development and poverty reduction strategy (EDPRS).
- The new Ministry in charge of Science, Technology and Scientific Research has therefore a lot of work. It face serious challenges, the most important ones being the lack of human resources, inadequate financial resources and the infrastructure necessary for research.

- Despite this, we can say that Rwanda is currently making quickly a place in the sun for itself in the Great Lakes region and in the African community. Two of its higher education institutions, National University of Rwanda and the Kigali Institute of Science and Technology are actually ranked among the best universities of the African continent

Thanks for listening!

UNESCO Forum on Higher Education Research and Knowledge

Legacies of the 20th Century & Knowledge Imperatives for the 21st Century

Nazli Choucri
Professor of Political Science
Massachusetts Institute of Technology

UNESCO Paris 19-21 March, 2009

CONTENTS

(1) Knowledge Legacies of the 20th Century

(2) Models of Knowledge Value

(3) Imperatives for the 21st Century

(4) Global System for Sustainable Development

(5) Conclusion

(1) Knowledge Legacies of the 20th C.

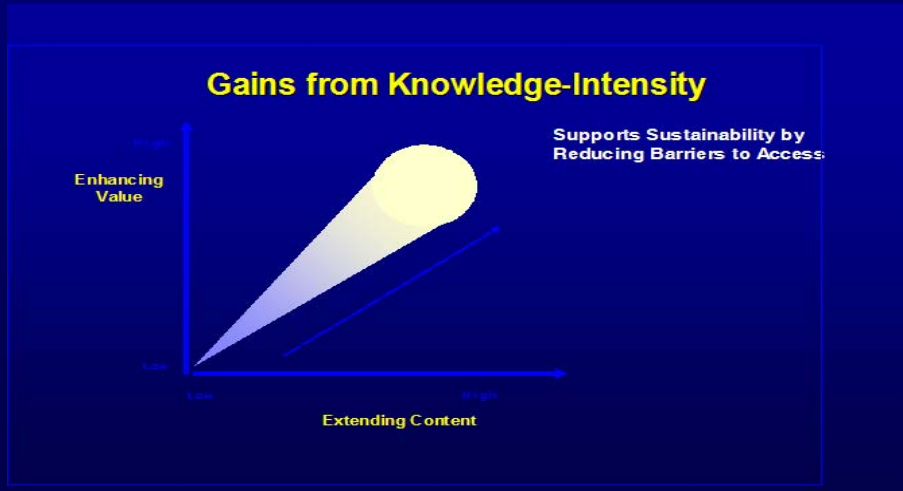
- **The Sustainability Objectives**
- **The Knowledge Economy**
- **Models of Knowledge Value**
- **Diverse Knowledge Forms**
- **New Systems and Spaces**

The Sustainability Objectives

- New Vision of Society
- New Knowledge Needs
- Re-Visiting Social Sciences Foundations
- Developing Knowledge-for-policy

The Knowledge Economy

- **Enhanced human knowledge & skills**
- **Gains from Knowledge**
- **Content-of-Knowledge & Knowledge-of Content**
- **Greater knowledge Intensity of economic activity**



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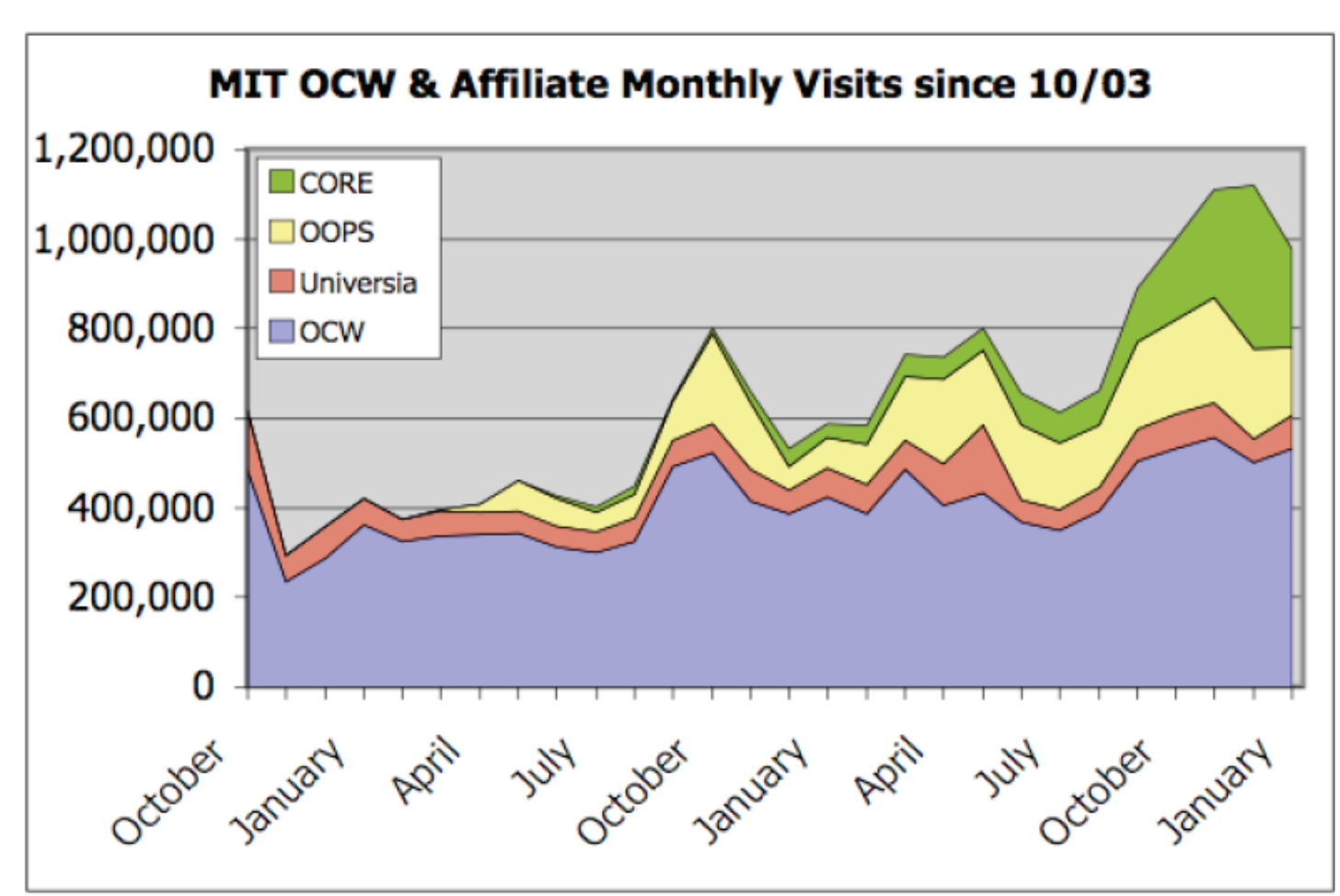


Source: MIT Open CourseWare Evaluation Summary: http://ocw.mit.edu/ans7870/global/05_Eval_Summary.pdf.

(2) Models of Knowledge Value*

- **Intellectual Property Rights**
- **Open Access**
- **Knowledge Commons**
- **Value-in-Networking**

*Source:
N. Choucri, *CyberPolitics in International Relations*
MIT Press [forthcoming]

New Systems & Spaces

Humans are embedded in three distinct but interconnected systems or 'spaces'

- **Society – Social Systems**
- **Nature – Ecological Systems**
- **Cyberspace – Virtual Reality**

Each with its own logic, laws, and modes of interaction leading to new knowledge needs

Diversity of Knowledge Forms & Functions:

- Concepts & Theories
- Ontologies & Frameworks
- Indicators & Measures
- Models & Methods
- Policy, Strategy, & Decision

(3) Imperatives for 21st Century

Understanding & Managing

- Ubiquity of Complexity
- Power of Knowledge Networks
- Knowledge Networks Defined
- Web-Based Knowledge Aggregation

Ubiquity of Complexity – Systems are

- Constantly changing
- Tightly coupled
- Governed by feedback
- Nonlinear
- Path-dependent
- Self-organizing
- Adaptive
- Signal trade-offs
- Counterintuitive
- Policy resistant

Source: J. Sterman, “System Dynamics, ESD Symposium, 2002.

Power of Knowledge Networks

Organized system of discrete actors with knowledge producing capacity

Combined through common organizing principles

Actors retain individual autonomy

Network enhances value of knowledge to actors & further expands knowledge

Knowledge Network - Defined

An organized structure and dynamic process generating and representing content, components, classes, or types of knowledge. This structure is:

Domain specific or characterized by **domain relevance** defined by the user or consumer

Reinforced by a set of **logical relationships** that connect the content of knowledge to its value (utility)

Enhanced by a set of **iterative processes** that enable the evolution, revision, adaptation, and advances,

Subject to criteria of relevance, **reliability, and quality.**

Web-Based Knowledge Aggregation

Knowledge access is necessary for decision but not sufficient

Dispersed knowledge, variable structure & assumptions etc. are barriers to use

Search for strategy requires informed iteration & efficient 'synthesis'

Different users require different aggregation services

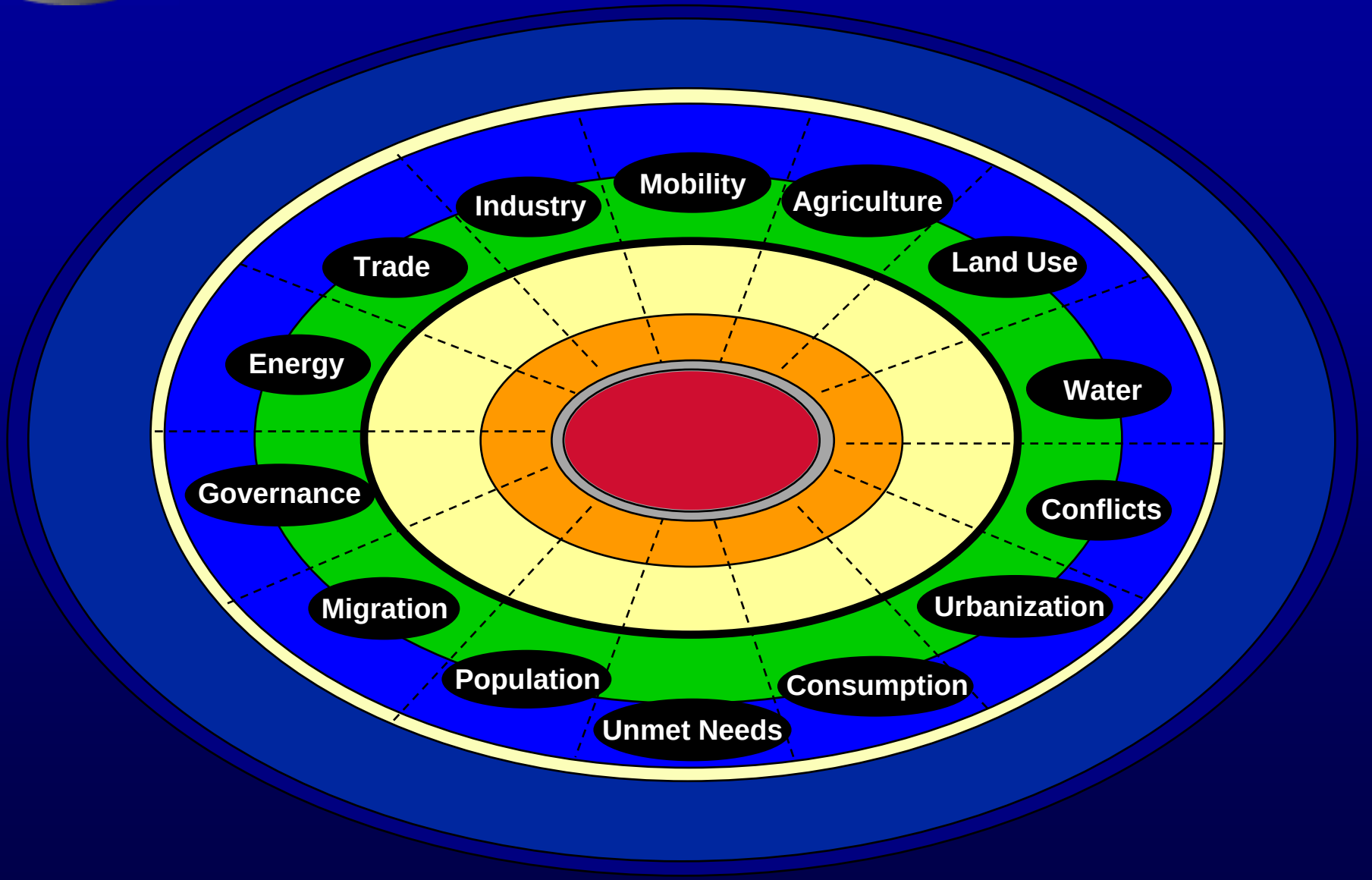
(4) Global System for Sustainable Development (GSSD)

An Ontology-Based Collaborative Knowledge System for Networking & Decision Support

Focusing on:

- **Human activities & conditions**
- **Sustainability problems**
- **Scientific & technological policies**
- **Economic, political & social policies**
- **International actions & strategies**

Framework – Broad Domains



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Framework – Basic Dimensions for each Domain

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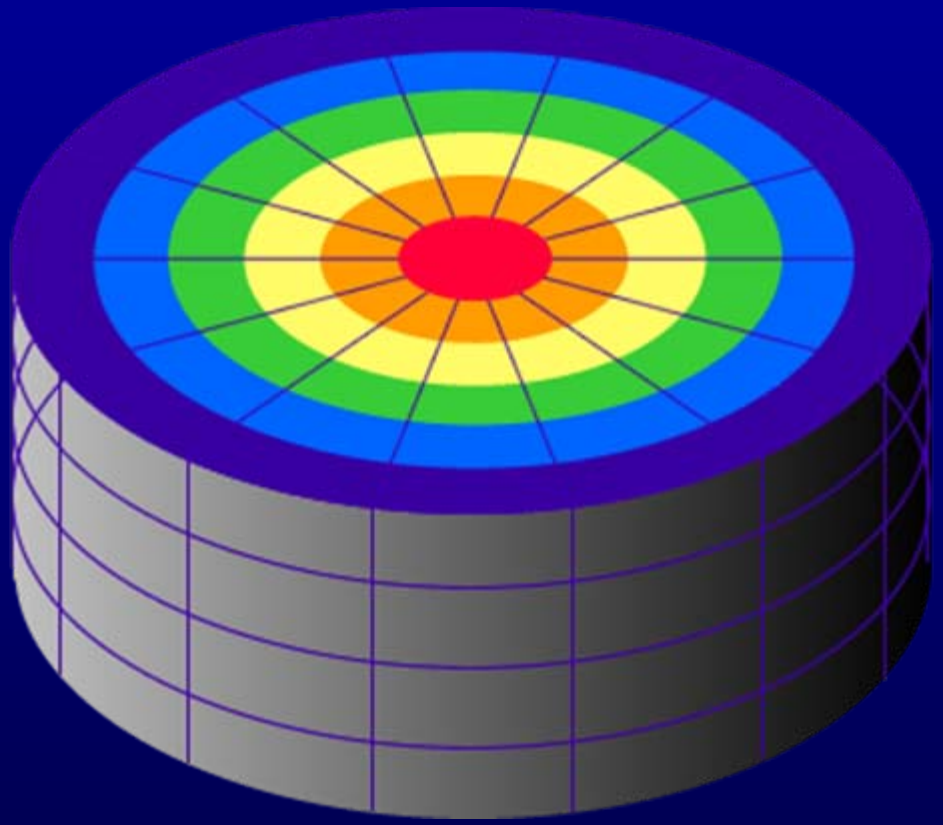
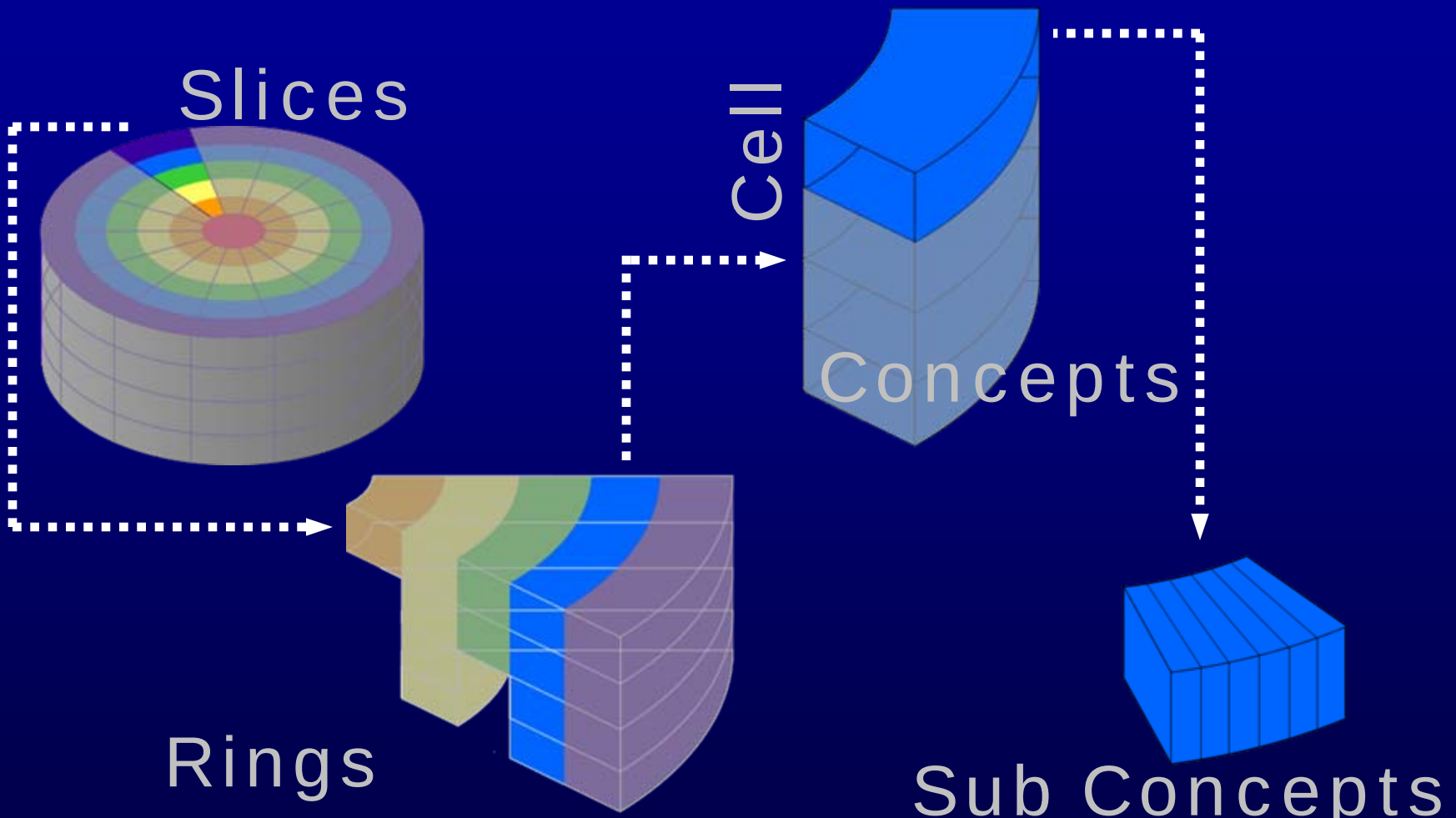
Hierarchical Nested System

- Domain - Slice
- Dimension - Ring
- Cell - Intersection
- Concept
- Sub Concept



Tracking Linkages



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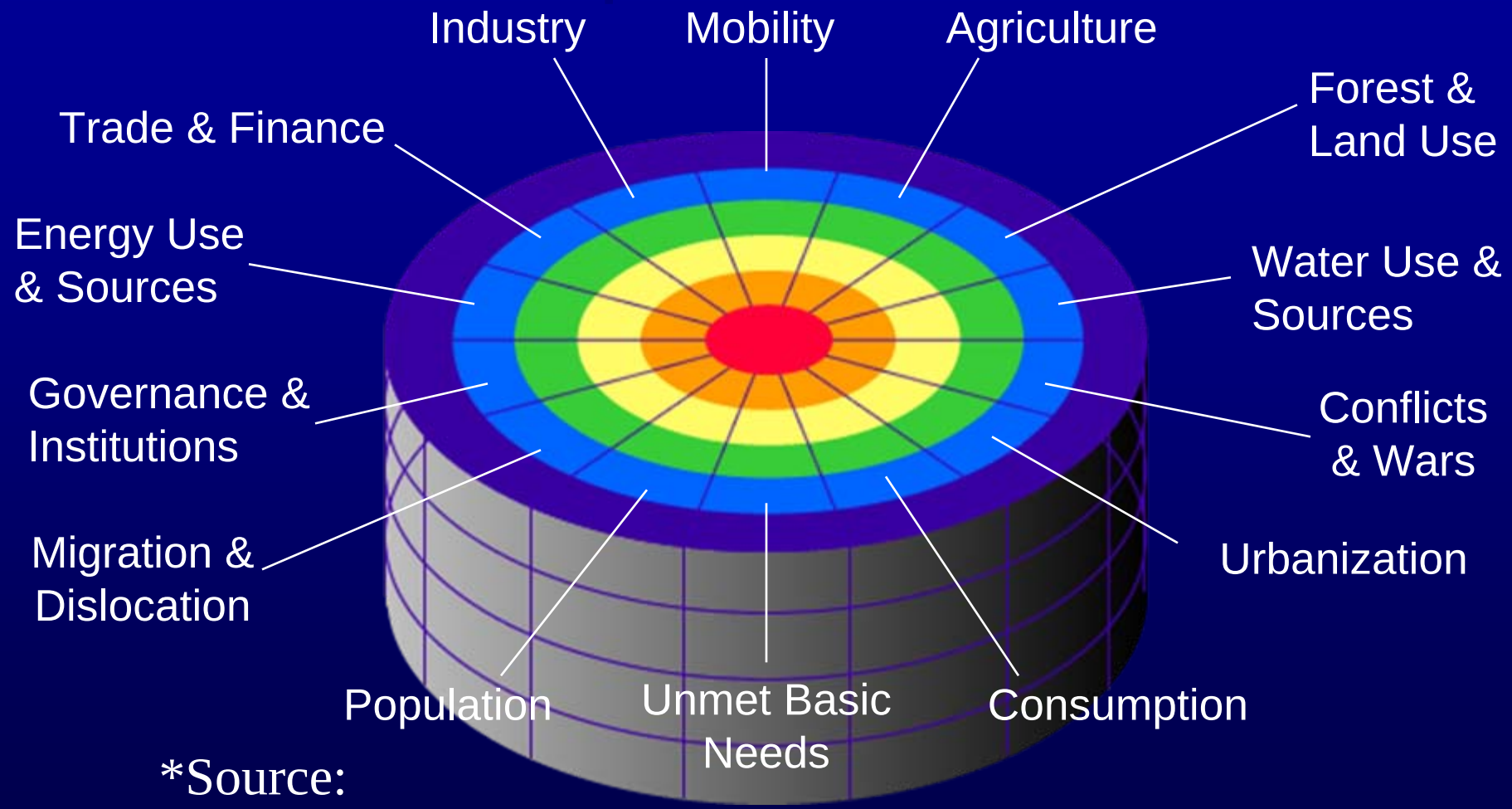
View of Integrated Conceptual Framework*



*Source:
N. Choucri et. al. (Eds.) *Mapping Sustainability* Springer, 2007.

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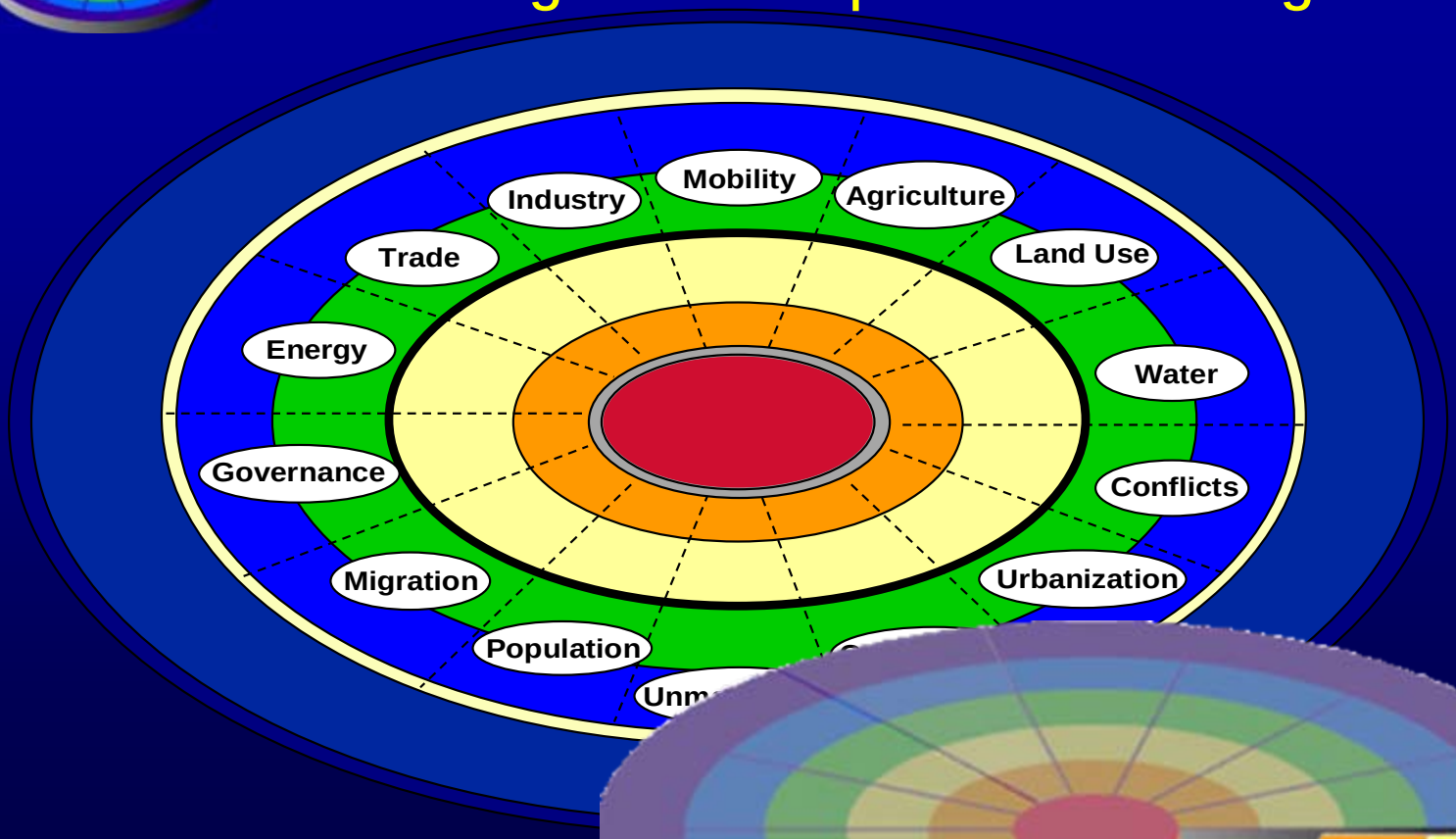
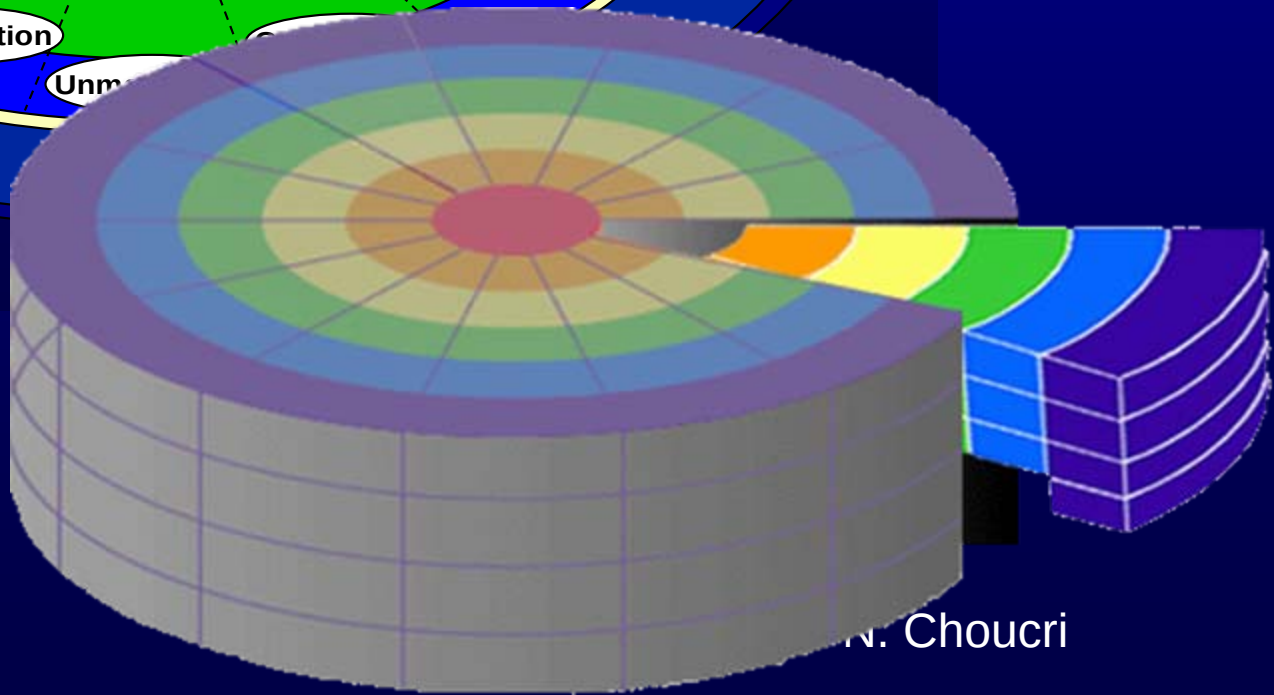
Illustrating Domain-Specific Knowledge





Source:
N. Choucri et. al. (Eds.)
Mapping Sustainability
Springer, 2007.

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Illustrating Knowledge Ontology

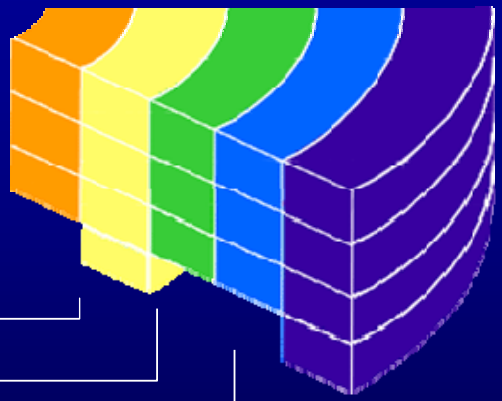
Rings:

Activities & Conditions

Sustainability Problems

Scientific & Technical Solutions

Social, Economic, Political, & Regulatory Solutions



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Source:
N. Choucri et. al. (Eds.)
Mapping Sustainability
Springer, 2007.

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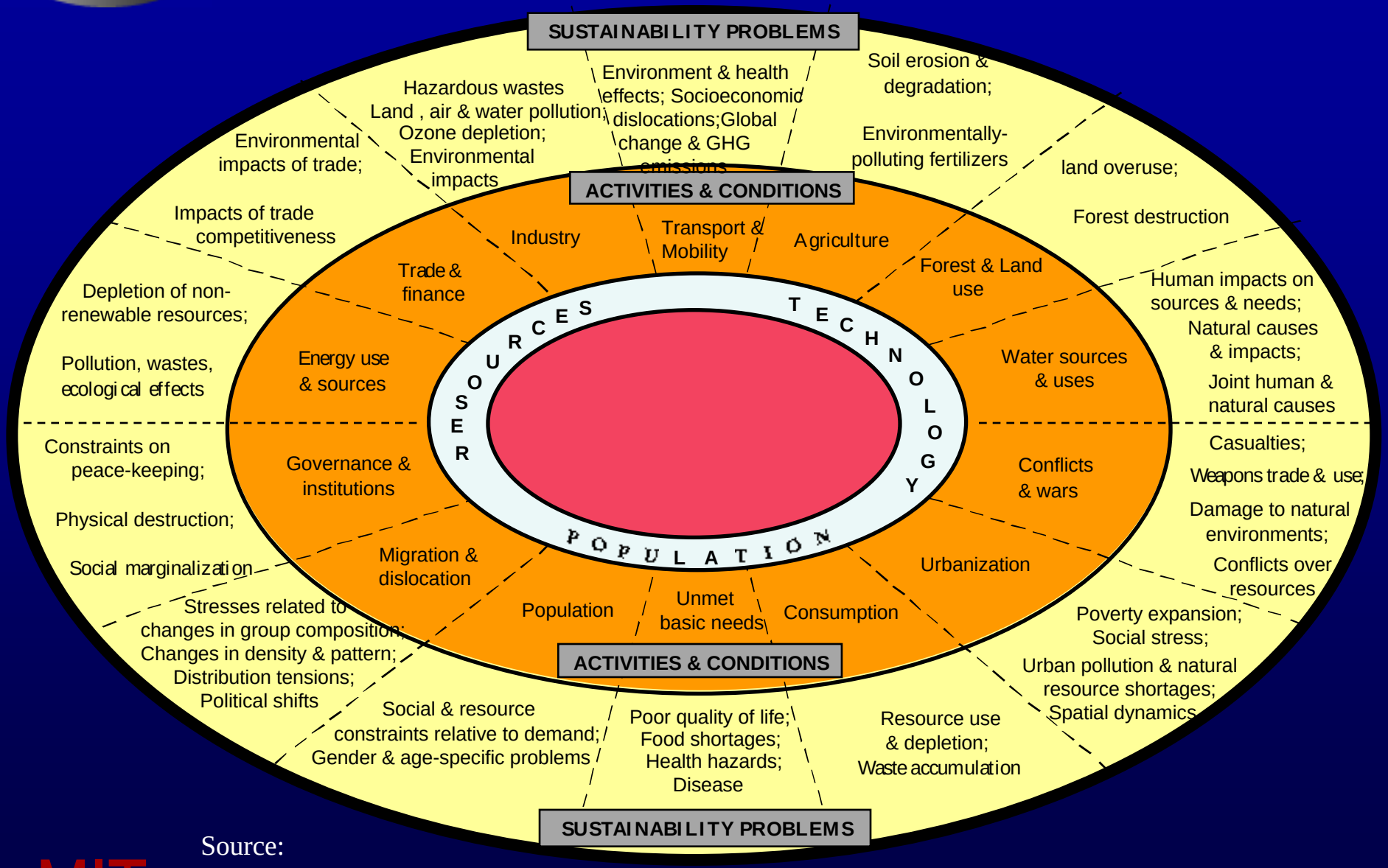
Conflicts & Wars

Activities & Conditions	Types of Conflict	Scope and extent Participant Characteristics Types of Warfare
	Causes & Sources	Security Concerns Economic Concerns Socio-Political Concerns Conflict Processes Misperceptions vs. Strategic Moves
	Military-related Activities	Military Systems Weapons and Weapon Systems
Sustainability Problems	Environmental Damages	Conventional Warfare Possible Effects of Nuclear War
	Social Impacts	Demographic Damages Refugees and Returnees Health Impact Education and Human Capacity Restriction of Civil Liberties
	Economic Impacts	Losses from Conflict and Violence Problems from Wartime Conditions
	Impacts on Sovereignty	Imperialism and Colonialism State Building
Scientific & Technological Solutions	Improved Warning Systems	Intelligence Communication
	Enhanced Monitoring Systems	
	Improved Disposal of Munitions	
Social Economic, Political & Regulatory Solutions	Confidence Building Measures and Improved Dispute Resolution	
	Diplomacy & Negotiations	Types of Negotiations Scale and Scope Enhancing Social Contracts
	Post-conflict Reconstruction	Rebuilding Strengthening Restitution and Accountability Improved Institutional Forms and Measures

FROM ACTIVITIES & CONDITIONS TO SUSTAINABILITY PROBLEMS



Source:
N. Choucri et. al. (Eds.) *Mapping Sustainability*, Springer, 2007.

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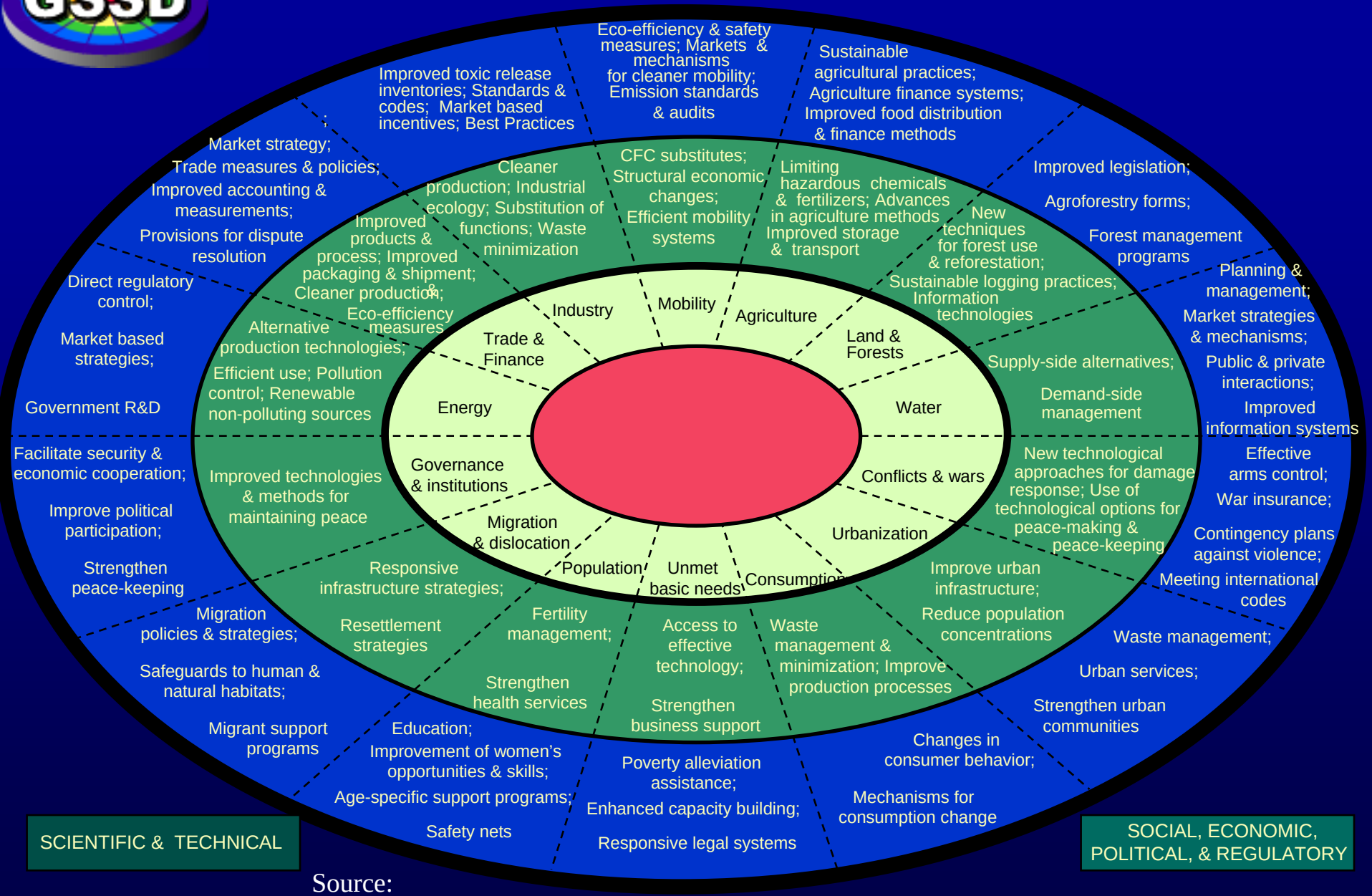
TYPES of SOLUTION STRATEGIES



Source:
N. Choucri et. al. (Eds.) *Mapping Sustainability*, Springer, 2007.

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(5) CONCLUSION

Emergent Knowledge Challenges

- Addressing Cyberspace Relevance
- Leveling the Playing Field
- Reducing Barriers to Knowledge Access
- Understanding “Time” & Expanding “Space”
- Enabling & Managing Multilingualism
- Linking Knowledge Globalization & Localization

The UNESCO Forum for Higher Education, Research and Knowledge
Workshop on Research in Diverse Social Contexts:
Tensions, Dynamics and Challenges
UNESCO, Paris, 19-21 March 2009

Viewpoint

Super Research Universities

Alec Boksenberg
University of Cambridge

Super Research Universities: The Extreme of the Higher Education Continuum

[Reference: Mohrman, K., Ma, W. and Baker, D. (2008)]

- In a knowledge intensive society, major research universities are key institutions for social and economic development.
- While these institutions also educate undergraduates, train professionals for a wide range of positions, provide service to society, and engage in applied work and technology transfer, their distinguishing feature is the high priority given to the discovery of new knowledge and the production of doctorates, especially (but not exclusively) in science and technology areas.
- Knowledge, again especially in science, is a world commodity; research institutions are by nature globally connected, as well as locally engaged in industry and policy-making for development.

- A subset of research universities – a small group of leading institutions – reflects a new phenomenon for the 21st century.
- These institutions represent an intensification and globalisation of the development of research universities in general. To emphasise the worldwide perspective and the high scholarly output some refer to them as *super research universities* or the *emerging global model*. In all, they are characterised by a level of research endeavour that far exceeds past experience. Some aspects of these are:
  - they are engaged in worldwide competition for students, faculty, staff and funding;
  - they operate in an environment in which traditional political, linguistic, and access boundaries are increasingly porous;
  - they look beyond the boundaries of their home countries to define their scope as trans-national in nature;
  - their peers span the globe.

- The ethos of these research universities suggests that investment in human capital is good for society and that new knowledge leads to a better world.
- Thus higher education and research becomes a key ingredient of the recipe for managed social and economic progress sponsored by the nation state.
- Although such research universities represent only a small proportion of higher education, other institutions often look to them as models, and they also interact widely with counterparts as well as other universities at all levels both nationally and internationally, so their influence on the sector is far greater than their number suggests.
- The worldwide reach and influence of these model institutions means that individual nation states have less influence over them as universities than in the traditional past.

- These research institutions exhibit a number of specific properties and functions:
  - global mission
  - research intensity
  - new roles for professors
  - diversified funding
  - new relationships
  - worldwide recruitment
  - increasing complexity
  - collaboration with other global institutions

Global mission

- transcending the boundaries of the nation state, they aim for global perspective and to advance the frontiers of knowledge worldwide:
  - faculty members collaborate about as often with peers on different continents as with own campus colleagues;
  - special attention is given to international PhD students, seeking the best minds worldwide to contribute to the research agenda as part of their doctoral studies;
  - research partnerships are promoted with top institutions abroad, expanding influence and intellectual capital;
  - students and faculty members are received from developing countries for the most up-to-date learning to contribute to their home countries' national growth.

Research intensity

- they are increasingly more research intensive, with use of scientific methods also in disciplines outside the sciences:
  - the pursuit of new knowledge most prized is scientific and technological, as well as the scientific study of human environments through the social sciences;
  - disciplines such as linguistics, political science, and history have become increasingly quantitative in methodology and 'scientific' in approach;
  - medical schools and universities are linked into a highly expansive research-based relationship;
  - there is demand that research go beyond the intellectual curiosity of the investigator and be pushed to application, resulting in development of spin-off businesses, science parks, research incubators, and technology transfer offices.

New roles for professors

- there is a shift to team-oriented, cross-disciplinary, and international partnerships, directed to real-world problems:
  - professors have multiple responsibilities – to conduct publishable research, teach graduate and undergraduate students, provide service to their universities, benefit local and national communities – but the reward system gives first priority to published research, especially in prestigious journals, over the other goals;
  - a new category of faculty academics do not teach but work with contracted projects, consulting businesses, research institutes, and governmental agencies, commercialising their knowledge;
  - at the same time, success brings more money for basic research and further exciting intellectual challenges.

Diversified funding

- with the high cost of research enterprise the size of funding streams obtained determines in large part their success in research output and global reputation; there is the need to go beyond government support and student contributions:
  - funding is obtained from corporations and private donors;
  - there is strong reliance on competitive research grants for science or technology innovation;
  - creation of for-profit businesses as spin-offs of research enterprises is encouraged;
  - government funding is becoming a declining share of the total budget;
  - with reduced centralised control from a single funding source there is the benefit of greater flexibility in making choices.

- New relationships
  - new relationships are created among universities, governments, and corporations to advance economic development and to produce knowledge for the social good:
    - the state has become less of a sponsor and more of a facilitator for partnerships between universities and businesses, encouraging universities to seek funds from the private sector;
    - government agencies bring universities to work on nationally important social and economic issues through adoption of performance-based university research funding strategies for targeted programmes.

- **Worldwide recruitment**
  - there are direct benefits from adoption of open recruitment strategies for students, faculty staff, and administrators:
    - in the global environment, higher education is open to external forces both nationally and internationally;
    - the trans-national character of much work demands engagement of people with experience of and sensitivity to many cultures;
    - universities aiming to move rapidly into the international arena recruit professors from other countries to bring instant upgrading, and often prestige;
    - in many national institutions more than half of the professors are citizens of other nations.

Increasing complexity

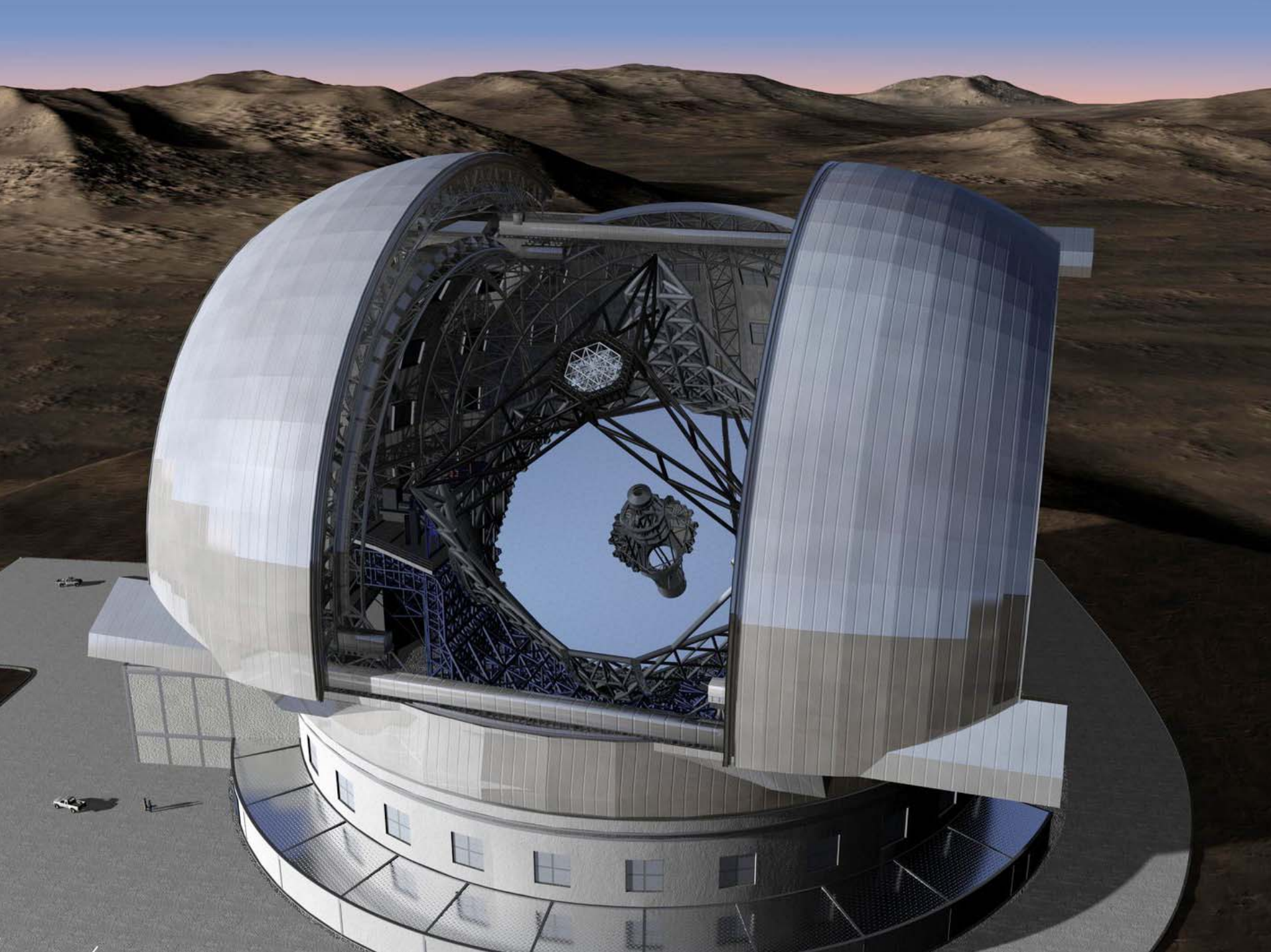
- there is a move to greater internal complexity in conducting research, such as enhanced technological infrastructure for discovery, interdisciplinary centres, integration of research elements into student training programmes, leading to:
  - substantial expansion of research activity;
  - becoming more comprehensive and more integrated by adding new programmes to existing departments;
  - establishing professional schools, new research centres, and interdisciplinary units;
  - administrative offices for human subjects review, patents, government liaison, development, fund-raising;
- the massive research units developed in some universities have transformed the nature of large-scale scholarship.

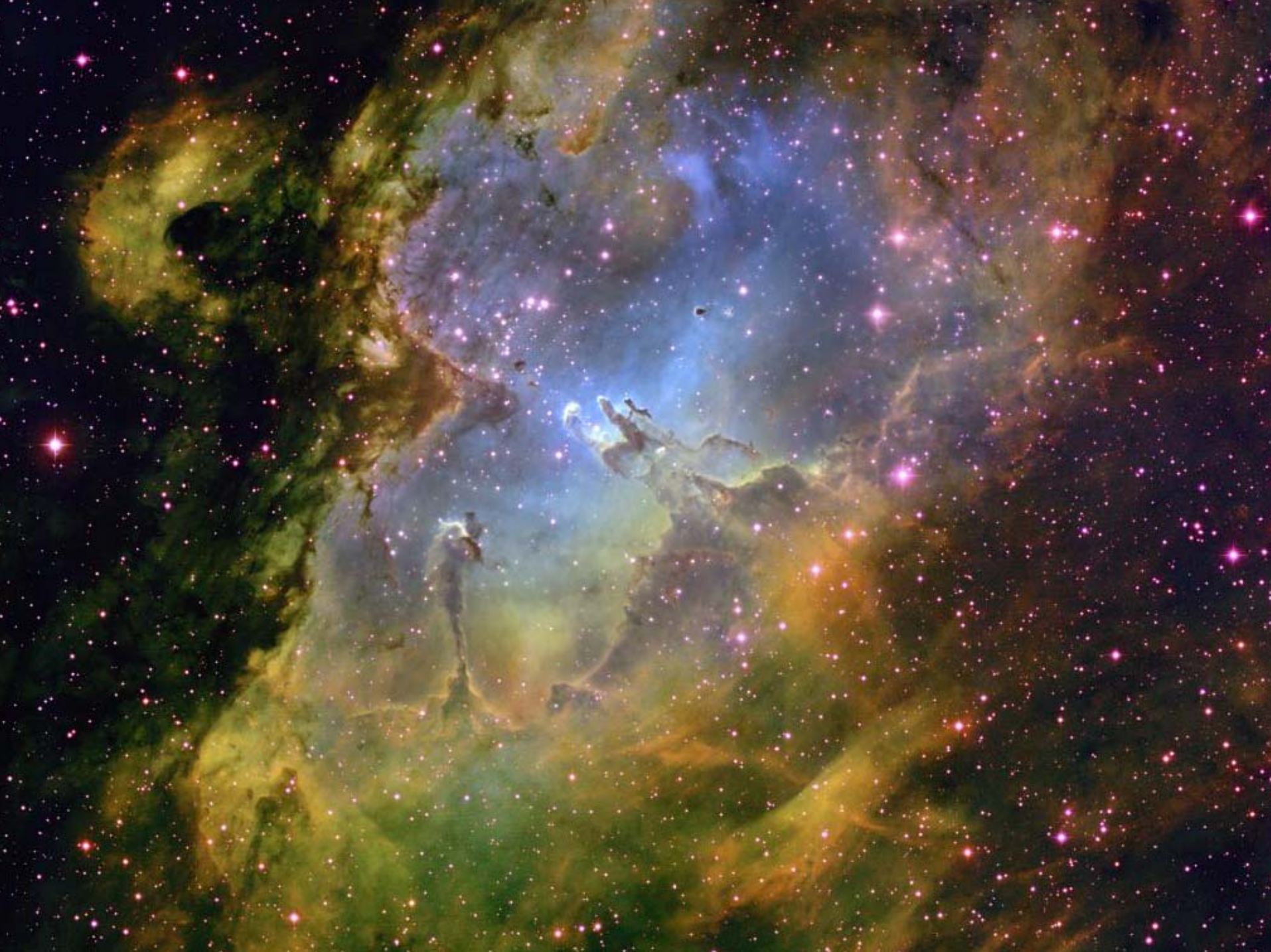
Collaboration with other global institutions

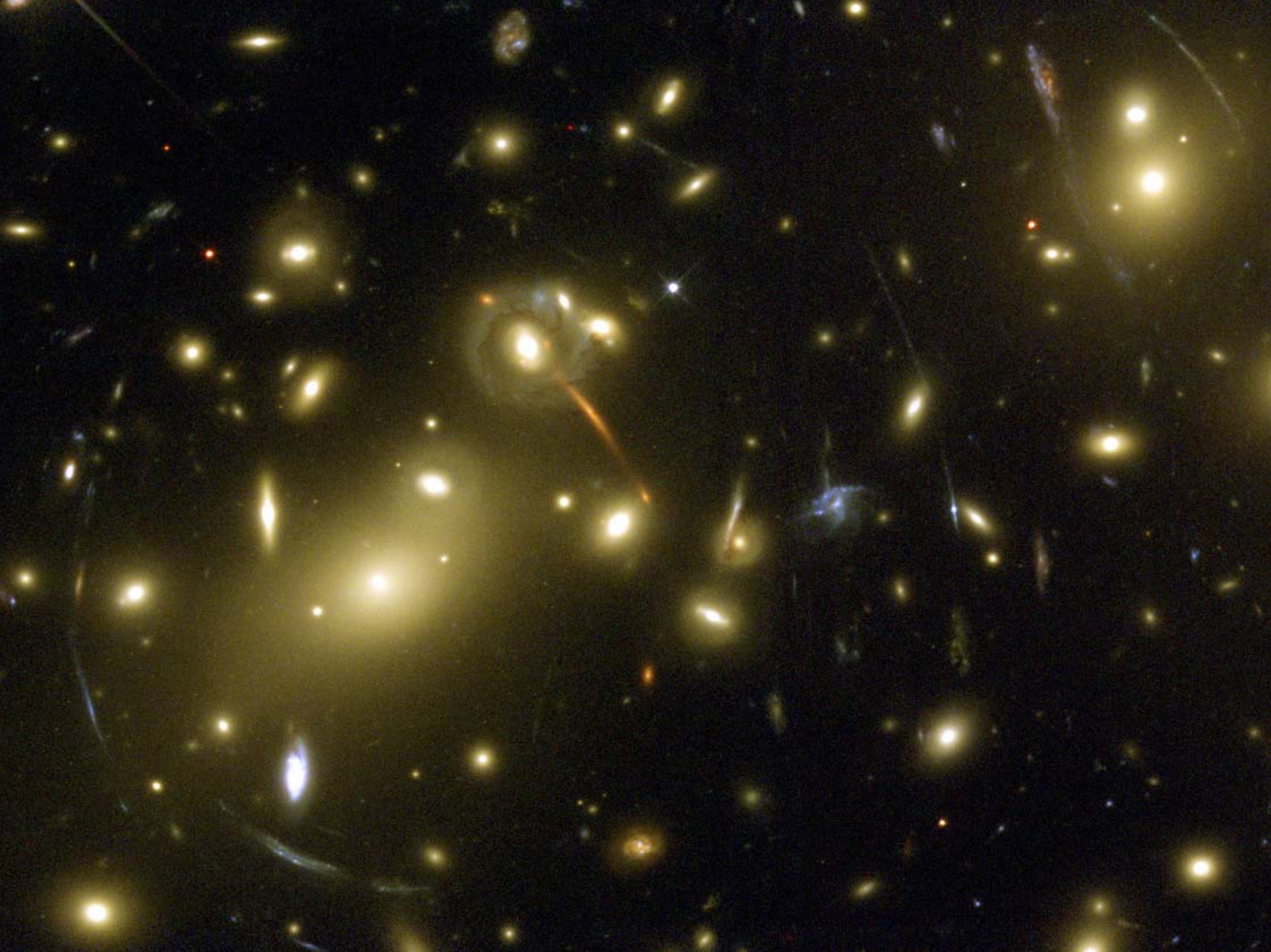
- there is growing participation with international non-governmental organisations and multi-governmental organisations in support of collaborative research and student and staff mobility:
  - the growth of international university associations demonstrates the interdependence of universities through trans-national activities;
  - a well-known multi-national organisation is the European Union's Erasmus Mundus programme, a cooperation and mobility initiative that promotes the EU as a centre of excellence in learning around the world;
  - another example is the Association of Pacific Rim Universities involving 37 comprehensive, research intensive institutions on all shores of the Pacific;

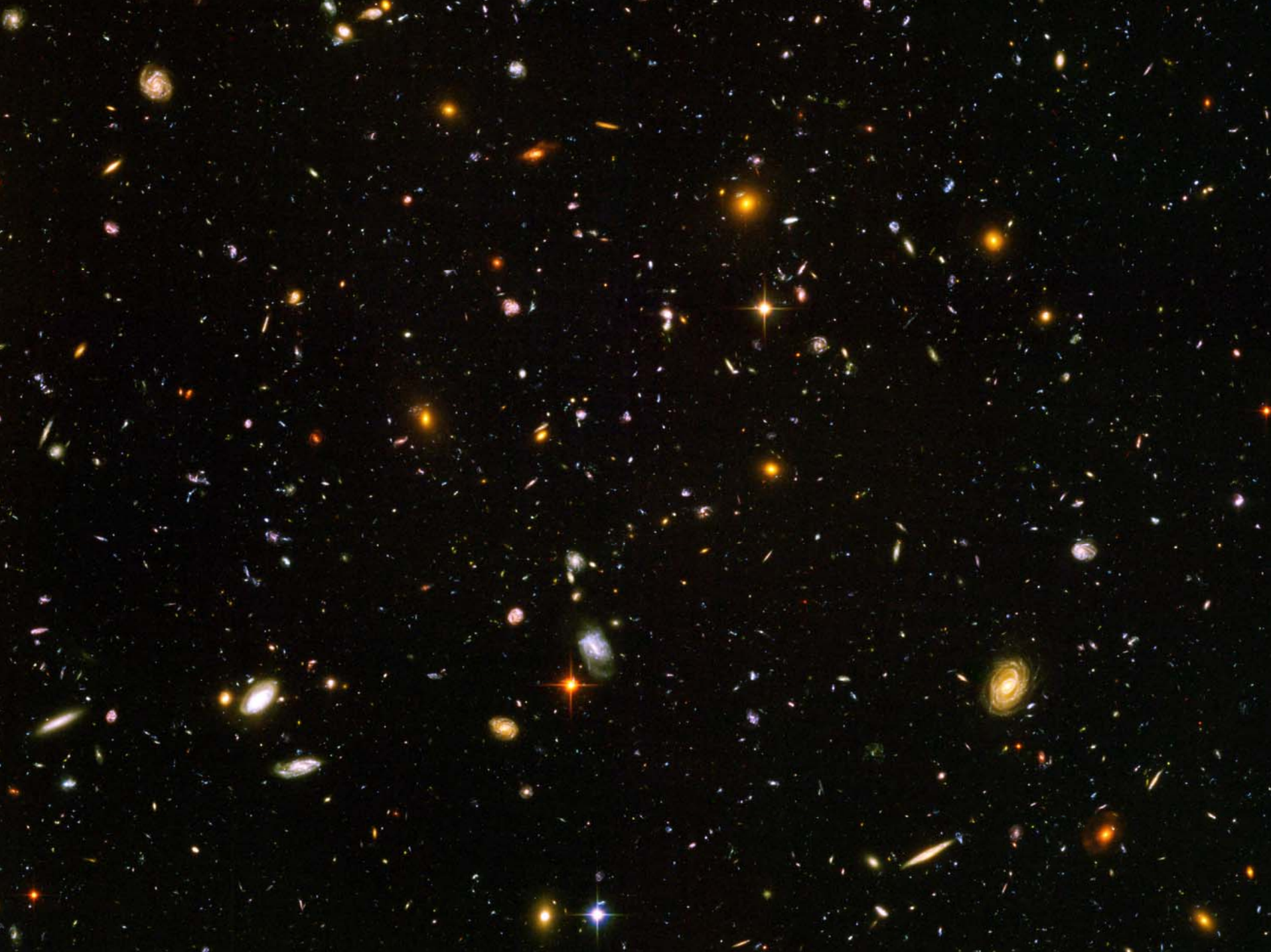
- these organisations differ from traditional international organisations in that they are less *ad hoc*, better organised, and more focused in their objectives and activities;
- the practical benefits to member institutions are multiple:
  - to share information
  - to establish formal student and staff exchanges
  - to improve access to international resources
  - to facilitate collaborative research
  - to provide a global dimension to the curriculum
- these global organisations also provide a form of validation of international stature, providing significant prestige to member universities.

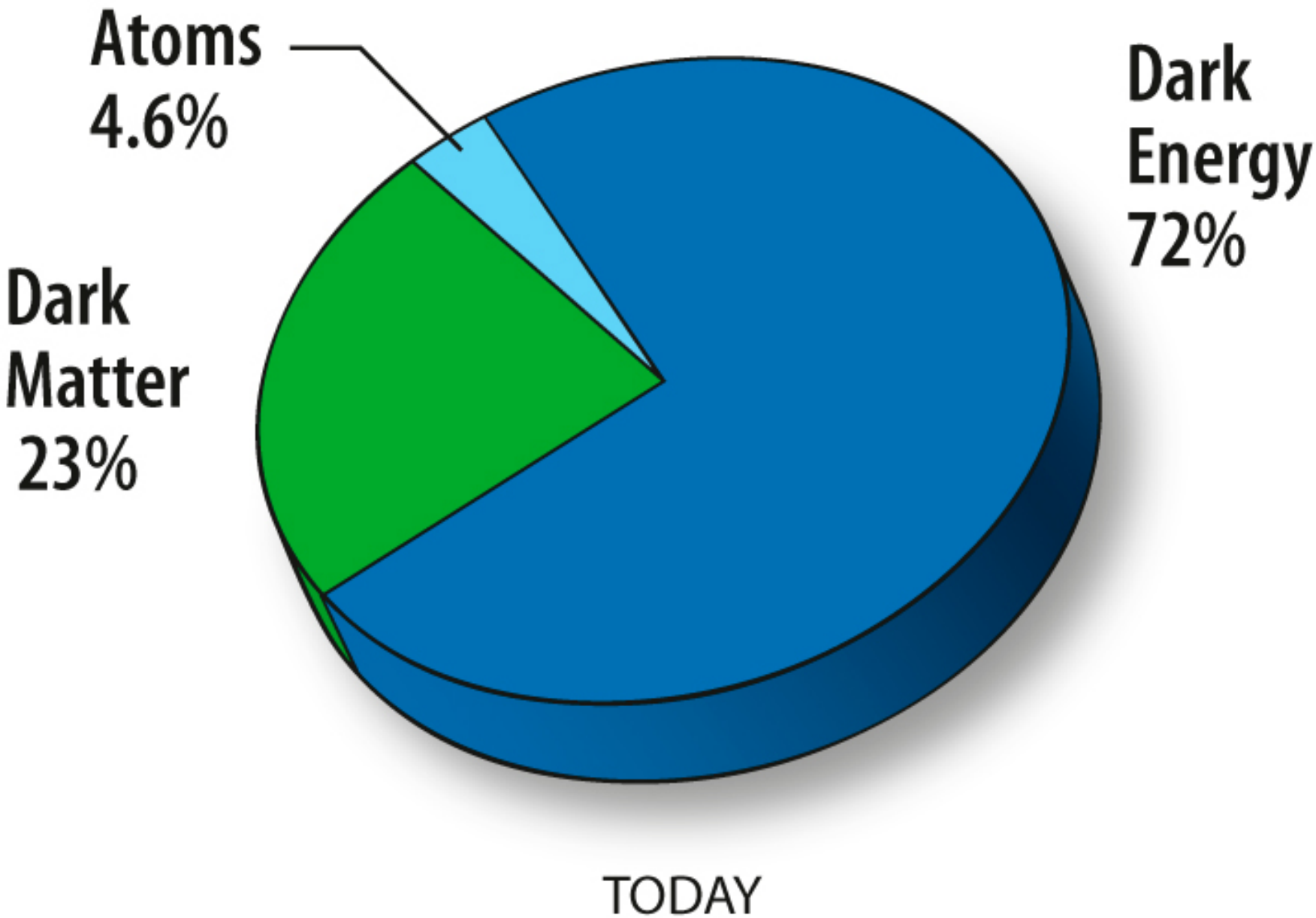
- big science and technology programmes are becoming more multi-national, being effected through extensive partnership organisations with shared capital construction of large research facilities and shared funding for operations and enhancement:
  - these are programmes that are too large even for the most developed countries acting individually;
  - example organisations for such programmes and funding are CERN, ESA, ESO, EU;
  - auxiliary equipment, instruments and detectors are often produced individually by institutions or in partnerships among institutions, supported through national major grants;
  - the use of the facilities by researchers or groups for individual programmes are supported through national minor grants;
  - there is scope for effective inclusion of university groups from developing countries in research partnerships.











13.7 BILLION YEARS AFTER THE BIG BANG

The Developing Scene

- In the early 19th century Wilhelm von Humboldt had a vision of a university characterised by the primacy of research, the importance of science, the integration of teaching and research, with all these activities contributing to the development of the nation. Knowledge production was the top priority.
- In today's higher education global landscape, von Humboldt's ideas remain salient, with the additional belief that expanded education leads to social betterment.
- Since the 1980s the model of the national university has steadily lost ground to a more research-based model of the university that provides knowledge for all, not just for elites.
- The idea that nations should be appropriately concerned with increasing democracy and human rights is consistent with the logic behind expanded access to higher education.

- How the super research university model has come about:
  - there is a developing global commitment to the expansion of higher education and research; a commitment to the public good;
  - in all parts of the world universities have become increasingly responsive to trans-national models of what the university should be, with special validity in an increasingly globalised educational environment, above and beyond local competitive factors or national regulatory forces;
  - there is stronger emphasis on the larger international forces that have an impact on higher education and research;
  - of significant influence is the advent of alternative sources of funds and new public methods of funding because most governments no longer provide full funding for their universities.

- The large research literature on the reasons for widespread educational development in modern society points to three distinct cultural ideas, each of which contributes to the overarching motivation behind the new university model:
  - increasing global emphasis on democracy and human rights;
  - modern national development as a political objective;
  - expansion of science as a broad authority and economic asset in society.
- Thus the super research university is both a result of, and an influence upon, contemporary society.
- Despite the many actors, academic freedom must remain as a core value essential for the success of all research universities worldwide.
- The super research university should not be seen as in isolation but as a member of a continuum of institutional types.

THE TOP 200 WORLD UNIVERSITIES Source: QS Ltd published October 9 2008

2008 RANK	2007 RANK	INSTITUTION	COUNTRY	PEER REVIEW SCORE	EMPLOYER REVIEW SCORE	STAFF/STUDENT SCORE	CITATIONS/STAFF SCORE	INTERNATIONAL STAFF SCORE	INTERNATIONAL STUDENTS SCORE	OVERALL SCORE
1	1	Harvard University	US	100	100	96	100	87	81	100
2	2=	Yale University	US	100	100	100	98	89	71	99.8
3	2=	University of Cambridge	UK	100	100	99	89	98	95	99.5
4	2=	University of Oxford	UK	100	100	100	85	96	96	98.9
5	7=	California Institute of Technology	US	100	74	98	100	100	93	98.6
6	5	Imperial College London	UK	99	100	100	83	98	100	98.4
7	9	University College London	UK	96	99	100	89	96	100	98.1
8	7=	University of Chicago	US	100	99	98	91	78	83	98.0
9	10	Massachusetts Institute of Technology	US	100	100	90	100	33	94	96.7
10	11	Columbia University	US	100	99	98	94	29	89	96.3

The Wider Context

- Other universities and professional schools may have fewer PhD programmes than the top universities and/or a concentration on master's level education for business, law, architecture, public administration, and other important fields.
- In such institutions, research at an internationally competitive level may take place in only a few departments or institutes with a comparative advantage based on geography, national culture, or other factors.
- In less affluent countries, universities may not have the resources to support more than one or two research programmes while the rest of the institution focuses energy on applied work or other training for national needs.

- Nevertheless, it is a strong advantage *(Altbach and Balan 2007)* for nations to have at least one university connected to the international discussions of science and scholarship, and undertaking research in one or more fields relevant to national development. Without such connections, nations are unable to participate in the world knowledge system. Such universities can have different units concentrating on very different priorities.
- In many nations, the California system of three tiers of higher education – doctoral, masters, and community colleges – has been adapted to create a segmented array of colleges and universities. Financial realities also tend to spread institutions along this continuum.
- The appeal of the new model, however, lures more and more institutions to try to become research universities. One plausible scenario for the next 20 years is a significant attempt by most of higher education worldwide to mimic the success of the top institutions.

- While the established top universities can pit international research prestige against mass education demands, in many countries where the move to mass education is more recent, the tension arising from the urge for innovative research and wider global reach, while at the same time providing tertiary education for as many people as possible, brings obvious difficulties.
- Although not every institution can be or should be a super research university, guidance for tendency in this direction might be:
  - graduate education, where instruction and teaching and research are seen as complimentary rather than competitive, is easier to fit into the model compared with programmes that demand difficult choices between these two fundamental goals of higher education;
  - a scientific approach to the study of all things, particularly applying to fields related to social and economic progress, dominates the prestige hierarchy;

- strong English language skills give significant advantage in enabling interaction with western scholars, gaining information from western journals, and presenting research in wide-read international publications;
- privileged disciplines attractive for funding are those that are seen as immediately useful or practical by the general public, government officials, and other decision makers;
- to join the international marketplace of ideas requires acceptance of the methods, norms, and values of the universities in Western Europe and North America that dominate the system;
- the natural sciences are especially appropriate in this arena; these can be seen as the truly universal culture — knowing no borders and using the same methods, sharing the same understanding, and having the same spirit of common endeavour recognised by all scientists over the globe.

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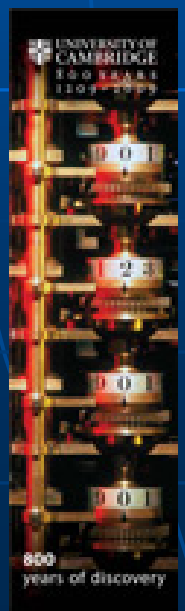
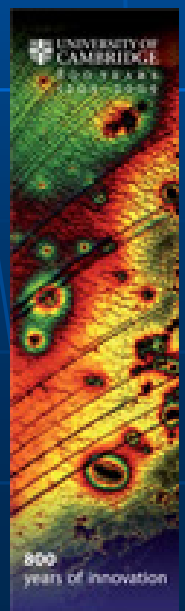
Super Research Universities: Example

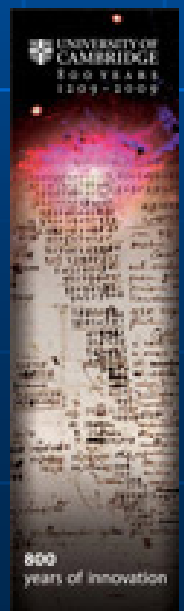
University of Cambridge

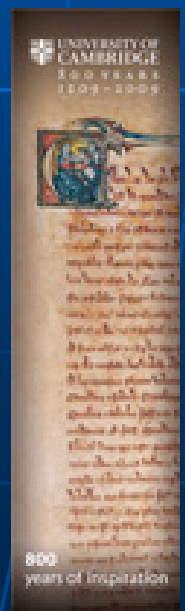
UNIVERSITY OF CAMBRIDGE

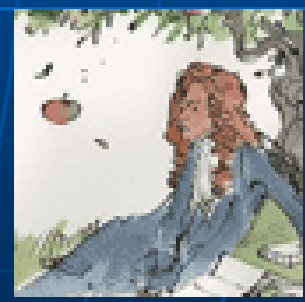
The University of Cambridge is the second-oldest university in the English-speaking world. It grew out of an association of scholars that was formed in 1209 by scholars leaving Oxford after a dispute with local townsfolk. The two Universities are often jointly referred to as *Oxbridge*. In addition to a history of cooperation and cultural and practical associations, there is a long tradition of friendly competition between the two Universities.











- Academically Cambridge is consistently ranked among the world's top few universities – 2nd after Harvard in both Shanghai Jiao Tong University's *Academic Ranking of World Universities* (2005, 2006) and The Times HE Supplement – QS *World University Rankings* (2006, 2007, 2008). It has produced 83 Nobel Laureates to date, more than any other university in the world.
- In the 2001 and 2008 Research Assessment Exercise (a UK-wide survey of research) Cambridge was ranked first in the country. In 2005, it produced more PhDs per year than any other British university (over 30% more than second-placed Oxford). In 2006, a Thomson Scientific study showed that Cambridge had the highest research paper output of any British university.
- Another study in the same year by *Evidence* showed that Cambridge won a larger proportion of total British research grants and contracts than any other university.

- Cambridge is a collegiate university, meaning that it is made up of self-governing and independent Colleges, each with its own property and income, some extremely rich. Most Colleges bring together academics and students from a broad range of disciplines.
- The Faculties are responsible for ensuring that lectures are given, arranging seminars, performing research and determining the syllabi for teaching, overseen by the General Board. Together with the central administration headed by the Vice-Chancellor, they make up the entire Cambridge University.
- Facilities such as libraries are provided on all these levels: by the University (the Cambridge University Library), by the departments (departmental libraries), and by the individual Colleges (all of which maintain a multi-discipline library, generally aimed mainly at their undergraduates).
- All students are attached to Colleges, where they live, eat and socialise. It is also the place where they receive small group teaching sessions, known as supervisions.

- Currently there are 31 Colleges. The University is made up of over 150 Departments, Faculties, Schools, Syndicates and other institutions. Academic members of these are usually also Fellows of one or more of the Colleges, and responsibility for running the entire academic programme of the University is divided amongst them.
- There are six Schools:
  - Arts and Humanities
  - Biological Sciences, including Veterinary Medicine
  - Clinical Medicine
  - Humanities and Social Sciences
  - Physical Sciences
  - Technology
- Teaching and research is organised by Faculties, which may include a number of Departments and other institutions. In addition, a small number of Syndicates have certain responsibilities, for example for the University Press and the University Library.

Associated Organisations and Institutions of the University

- Auto-ID Radio Frequency Identification Labs
- Babraham Institute (biomedical research)
- Cambridge Assessment
- Cambridge Enterprise - technology transfer office
- Cambridge Network –industry networking
- Cambridge Bio-Medical Campus
- Cambridge Crystallographic Data Centre
- Cambridge Science Park
- Cambridge University Library
- Cambridge University Press
- Cambridge University Buddhist Society
- Cambridge University Students' Union (CUSU)
- Cambridge University Technology and Enterprise
- Coimbra Group
- Downing Site
- Fitzwilliam Museum
- Franco-British Student Alliance
- Graduate Union of Cambridge University
- Granta, a literary magazine
- Isaac Newton Institute for Mathematical Sciences
- Kettle's Yard art gallery
- League of European Research Universities
- Medical Research Council research centres
- Laboratory of Molecular Biology)
- Millennium Mathematics Project
- The Naked Scientists – science radio show
- New Museums Site
- The Psychometrics Centre Phoenix
- Russell Group
- Sanger Institute (genome research)
- Scott Polar Research Institute
- Sidgwick Site
- West Cambridge Science and Mathematics Site
- Westminster Quarters
- Cavendish Laboratory
- Faculty of Mathematics
- Museums of the University
- 800th Anniversary Fundraising Campaign

- In 2006, the total financial endowment of the University and the Colleges was around US$8 billion, the largest in Europe; each College is an independent charitable institution with its own separate endowment. On the same scale Oxford is possibly ranked second and the Central European University in Budapest third.
- Ranked on a US university endowment table in 2006, Cambridge came fourth compared with the eight Ivy League institutions.
- Comparisons between Cambridge and top US universities are however inaccurate because being a state-funded public university, Cambridge receives a major portion of its income through grants from the British Government. In 2006, approximately one third of Cambridge's income came from Government funding for teaching and research, with another third from other research grants.
- Much also comes from benefactions and fundraising. As one case, in 2000 Bill Gates donated US$210 million to endow the Gates Scholarships for postgraduate students from outside the UK.

- There are research departments and teaching faculties in most academic disciplines. With a slight bias towards mathematics and science, for which it has an extremely strong reputation, Cambridge also has a number of strong humanities and social science faculties. All research and lectures are conducted by University departments.
- During the 1990s Cambridge added a substantial number of new specialist research laboratories to University sites around the city.
- Cambridge is a member of: the Russell Group, a network of research-led British universities. It is also considered part of the *Golden Triangle*, a geographical concentration of UK university research.
- Building on its reputation for enterprise, science and technology, Cambridge has a partnership with the Massachusetts Institute of Technology, embodied as the joint Cambridge-MIT Institute.

- The University is also closely linked with the development of the high-tech business cluster in and around Cambridge, especially those related to software, electronics, and biotechnology, which forms the area known as *Silicon Fen,* also sometimes known as the *Cambridge Cluster* or the *Cambridge Phenomenon*.
- In 2004, Silicon Fen was the second largest venture capital market in the world, after Silicon Valley.
- Estimates in February 2006 showed about 250 active start-up companies directly linked with the University, worth around US$6 billion.

International Connections

- The University's international links across the globe in virtually every area of research are extensive, and exist with individual researchers, departments and Colleges. They involve: research collaborations; flow of incoming research students; study visits abroad; and interactions with industry, government agencies and non-governmental organisations.
- Agreements are made between foreign institutions and Cambridge departments or Colleges. An example is Erasmus agreements, promoting mobility and lifelong learning within the European Union.
- Major Universities included in bilateral agreements are:
  - Massachusetts Institute of Technology, USA
  - Tsinghua University, People's Republic of China
  - Peking University (Beida), People's Republic of China
  - Kyoto University, Japan
  - Tokyo University, Japan

The Cambridge-MIT Partnership Programme

- The Cambridge-MIT Institute (CMI) was established to explore how academics, industrialists and educators might work together to stimulate competitiveness, productivity and entrepreneurship – *Accelerating Innovation by Crossing Boundaries and Working in Partnership*
- Funded through Government, with additional financial support from the public and private sectors, CMI set out to enhance competitiveness and innovation by improving knowledge exchange between universities and industry.
- Since 2000, CMI has worked with over 100 universities and more than 1000 companies and public enterprises on a series of challenging projects involving education, research and knowledge exchange.
- Many significant activities have established an independent life.
- A clear message from the CMI experience is that the constructive interplay of education and research, and formal and informal engagement with industry and enterprise has the greatest potential to substantially enhance knowledge exchange and accelerate innovation.

- Another example of a formal comprehensive engagement in research with the academic systems of other countries is the Cambridge India Partnership:
  - strong research links exist between Cambridge's science departments and several institutes in India, including the National Physical Laboratory in Delhi, the National Chemical Laboratory and the National Centre for Radio Astrophysics in Pune, the National Centre for Biological Sciences and the Indian Institute of Science in Bangalore, the Tata Institute of Fundamental Research in Mumbai, the IIT Department of Chemical Engineering in Kanpur, and the Harish-Chandran Research Institute in Allahabad
  - around 20 Indian researchers visit the Cambridge Isaac Newton Institute for Mathematical Sciences each year to take part in its programmes
- A different example, of an individual initiative from a Cambridge Professor, is the establishment in Africa of the African Institute of Mathematical Sciences.
- In addition, there are various multilateral alliances, including:
  - Coimbra Group, an association of leading European universities
  - European University Association (EUA)
  - International Alliance of Research Universities (IARU)
  - International Association of Universities (IAU)
  - League of European Research Universities (LERU)

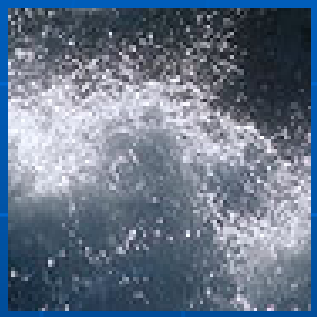
Internationally-Related Themes

The University also promotes understanding about other regions and cultures through teaching in its particular institutions:

- Cambridge Committee for Russian and East-European Studies
- Centre for the Study of Jewish-Christian Relations
- Cambridge Inter-Faith Programme
- Centre of African Studies
- Centre of Latin American Studies
- Centre of South-Asian Studies (India, Pakistan, Sri Lanka, Bangladesh, Himalayan Kingdoms, Burma, Thailand, Malaysia, Singapore, Vietnam, Cambodia, Laos, Indonesia, the Philippines and Hong Kong)
- Department of East Asian Studies (Chinese & Japanese)
- Department of French
- Department of German and Dutch
- Department of Italian
- Department of Middle Eastern Studies (Hebrew & Aramaic, Middle East & Islam)
- Department of Slavonic Studies (Russian)
- Department of Spanish and Portuguese
- Digital Himalaya
- Faculty of Asian and Middle Eastern Studies
- Modern Greek Section
- Mongolia and Inner Asia Studies Unit
- South Asian Studies (Hindi, Sanskrit and other languages of the Indian sub-continent)

Global Issues

One example of Cambridge's work on global issues is its extensive work in the environmental sciences:



Conservation Science

Climate Change

Energy

Society

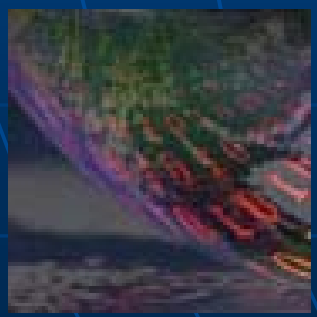
Water

Waste

Built Environment and Industry

Natural Hazards

Technology



Climate Change

Research Groups:

1. Cambridge Centre for Climate Change Mitigation Research (climate change)
2. Cambridge Quaternary (palaeoclimate) (climate change)
3. Centre for Atmospheric Science (climate change)
4. Climate Change and Earth Ocean Atmosphere Systems (paleoclimate)
5. Effect of Climate and Land Use Change on River Hydrology in Thailand (climate)
6. Environmental Economics (climate)
7. European Ozone Research Coordinating Unit (climate monitoring)
8. Glaciology and Quaternary Science research cluster (climate change)
9. Physiological Ecology Group (climate change)
10. Polar Ocean Physics Group (global climate change)
11. Quaternary Palaeoenvironments Group (palaeoclimate)

FINISH

The UNESCO Forum for Higher Education, Research and Knowledge
Workshop on Research in Diverse Social Contexts:
Tensions, Dynamics and Challenges

UNESCO, Paris, 19-21 March 2009

Viewpoint

By Abdelwahab Ben Hafaiedh, PhD
Coordinator
The Middle East Research Competition.(MERC)

What can be said about Research on Social Science in the Arab Countries ?

Challenges and Needs

Introduction

- As it has been pointed out by several reports since 1998 (UNESCO,UNDP), research in the Arab countries is gradually losing its competitive edge, both in terms of financial benefits and societal recognition. This is attributed to several factors:
- 1) Teaching staff heavy work and teaching load
- 2)The large number of professionals going into private practice.
- 3) Most of the research produced and published is done by academicians to fulfill their promotion requirements.
- 4) Lack of financial support.
- 5) Lack of academic freedom.

I) Trends of the recent past and challenges of the present

II) Evidences and Possible Continuing trajectories

III) Future priorities and needs

(I) Trends of the recent past and challenges of the present

5/5

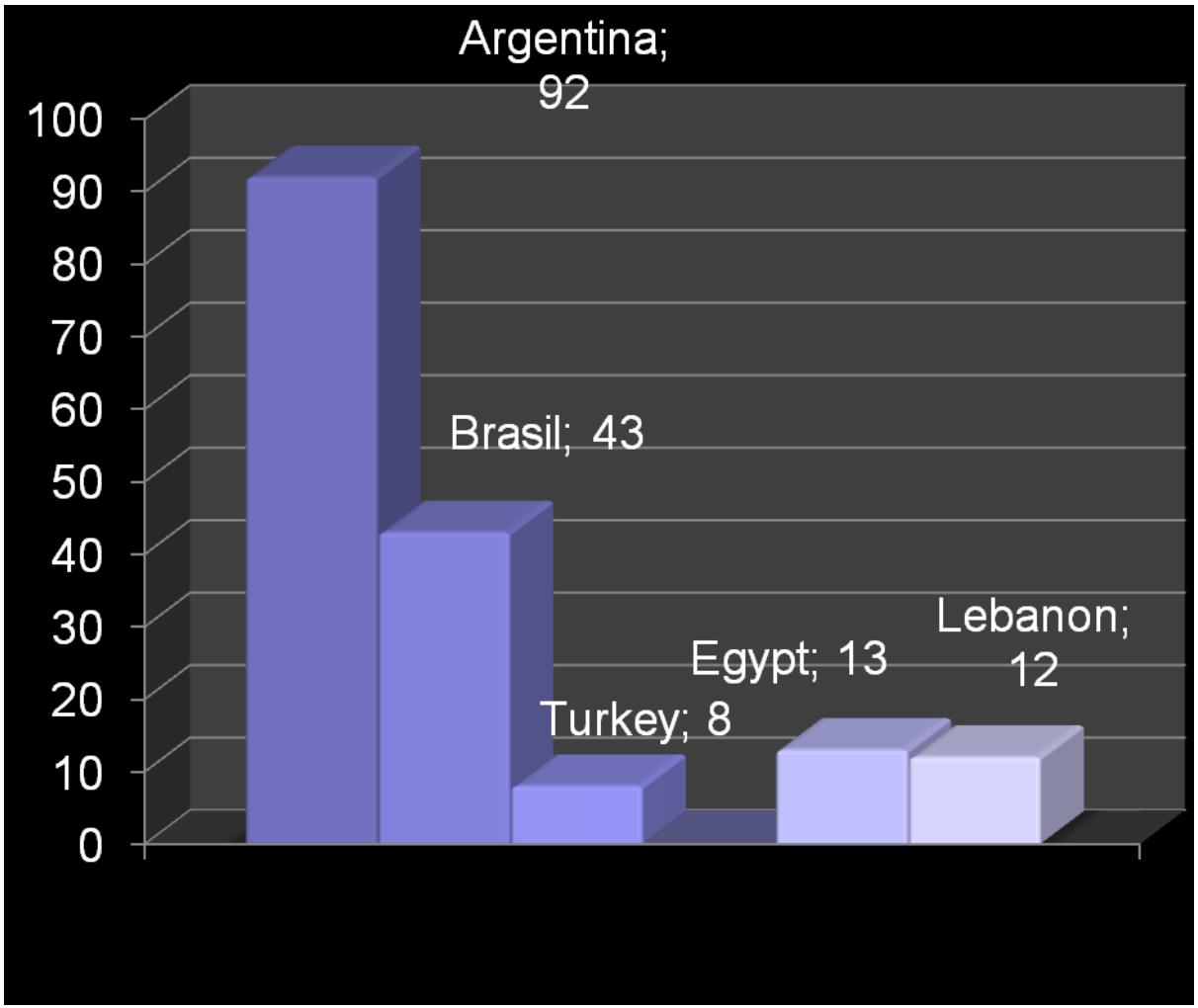
- Indicator of Performance of Higher Education and its impact on Social Science Research
- Indicator of Dissemination of Social Science.
- Indicator of Regional Co-operation and Collaborative Research.
- Indicator of Accumulation of knowledge
- Indicator of accessibility to scientific information .

(1) Indicator of Performance of Higher Education:

What is the impact of Massification of Higher Education on Social Science Research?

- In 1950, there were no more than 10 universities across the region. Today, there are more than 250 higher education providers.
- As a result, there is high pressure and demand on professors to teach more and also larger classes
- This situation has had an immediate impact on the quality of research

(2) Indicators of dissemination of Social Science

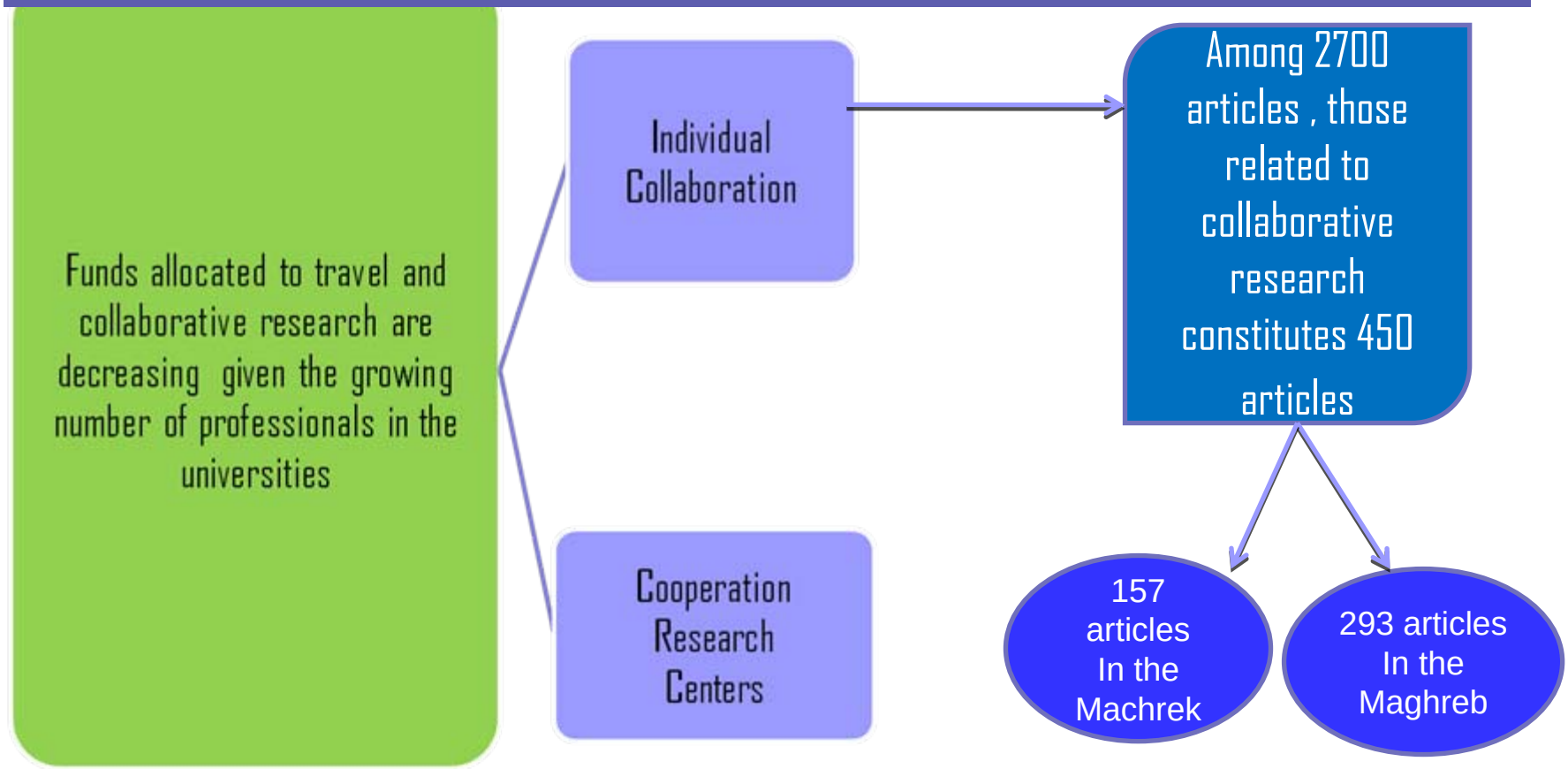


In terms of production of social science journal, the Arab countries produce fewer regional journals in local language than other countries.

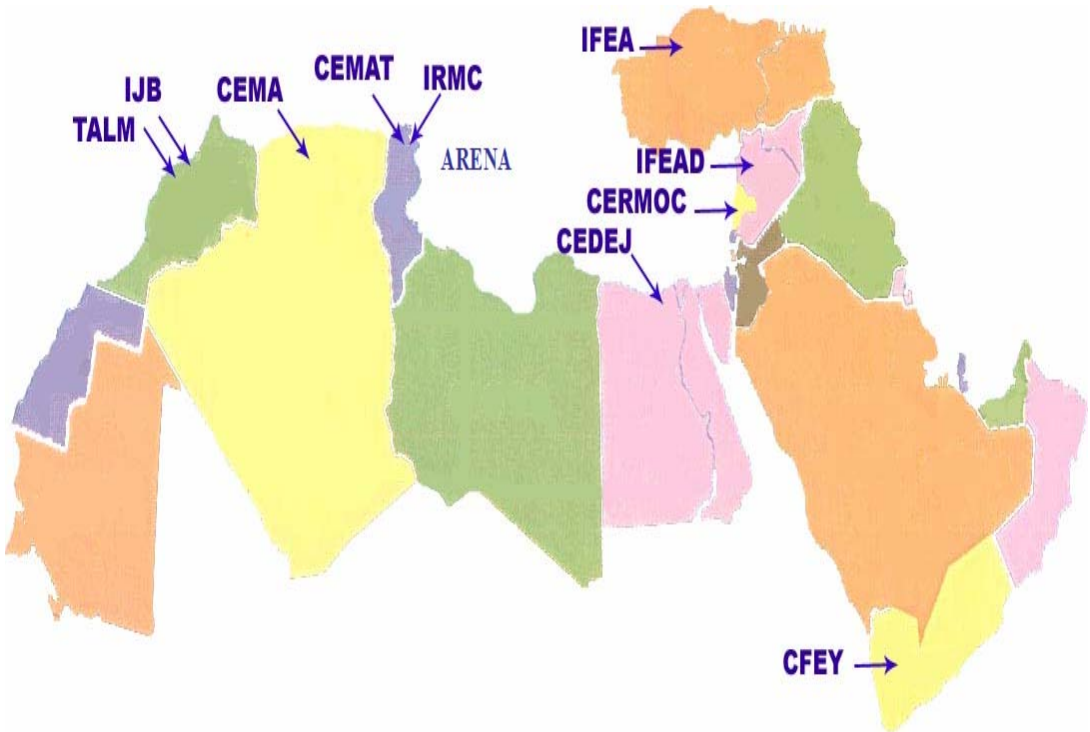
Funds allocated to journals are decreasing on a per capita basis , given restrictive press and publications laws.

Source: Unesco dare database 2006

(3) Indicator of Regional Co-operation and Collaborative Research.



(1-3) Collaboration with Cooperative Research Centres.



- They contribute to the development of networking and international visibility of regional Social Science .
- They are very much in demand among local research community.
- Some of them have their own agenda and most of them play the role of host institutions for foreign researchers.

(4) Indicator of accumulation of knowledge:

what are Arab Social Scientists Talking about? …

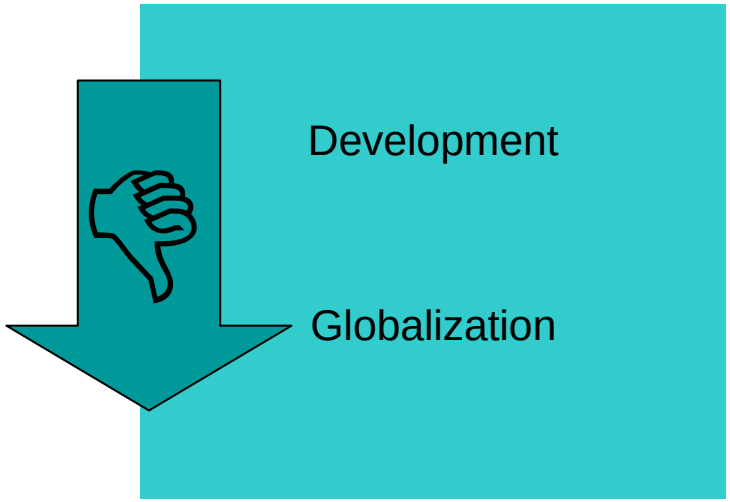
Selected Journals

- Revue Tunisienne des Sciences Sociales
- Journal of Social Science
- Insaniyat
- Bulletin of Arab Research and Studies
- Journal of Development and Economic Policies
- Journal of Social Science
- Journal of Human Sciences
- Middle Eastern Studies Journals
- Journal of the Gulf and Arabian Peninsula Studies

Source: Dala Dhakkar 2007

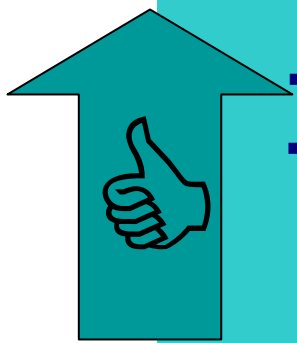
Declining Issues

- Development
- Globalisation
- Classes and Social Mobility
- Law and justice



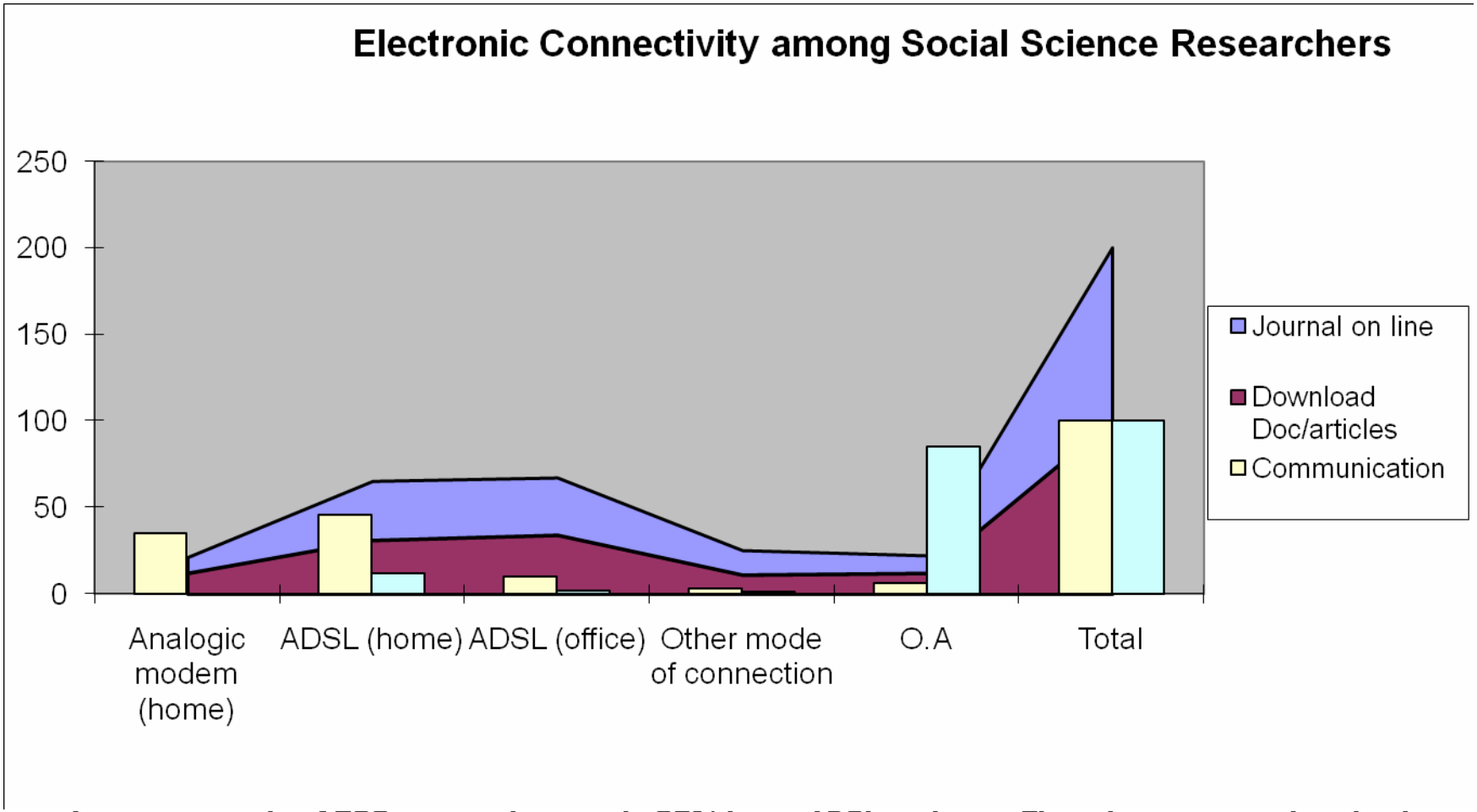
Emerging Issues.

- Women studies
- Cultural Identity
- Familiy & private life
- Regional Conflict
- Social Protection
- Religion/Political Islam
- Education



- Women Studies
- Cultural identity

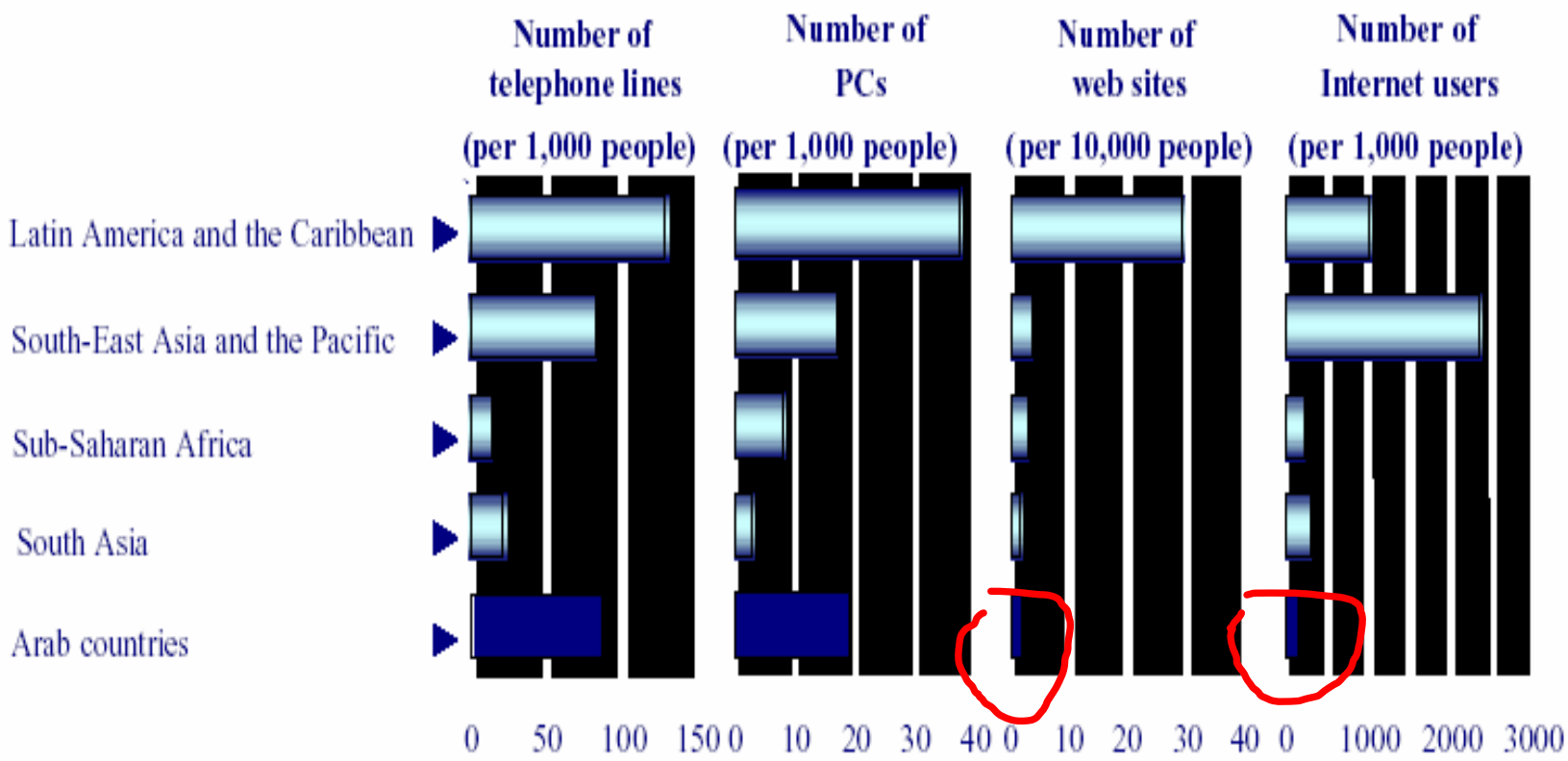
(5) Indicator of Scientific Information Accessibility



Among a sample of 700 researchers, only 35% have ADSL at home. The others cannot download documents from their offices or places of work

(Source: El Fida 2007)

(1-5) Compared to other regions, the Arab Region has a low number of websites and internet users..



(II) Some Evidences and possible continuing trajectories

(1) First Evidence: Studying Social Science....What for?

- The Research “Market" is still weak .Doctoral studies in most of the Arab Countries are still structured, for the most part, as if all students were destined to become university professors."

- Many Social Science PhDs report that being under prepared for the modern workplace, both inside and outside the university.
- Some reports suggest that career preparation should begin early in doctoral programs and should include issues such as job search strategies .

Source: Ben Hafaiedh (ATS Survey 2000)

(2) Second Evidence: Indigenization… Without "memory":

- At the present time, there are no accurate statistics and only a guesstimate can be made, which indicates that there are 70,000 social science researchers in the MENA countries (About 20,000 seniors and about 50,000 juniors). This represents more than a ten time increase in 30 years (S.Ibrahim 2002)

- In several countries of the region, especially in Morocco, governments undertook measures encouraging the early retirement of senior researchers and university staff in order to replace them by new PhD holders.
- Social Science in most countries of the region seems to be functioning without 'memory', and with new generations entering the field and lacking strong attachment to previous generations who have strong links to the West.

(3) Third Evidence: Research….without a Communication Process!

- A deficit of trust between decision makers and Social Science researchers
- A lack of academic freedom in some countries
- Difficult procedures concerning the accessibility to statistics and information in most of the Arab Countries.

(III) The future Needs and Priorities

- Needs for Research Environment,
- Needs for Improving research Environement
- Needs for Renewing Research Agenda for Developping Regional Structures of Research

(1) Needs for Developing Regional Structures of Research:

- Crisis of public research, in a context marked by discouragement of autonomous initiatives and fundraising (NGOs, associations, foundations).
- Two experiments of launching a regional Council of Social Science: the first one was in 1999, in Tunis (Arabssco) and the second one in 2008 in Cairo (ACSS).
- Many researchers had expressed the necessity to have a regional council of Social Science equivalent to CODESRIA or OSSERIA in Africa....

(2) Needs for Improving Environment of Research:
Academic freedom

- In Most of the Arab Countries ,Religion and Governments contribute to the politicization of knowledge . In regard to Research Activity and academic freedom ,both of them are two sides of the same coin.
- While the "Islamisation" of Social Science , frequently results, in the expropriation of freedom of thought from the 'below'.
- The excessive politicization of issues from governments, limits the margin of developing free, comparative and basic research from the "above".

(3) Needs for Renewing Research Agenda

After Development and globalization…what is next?

Three perspectives:

- **The return to the local** via the rise of community can be understood as a part of a post globalisation posture. It's important to understand the local actors in the local fields in which people struggle for recognition, status and legitimacy.

- **The return to public interest** refers to the "common well-being" or "general welfare." The public interest is central to policy debates and social well-being

- **Enhancing Comparative Research** : The modest level of collaborative research will in the long run affect the quality of research and the credibility of researchers. This is based on the belief that comparative social science is the entry point to the development of local social science and global concerns.

The UNESCO Forum for Higher Education, Research and Knowledge
Workshop on Research in Diverse Social Contexts
UNESCO, Paris, 19-21 March 2009

National Health Research Systems in Latin America:
Outcomes of the First Latin American Conference on Research and Innovation for Health
and a review of 14 countries

Executive Committee, First Latin American Conference on Research and Innovation for Health

Viewpoint

By Jackeline Alger, MD, PhD
Faculty of Medical Sciences, Honduras National University;
Department of Clinical Laboratories, University Hospital;
Ministry of Health, Tegucigalpa, Honduras

Background: national health research system (NHRS)

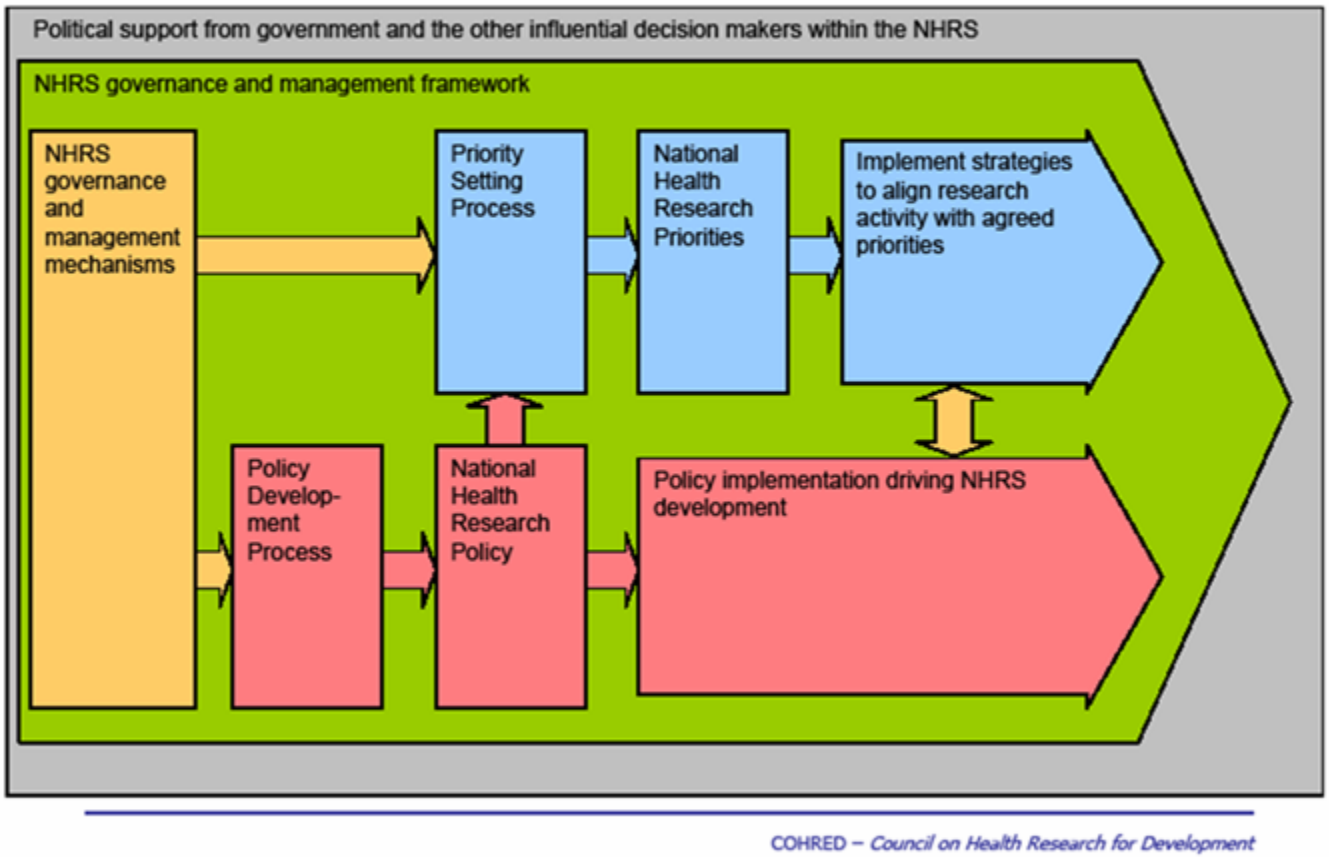
- **NHRS**: people, institutions, and activities whose primary purpose is to generate high-quality knowledge that can be used to promote, restore, and/or maintain the health status of populations; it should include the mechanisms adopted to encourage the utilization of research.

- **Actors**: those involved in knowledge generation, research synthesis, and using research results in the public and private sectors.

- **Principal functions**: stewardship, financing, creating and sustaining resources, and producing and using research.

Pang T, *et al*. Knowledge for better health — a conceptual framework and foundation for health research systems. *Bulletin of the World Health Organization* 2003;81:815-820.

Foundations of NHRS Development



Kennedy A. COHRED Council on Health Research for Development. *Symposium on the Comparative Analysis of National Research Systems. UNESCO, Paris, 16-18 January 2008*

First Latin American Conference on Research and Innovation for Health, Rio de Janeiro, Brazil, April 16-18, 2008.

Aims

To identify practical answers to common challenges in the region: how to ensure that research addresses countries' health priorities and contributes to equitable development in Latin America.

To examine the creation, development and strengthening of national health research systems (NHRS) and regional cooperation as a means to take advantage of existing resources and reduce inequities.

First Latin American Conference on Research and Innovation for Health, Rio de Janeiro, Brazil, April 16-18, 2008.

Participants: ~120 strategic actors

Country health and science and technology officials; representatives of development and technical cooperation agencies; national, regional and global research networks and organizations; and technical officials of the Pan American Health Organization (PAHO) and World Health Organization (WHO).

First Latin American Conference on Research and Innovation for Health, Brazil, April 2008

- The Conference was a product of alliance
  - Ministry of Health of Brazil
  - PAHO/WHO
  - Mexican Coordinator Commission of National Institutes for Health and High Specialty Hospitals (INSalud)
  - Council on Health Research for Development (COHRED)
  - Global Forum for Health Research (GFHR)
  - NicaSalud, Nicaragua

First Latin American Conference on Research and Innovation for Health, Brazil, April 2008

- NHRS background papers for 14 countries
- Teams of national experts (common format adapted from the COHRED NHRS Development Framework)
- Written in late 2007 – early 2008

  Argentina, Bolivia, Brazil, Chile, Costa Rica, Cuba, Ecuador, El Salvador, Honduras, Panama, Paraguay, Peru, Uruguay and Venezuela.

National Health Research Systems in Latin America: a review of 14 countries

- **Information**:
  - Governance and management structures
  - National policy framework – in particular human resources and financing strategies
  - Research priorities and the priority setting process employed
  - Formal research dissemination and utilization structures
  - Specific innovation structures and policies, and other issues identified as important by each country.

National Health Research Systems in Latin America: a review of 14 countries

- **Source of information**
  - National policy documents
  - Databases
  - Interviews with senior figures in research and policy
  - Writing team's own knowledge of national health research systems

- **Preliminary results**

Country general characteristics

Data for 2005. Adapted from HDR 2007-2008, UNDP

Country	Human Development	Population (Millions inhab)	National commitment to health and education	
	HDI (Rank)		Health expenditures (% GDP) 2004	Education expenditures (% GDP) 2002-2005
Argentina	0.869 (38)	38.7	4.3	3.3
Bolivia	0.695 (117)	9.2	4.1	2.4
Brasil	0,800 (70)	186.8	4.8	…
Chile	0.867 (40)	16.3	2.9	2.4
Costa Rica	0.846 (48)	4.3	5.1	3.4
Cuba	0.838 (51)	11.3	5.5	9.7
Ecuador	0.772 (89)	13.1	2.2	2.5
El Salvador	0.735 (103)	6.7	3.5	1.8
Honduras	0.700 (115)	6.8	4.0	3.8
Panamá	0.812 (62)	3.2	5.2	4.6
Paraguay	0.755 (95)	5.9	2.6	1.9
Perú	0.773 (87)	27.3	1.9	2.8
Uruguay	0.852 (46)	3.3	3.6	2.5
Venezuela	0.792 (74)	26.7	2.0	4.6

Country general characteristics, cont

Data for 2005. Adapted from HDR 2007-2008, UNDP

*>0 but low enough to be rounded to cero, *2004 Data, **2003 Data

	Techbology and knowledge				Research output	
	Patents granted (residents) per million inhab 2000-05	I&D Expenditures (% GDP) 2000-05	S&T Expenditures (US Millions)	Researchers in I&D (per million inhab) 1990_2005	Scientific publications LILACS (2007)	Scientific publications in health ISI [number (total publications)]
Argentina	4	0.4	845.2	720	1,141	3,024 (5,222)
Bolivia	...	0.3	23.0	120	103	141 (184)
Brasil	1	1.0	7290.2	344	14,585	13,534 (21,206)
Chile	1	0.6	633.7**	444	1,549	1,510 (3,425)
Costa Rica	...	0.4	69.9**	...	85	222 (287)
Cuba	3	0.6	234.2	...	927	399 (664)
Ecuador	0	0.1	18.6***	50	12	176 (264)
El Salvador	...	0.1	...	47	0	12 (19)
Honduras	1	0.0	3.5***	...	38	22 (23)
Panamá	...	0.3	38.0	97	2	225 (302)
Paraguay	...	0.1	6.5	79	268	324 (445)
Perú	0,0*	0.1	100.5**	226	8	95 (104)
Uruguay	1	0.3	...	366	122	282 (429)
Venezuela	1	0.3	333.1	...	546	554 (1,097)

Characteristics related to NHRS governance and management (1)

- Six of the 14 countries have formal governance and management structures for health research:
  - Brazil and Costa Rica: MOH
  - Argentina, Cuba, Ecuador, Venezuela: MOH and S&T

- The rest 8 countries

  Some of them have some organization that could evolve into formal NHRS governance and management structures

Characteristics related to governance and management of a NHRS (2)

- Coordination between different stakeholders
  - Brazil and Costa Rica: national research agenda
  - Argentina and Ecuador: national forum
  - Cuba and Venezuela: national system for research and technological innovation

- Health research policy framework: Brazil and Ecuador

  The rest: sets of health laws that covers health research in different details; S&T laws; except El Salvador and Honduras

Characteristics related to governance and management of a NHRS (3)

- Priority setting process
  9 countries: Argentina (2006), Brazil (2006), Costa Rica (2005), Cuba (2006), Ecuador (1999, 2008), Panama (1998, 2000, 2007), Paraguay (2002, 2004, 2007), Peru (1984, 1997, 2001, 2006-07), Venezuela (2005).

- Process: led by MOH and major consultations

- Wide range of topics: from diseases, events, habits to health categories, including health research itself

First Latin American Conference on Research and Innovation for Health, Brazil, April 2008

Debate in four groups (1)

1. National Health Research Systems

2. Human resources for health research

3. Funding of research for health

4. Innovation, product development and access.

Debate in four groups (2)

Conclusions

1. Strengthening and regulatory role of NHRS and regional cooperation are vital to face the challenges to health and promote the equitable development in Latin America.

2. The regulatory role of the NHRS, including research, development and distribution of technologies, is a non-transferable government responsibility. This is the only effective way to articulate research and innovation with public health and development priorities.

Strategic action lines (1)

1) The government should exert the regulatory role of the NHRS through MOH with support from other governmental and non-governmental actors.

2) The NHRS should establish and update research priorities, with the purpose of optimizing resources and respond to the evidence needs of the health system and the national developmental goals.

3) The NHRS should promote a political, legal and educative environment to favor equity driven research

Relevance for Honduras

- Participation in the Conference, allowed a group of professionals (MOH, National University), to learn about advancement on these topics in Latin America, especially in Central America.

- This initial knowledge allowed to organize an interinstitutional group (MOH, academy, S&T, Social Security and private foundations), with support from PAHO/WHO Honduras and COHRED.

- A route has been established to build the NHRS

Challenges

- To promote regional cooperation as a key factor to consolidate the NHRS, conciliate the intellectual property and public health interests and to reduce inequities in knowledge, financing and technology matters.
- **Action lines**
  - to generate strategies and collaborative projects based on common and supplementary goals
  - to confront the challenge to conciliate the intellectual property and public health interests and to harmonize the regulatory frameworks and processes existing in different countries.

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Mapping and analyzing research systems: **A Template and How to breathe dynamics into it**

(recording the trends, challenges, tensions and initiatives within the research system)

Dr. Roland Waast, IRD, Paris
Dr. Johann Mouton, CREST, Stellenbosch

UNESCO Forum on Higher Education, Research and Knowledge
18 March 2009

Summary

- Existing documents

  Existing documents

  Pitfalls of data collection for policy making
  Taking stock of the research system
  The need to integrate dynamics

- The Template

  Headings 1 to 9
  Heading 10

- Making the information dynamic

  The context

  Trends, challenges, tensions and initiatives

Existing documents (1)

- A **Template** for collecting data on research systems
- Elaborated from a **Meta-Review** of 52 country case studies
- Covering poor and developing countries
- Accompanied with **Regional and Global Syntheses**
- See on the web: unesco special initiative

Existing documents (2)
Our Intentions

- A “reference study”
- Added with some “generalizations” and analytical propositions that emerged from the individual country studies
- To back **initiative taking, and evidence based policy making**
- By putting forward **not** solutions, models or “good practices” **but** a panorama of the relevant data

Pitfalls of data collection
for policy making in the developing world

- The need for a **panorama**

  (not only the distinctive experience of some witnesses or stakeholders)
- Information scattered, withheld, unsteady, lacking homogeneity
- Lack of local offices in charge of collecting data and **storing** information (local, regional, world-wide)
- Non standardized list of relevant information, useful for science policy making
- Shortcomings of *indicators* and need for other **relevant information,** regarding diverse contexts and various stakeholders' initiatives in developing countries

Taking stock of the research system (Our choices)

- Not a manual, but **a guide**
- **Structured** information, not necessarily standardized
- **Indicators, Descriptors and Narratives**
- Information easy to understand and not too difficult to collect
- Needs a **methodology**
- Wide range of headings and items, more or less relevant in specific contexts
- Choice to be made in context of **minimum** data, and minimum information quality standards, required to enable making policy advice

Shortcomings and possible misunderstandings

- **Shortcomings** to be addressed (Work is in progress)
- **Possible misunderstandings:**

  - No view to deliver recommendations; no evaluative or prognostic comments

  - But we make room in the Template to integrate them
- **Possible misuses of the Template:**

  - Needs to (and can) be *adapted* :

  ☒ to the context

  ☒ to the purpose (descriptive-analytical/ diagnostic/ monitoring/ prognostic/ policy advice)

  ☒ and to the mandate of the user (policy maker, manager, consultant, professor…;

  in charge of orientation of research, of cooperation, of training, etc)
- **Needs dynamics (not only descriptive)**

  - See our Regional Reports and General Synthesis

  - *Special heading "N° 10"* in the Template: about *tensions, issues, challenges and initiatives*.

  - **Focus of this day**

The template

Template: The Context

Purpose	Headings	Content
Context (1)	***General*** (economics, political, educational, socia): significant strengths & weaknesses; major events or developments	Historical Narrative Statistical Indicators
Context (2)	***History*** of science in the country (region)	Descriptors: (chronological) lists of establishments, Journals, Associations & academies, Ministries & policy briefs Narratives: Major periods and events shaping the institution of science
Context (3)	***Governance*** of science in the country (region)	Descriptors: Lists of sc policy documents & commissions; assessment reports; Diagram of science governance
Context (4)	***Informal*** S&T structures	Descriptors: National scientific Journals, Societies & Associations Narrative: Historical description of these structures

Template: Input / Output

Purpose	Headings	Content
Input/Output (1)	***Performers*** (*Key*) public & private univ, public & internat centres, private sector facilities	Descriptors: Listing of names Narratives: Strengths & weaknesses of the Univ system; Niche areas of research; Modes of knowledge production
Input/Output (2)	***Human Resources*** Numbers and quality (where) Critical mass Profession & Status Reproduction & brain drain	Indicators: Numbers (headcount, FTE, by localization, field, gender, nationality…) Narratives: Remuneration, Careers, Mobility, History of the profession, Episteme
Input/Output (3)	***Funding*** Role of the Government, Incentives, Foreign funds	Indicators: Intensity; Expenditures and sources of funding Narratives: Government Schemes, Tenders and Contracts, Tied agenda
Input/Output (4)	***Cooperation***	Descriptors & Indicators: main agreements and partners; Networks Narratives: Domains and topics; Types: individual, institutional, national…
Input/Output (5)	***Output*** Publications; Others	Indicators (Publications; patents) Narratives: Incentives to encourage innovation, liaison with the productive sector, popularization and publications

Template: Dynamics

- Tensions

  Within the system : between sectors, types of performers, types of researchers, corporate bodies, etc

- Challenges

  Unexpected and external events, out of control

- Issues

  A rephrasing of tensions and challenges in terms of problems to be solved

- Initiatives

  Schemes of action to face the issues

Template: Grasping the dynamics

- Assets and obstacles
- Human resources
- Institutions
- Output
- Function of science

Dynamics: Assets & Obstacles

- History

  (Ex.: Ancient institutionalization; Old sanctuaries; National great figures; Corporate bodies)

- Development strategies

  Past & present; Linkage to industrialization; Linkage to economic resources; Leeways and initiatives

- Trust in science

  Science & Society (general trend); New pact (innovation)

- Social environment

  Social values all around; Knowledge value; Support to science; Socio cognitive blocs. Initiatives from researchers

Dynamics: Human Resources 1

- Numbers: the critical mass

  in relevant niches; data from bibliometric studies

- Quality

  Different Epistemes; Need for keeping up to date

- Profession

  - Working & living conditions: motivation and orientation

  - Professional paths: from great hopes to relegation; New proletariat. Initiatives for a revaluation

  - Changes in the profession: New modes of knowledge production, new modes of funding; constraints of a new pact with society.

  - Conflicts of values and epistemes. Changing hierarchy of the disciplines and capabilities. Managerial challenges

Dynamics: Human Resources 2

- New modes of knowledge production

  Nature of the new mode. Reasons for contract research.

- Evaluation

  New pact. Institutions and tools. Incentives. Policy

- Reproduction

  Need for up to date supervisors + injection of new blood

  Which cooperation is appropriate?

- Brain drain

  - Measures; Reasons

  - Initiatives and policy. Material incentives; sound institutions. « The diaspora option ». Import of foreign campuses

Dynamics: Institutions

- De-institutionalization?
  - A consequence of contract research & brain drain
- The role of institutions
  - Sanctuaries for intellectual competition & the ethos of science
  - Role of Universities
- Policy and Managerial issues
  - Centres of Excellence or National systems?
  - How to set up a collective dynamics ?
- Co-operation challenges
  - Choice of partners
  - Institution (re-) building

Dynamics: Output

- Quality
  - Diverse epistemes. How to assess their efficiency ?
- Relevance
  - Definition of anticipating niches
  - Choice of relevant topics
- Cooperation policies
  - How to gain access to frontier issues (technological…) ?
  - Participating in large international programs
- Links
  - **Networking** in the scientific world (descriptors)
  - Liaison with the society

Dynamics: The function of research

- Sustainable & Up to date training
- Credibility before economic partners
- Expertise and advice to the State
- Strategic ideas towards recurrent problems
- Bring to light new resources
- Anticipating niches and innovations

Thank you

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