

**Draft concept note for the implementation of
research strategy in USTH**

Didier Lecomte
Director of Research and Innovation

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1. General objective:

Premise

Research at USTH is built within the six departments. A strong incentive will be put on the development of innovative technologies and systems (in particular ICT, biotechnology and nanotechnology) at laboratory scale and their applications in the fields of Space, Health, Energy and Environment. Scaling-up and dissemination techniques fully become objects of research as well as the issues of environmental impacts and risks assessment.

The purpose of this note is to provide the institutional framework for strategic thinking related to the Research areas of USTH for the next decade and the implementation of the research centers to be developed within the six existing departments, namely Biotechnology and Pharmacology, Material Sciences and Nanotechnologies, Water-Environment-Oceans, Information and Communication Technologies, Energy and Aeronautics-Space.

2. Context

The intergovernmental agreement of November 12, 2009 formalizes cooperation between France and Vietnam for the implementation of a University of Excellence in Hanoi, the University of Science and Technology of Hanoi (USTH). A consortium of French Academic partners has been set for a period of 10 years. It includes over fifty institutions (universities, major research institutes, Grandes Ecoles) sending academic staff to USTH for short term teaching assignments. In return, each year for a period of 10 years, 40 students will receive a PhD fellowship from the Vietnamese government to study in France. The best of these students will be recruited as faculty members at USTH. A French Foundation will raise funds for the development of interactions between education, research and business.

In addition to this agreement, a second foundation of Vietnamese law, is in charge of raising funds from Vietnamese companies to provide scholarships to outstanding students.

The agreement clarifies the six scientific and technical domains of USTH.

- Biotechnology - Pharmacology;
- Materials Science - Nanotechnology;
- Information and Communication Technology ;
- Water - Environment - Oceanography;
- Energy
- Aeronautics and Space.

The agreement includes the implementation of future International Joint Research Units (UMI) grouped in one or more graduate schools, under the joint responsibility of Vietnamese and French partners: universities, schools, research organizations and Vietnamese and French companies. Researchers, lecturers and supporting staff of both Vietnamese and French sides are assigned by their home institutions.

Funding from France reaches € 100 million distributed as follows:

- € 40 million for student training by research (2010-2020).
- € 30 million for implementation of the 6 International Joint Research Units (UMI)
- 30 M € consolidated costs of the contributions to teaching from the Consortium academic partners.

In addition, France (MoFA, MoR) funds 3 executive positions and experts: the Rector, the General Director of Services and the Director of Research and Innovation.

Vietnam funds \$213 million including \$190 million loan by the Asian Development Bank (ADB) and \$ 23 million own investment will support the 4 following outputs:

Output 1: Effective Management and Governance System for USTH Developed and Implemented

Output 2: Systems to promote high quality and relevant academic programs at USTH developed and implemented

Output 3: Physical Facilities at USTH Constructed

Output 4: Effective project management and implementation

Full description of the project is available on the ADB website:

<http://www.adb.org/projects/documents/university-science-and-technology-hanoi-development-new-model-university-projec-8>

3. Research Implementation at USTH

In 2014, 1,000 students will attend USTH. In 2017, 3000 students will be expected. In 2020, the number of 5000 students is put forward. The number will increase up to 7,000 in 2026 (ADB information).

We make the assumption that the faculty members will be around 2150 in 2017, 300 in 2022, with an average ratio of 15 students per faculty members. To maintain academic excellence and encourage diversity, it is likely that half the lecturers will be trained by the USTH consortium, the other half by other international institutions.

We also assume the creation of six research centers in close connection with the six scientific and technical domains of USTH. Each research center will have an average number of nearly 70 faculty members, with additional staff from French Institutions (MoFA, MoR, CNRS, IRD, CIRAD, ...) within the framework of specific agreements or joint laboratories.

Creating Joint International Research Units (UMI) in these research centers will be a medium-term objective to provide additional resources and meet the objectives of the inter-governmental agreement. However, to promote a broad consultation of the French and Vietnamese stakeholders of research, we will first focus on the creation of CNRS-type GDRI or joint structures with a large field of applications.

4. Institutional Support

Support from France

The intergovernmental agreement provides €30 million for the installation of six International Joint Research Units (UMI) located in the premises of the USTH. This financial support is carried through the provision of research staff and the purchase of specific equipment.

The Direction of Research and Innovation is managed by a French professor. Its missions, defined in a separate note (REF), can be grouped into four main goals:

- It develops, in conjunction with the Departments of USTH, the strategic research plan and the resources to implement it.
- It assists the development of research centers and provides administrative, scientific and legal support
- It promotes academic links between the USTH and companies,
- It develops, within the USTH, a culture of innovation and entrepreneurship

Support from Vietnam (via ADB):

The MOET (Ministry of Education) is the main employer of the USTH staff. The new model of University provides salaries that exceed by far the salaries performed in the public service. This increases the attractiveness of USTH, particularly towards young researchers trained abroad (typically PhD + 2 or 3 years) and wishing to develop a high standard research activity in Vietnam.

The first recruitment of faculty has started, showing the attractiveness of our model.

Output 2 of the AdB program will support the operation of a number of centers that will promote high quality and relevance in academic programs at the USTH, with a budget of 47.8 M\$ including research equipments, library, computers and capacity building:

- **Center for teaching and learning excellence.** This will prepare graduate students to be university teachers and improve the teaching and curriculum development competencies of existing teachers.
- **Center for quality assurance.** This will embed a permanent internal quality assurance management service for USTH management and academic staff by, among other things,

establishing a quality assurance framework and institutionalizing the use of peer review and other strategies.

- **Center for research support.** The center will provide USTH staff with high-level support in designing and publishing their research, applying for grants, and providing training in research strategies to postgraduate students.
- **Center for industry engagement.** The center will be responsible for building links with industry and other potential users of USTH's knowledge, expertise, and technologies. It will support researchers to establish industry links, develop joint research programs and contract research, and facilitate student placements, staff exchanges, and joint funding of infrastructure and services.
- **Center for laboratory management.** The center will develop a centralized workshop system for the maintenance and repair of USTH's scientific laboratories and build the capacity of technical staff to sustain an international standard science and technology university.

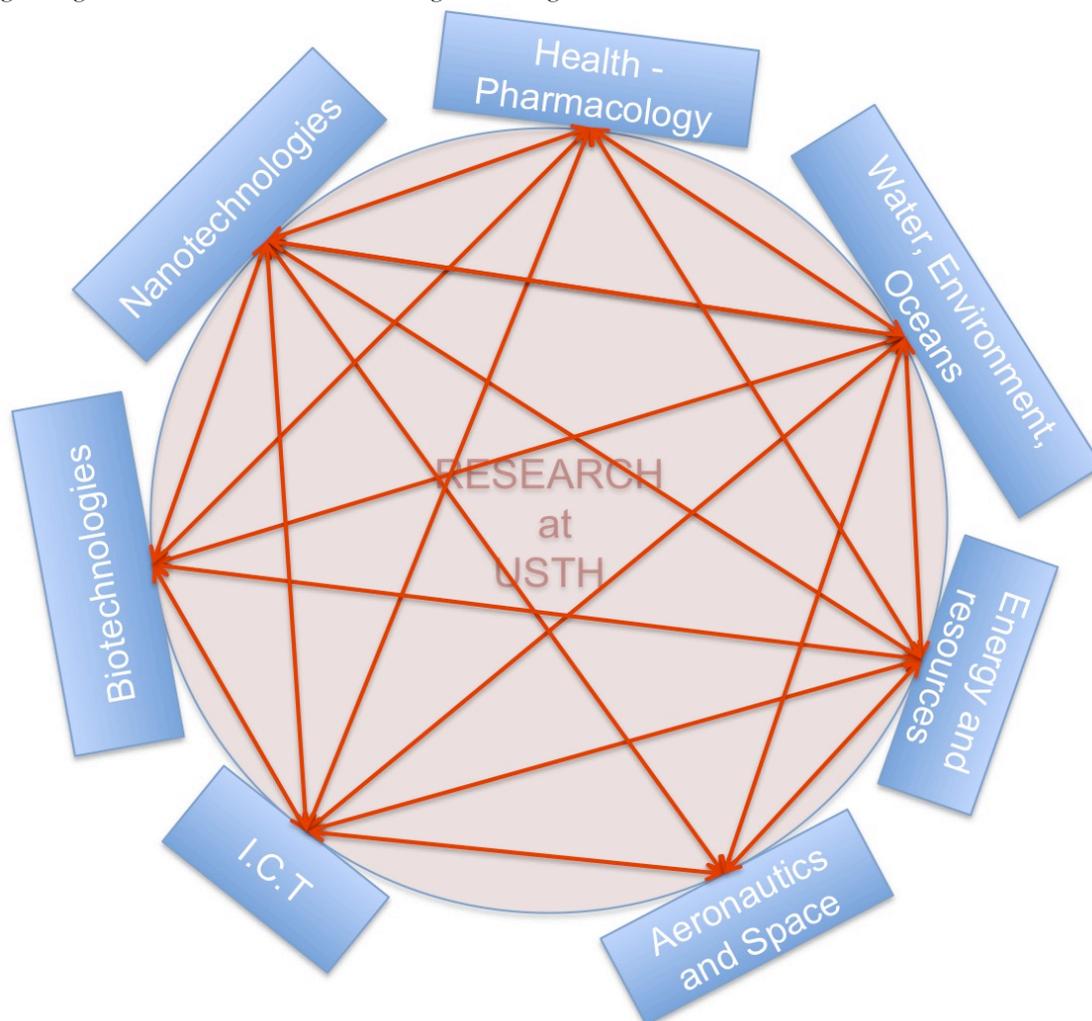
Complementary incentives

The application of USTH to the calls for research projects launched by the Vietnamese government (NAFOSTED) in relevant fields of our research will be strongly encouraged.

In general, it is desirable that any money invested in research by USTH over the next six years could generate additional financial return. Heads of Department will therefore be strongly encouraged to engage the participation of USTH, at the beginning in 2013, in research programs of the European Union (program "Horizon 2020") or other international research donors.

5. The requirement of interdisciplinarity

Each department of USTH will be engaged in a strategic thinking in order to define the boundaries of the future research activities in which more specific projects will be initiated. Our identity will emerge from the growing number of connections according to the diagram below:



A list of possible interfacing topics is given in appendix. It is neither exhaustive nor prescriptive and provides an illustration of what is expected from USTH departments in terms of openness to other disciplines. It may be used as a basis for discussions within the working groups.

6. Development of the Strategic Plan for Research at USTH

The strategic plan for implementation of Research at USTH will be developed between October 1, 2012 and September 30, 2013.

It articulates with the University development program as defined in the UIU (output 1 and 2)

The following outcomes will be expected.

Outcome 1:

In connection with the six domains of reference, the research themes will be defined for the next 10 years, and detailed in the following form:

- Research Centre (name, related departments, French partners, Vietnamese partners, international partners).
- Identification of scientific areas (between 2 and 5 per center)
- Identification - for the next 5 years - of interdisciplinary research programs including existing or projected joint programs (GDRI, LMI,...) and present research actions involving USTH Consortium partners and departments of the USTH (LIA, ...). A program is a medium-term project (between 3 and 5 years), receiving or likely to receive funding, due to a positioning in response to strategic issues raised by the Vietnamese authorities or public or private donors.
- Strategy for the development of shorter research projects on original and innovative subjects, to be developed within expected programs.

Outcome 2:

A programming of research for the period 2013-2018 is achieved. This programming includes:

- The material resources necessary for its implementation: research equipment, support services for faculty members.
- The surfaces and necessary constraints: laboratories, offices, halls and space for equipment specific services.
- Human resources: faculty members, postdocs, PhD students and support staff. A list of job descriptions of teachers and researchers is established with a priority order.
- Actual governmental funding (France, Vietnam) and potential funding in collaboration with third parties (companies, governmental or intergovernmental agencies, foundations, ...)
- The objectives of publications (qualitative and quantitative).

This program will consolidate all the material and human resources of USTH and its partners. It incorporates an assessment of risks associated with a decrease of governmental funding, the deficiency of a partner or delays in the construction of the Hoa Lac building. It takes into account the development plan of the Bachelor and Master programs and teaching priorities.

For each outcome, indicators will be developed

7. Work method

Responsibility and delegation of responsibility

Each Director of Department is appointed project manager. It may, in agreement with the DRI, delegate all or part of this task to a delegated project manager who continuously reports to him (her).

The Director of Department is responsible for conducting and achieving the project.

The project is divided into four phases.

Phase 1. Drafting of the working group.

The project leader provides the list of a Working Group. This group consists of:

- Department Director (possibly delegated project manager)

- Scientific Secretary (in support of the Head of Department)
- Co-Director of Department
- Possibly other department directors or their representatives.
- Scientific personalities of French renown research organizations (CNRS, INSERM, INRIA, INRA, CEA, ...) and especially from worldwide based organizations such as CIRAD and IRD
- Scientific personalities of Vietnamese partners institutions (VAST, VAAS)
- International experts (NGOs, Foundations, ADB) to the priorities in research and development of Vietnam.
- Experts from French companies wishing to relocate or Vietnam.
- Personalities from academia in France and Viet Nam chosen for:
 - their scientific expertise
 - their ability to develop a strategic vision in their specialty area
 - their ability to interact with other disciplines
 - their involvement in the project USTH (and in the French consortium USTH).

The list of members of the Working Group will be validated by the DRI. The project manager prepares a budget whose amount will be discussed and validated by the DGS.

Phase 2: Individual and collective work

A kick-off meeting is organized - physically or as a video conference.

The USTH project is exposed (DRI or DGS). The main constraints (time, budget, number of students, ...) and recommendations of the ADB are described.

The project manager organizes the work of individual and collective members. Several methods can be used:

- Strategic watch: collection of recent and relevant documents
- Interview of experts and telephone meetings.
- Videoconferencing
- Organization of roundtables with prospective goals. These roundtables can be implemented in conjunction with conferences organized in France, Vietnam or neighboring countries.
- Subgroups can be formed.

Phase 3: Report 1

The proceedings of the Working Group are set out in a seminar with participation of the DRI.

A plenary discussion is organized by the project manager, during which the different sub-working groups present a summary of their work.

After the seminar, recommendations are made by the Working Group. A position paper is issued.

Phase 4: Report 2

After a maturation period, a report containing the outcomes 1 and 2 is presented by the project manager to the Rectorate Board and later to the Scientific Council of the USTH. It takes into account the recommendations of the Working Group, the constraints of teaching, a detailed estimate of financial and human resources available. Indicators are built. Options are proposed to better manage project risks.

8. Agenda

The project duration is 6 months, included between t_0 and t_0+6

The starting dates t_0 will be staged between October 1st, 2012 and April 1st, 2013 so that the total strategy work may be completed by October 1st, 2013. The exact dates will be discussed with the Directors of Department / Project Managers.

Glossary

Research Center at USTH

A research center is a research structure within the USTH. It is organized in a matrix form: Research scientific areas (long term = 10 years) and research programs (medium term = 3-5 years). It includes possibly LMI, LIA, GDRI, UMI, "Joint laboratories" between USTH and other national or international Universities, Chairs of Excellence with companies or private/public institutions (UNESCO, BMGF, ...).

LIA (International Associated Laboratory) of CNRS:

An LIA is a "laboratory without walls" and is not a legal entity. It consists of the association of a CNRS-affiliated laboratory and a laboratory from another country. These laboratories pool together human and material resources towards a common, jointly-defined project designed to add value to their individual pursuits. A LIA agreement is for 4 years, renewable once.

The laboratories comprising an LIA retain their independence, their original status, their governance and their separate locations. This type of collaboration does not require an expatriation of the researchers involved in the project. A LIA receives earmarked funding from CNRS and the partner institution for equipment, travel, associate research positions, etc. It is coordinated by two co-principal investigators, who draw up the research program and submit it to the steering committee for approval. The latter is composed of representatives of the two partner institutions as well as established scientists from outside the LIA.

GDRI (International Research Network) of CNRS

A GDRI is a research network, devoid of legal status, set up for a period of four years, renewable once. A GDRI brings together several laboratories from two or more countries to coordinate research on a specified theme. GDRI program funding covers mobility, information exchange, seminars and workshops. The GDRI is overseen by a scientific management committee chaired by a coordinator and composed of representatives from the laboratories involved. It submits regular reports on its activity to a steering committee. The steering committee is composed of a representative of each laboratory's parent institution, other than the laboratory personnel. Upon approval of a GDRI an agreement is signed by the Director General of the CNRS and the parent institutions of the laboratories in the GDRI.

UMI (International Joint Unit) of CNRS and IRD

International Joint Units (UMI) are a new operational structure for research (SOR), first created in 2002. Its status is similar to that of a CNRS Joint Research Unit (UMR), and brings together in the same laboratory researchers, engineers, and technicians assigned to it by CNRS and by the partner institution. A UMI is headed by a laboratory director, appointed jointly by CNRS and the partner institution. The director is responsible for the management of all of the resources made available to the laboratory. The UMI may be located either in France or in the partner country.

LMI (International Joint Laboratory) of IRD

A LMI is an operational structure of research and training, physically located in the premises of a partner from an eligible country (the South), to carry out joint training projects and research around a common scientific platform (laboratories, equipment, computers, documentaries, etc.). It is established for a period of four years (renewable once). It is under the responsibility of a Director and one or more co-Directors, appointed jointly by the partner institutions.

Appendix: list of crossed scientific themes

Biotechnology and Pharmacology (BIOPHARMA)

- Biotechnology for food: crop adaptation to climate change, improved yields
- Biotechnology and Biomedicine: Health and plants, application of antibiotics, antimalarials, ...
- Biotechnology and environment pollution treatment in situ and ex situ treatment process liquid or gaseous effluents (*link WEO*)
- Biotechnology and Energy: Production of liquid and gaseous fuels and / or electrical energy (*link ENERGY*)
- Genetic improvement (plants, bacteria, ...) for biomedical, energy (maximizing conversion efficiency), environmental (*link WEO and ENERGY*)

Materials sciences and Nanotechnology (NANO)

- Nanomaterials and preservation of nonrenewable resources e.g: substitutions of catalysts and rare elements in the making of electronic components, ...
- Nanotechnologies for environmental catalysts, sensors, .. (*link WEO*)
- Nanotechnology for Space: new electronic components (*link SPACE*)
- Nanotechnology for Health: imaging, targeted therapies, ... (*link BIOPHARMA*)
- Nanotechnology for Energy: New Materials and Systems for energy conversion and storage (*link ENER*)

Information and Communication Technology (ICT)

- Acquisition, management and processing of very large number of spatial and temporal data (examples below)
 - Pandemic management
 - RFID and traceability for the environmental impact of urban settlements and industrial
 - Remote sensing and GIS: oceanography, environmental (*link WEO*)
 - Environmental modeling: climate change risks, impacts of natural disasters (*link WEO*)
- Modeling of complex structures (molecular scale): applications to biotechnology and nanotechnology (*links NANO and BIOPHARMA*)
- Modeling of complex systems: energy systems, industrial ecology and resource management (*link ENER*)

Water, Environment, Oceanography (WEO)

- Marine erosion and climate change (*links ICT and SPACE*)
- Environment and natural and industrial risks (*link ICT*)
- Environmental impacts of urban and industrial development
 - Industrial Ecology: sustainable integration of industrial plants in peri-urban area;
 - Competition for land use
- Large-scale applications of biotechnology to air and water treatment (*link BIOPHARMA*)

Energy and Resources (ENER)

- Industrial ecology of energy resources:
 - resources assessment for energy production: : water, soil, chemical elements (eg rare earths, phosphorus and indium), biomass and waste, ...
 - perspective and multicriteria evaluation of scenarios for energy: combining mass production, environmental control and risk, preservation of nonrenewable resources (*links ICT and WEO*)
- Performance and scale-up of conversion systems and storage of solar energy (NANO links)
- Performance and scale-up of processes for biomass and waste conversion into energy resources (links Biotech and WEO)

Aeronautics et Space (SPACE)

to be built in partnership particularly with *ICT* and *WEO* (remote sensing) and *NANO* (electronic components).