Evaluation of the framework conditions for applied R&D in Swiss Universities of Applies Sciences

1 Proposer

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2 Introduction

This proposal is submitted the Swiss Innovation Agency for the tender on the evaluation of framework conditions for applied R&D in Swiss Universities of Applied Sciences of the 15. April 2005.
The offer is structured as follows:

- in section 3, we introduce some concepts and categories necessary for the analysis and we precise the evaluation questions, based on the terms of reference of the tender but also on existing studies and evaluations.
- in section 4, we describe the methodology to be used for collecting and analyzing information, as well as the workplan.
- In section 5, we present the project team and we describe the past experience of the proposer.

3 Objectives, framework, issues and expected results

The tender requests an evaluation of the framework conditions for applied R&D in the Swiss universities of applied sciences, focusing especially on strategies and measures concerning R&D and on their implementation. Thus, the evaluation should focus on:

- The existence and the content of research strategies of UAS (aims, measures).
- The degree of their implementation.
- Their impact on research activities.

In the following, we shortly frame this issue in the overall context of higher education institutions in the specific situation of Swiss UAS and then we precise the main evaluation themes and questions; finally, we present the expected results and their valorization.

3.1 A general framework

Even if this evaluation will focus on the strategic dimension – i.e., on the definition of overall goals for the whole school and on the measures to achieve them –, we need to examine at the same time other features of the school which to a large extent define the relevance, the adequacy and effectiveness of the chosen strategy. For instance, while a largely top-down strategy enforced by the school direction could be successful in a rather centralized school, while in other situations bottom-up approaches could be more effective. Thus, we consider that probably there will no general best practices, but practices that fit better or worse in each school's context (which, of course, doesn't exclude the possibility of learning from other schools). Promoting awareness on this linkages will be an important result of this evaluation.

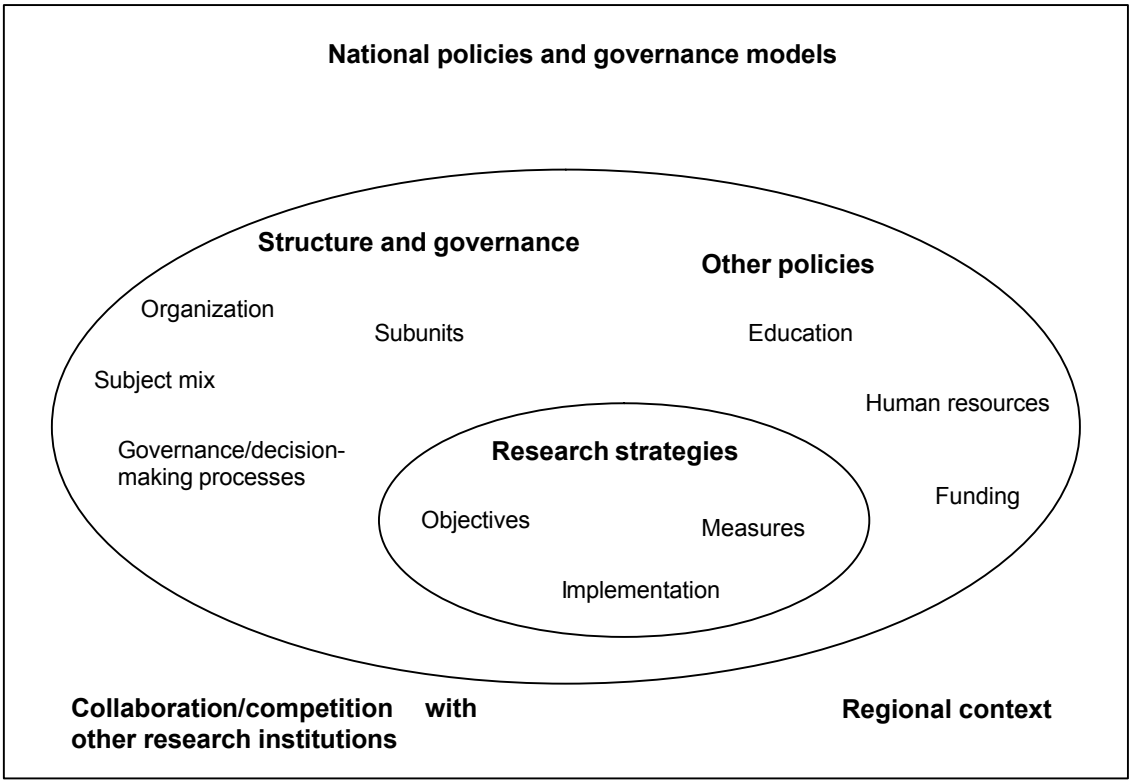

Figure 1. Framework for the analysis

Figure 1 depicts the main dimensions we will consider alongside the analysis of research strategies.

1) The structure and the governance model of the school. Even if the aim of a strategy might be to modify these structures, a good strategy has to take into account the existing conditions and their strengths and limitations. Specific issues to be considered include:

- The organization and the internal decision-making processes. Swiss UAS are the result of a process of merge and reorganization of different institutions, located generally in different locations and even different cantons. The peer review has showed that the degree of centralization and the ability of the direction to steer the school differs significantly between different UAS and, for the moment being, some UAS have to be considered rather as a loose joint venture of different schools, with little central power. The meaning of a research strategy for a whole UAS (and, more in general, its feasibility) depends critically on these structures.
- The subject mix and the research portfolio of the schools. Institutions merging in the UAS had a quite different level of development concerning research, which is (still) reflected in different research intensities. Moreover, UAS cover scientific domains with different research traditions and features: applied research was already developed in domains like informatics or technology, while domains like social work, economy, arts had little research experiences. The whole meaning of applied research (and its relationships with basic research in universities) is completely different in these domains. A good strategy should take in account these different situations.

2) Secondly, strategies and measures concerning research are closely connected – in many cases inseparable – from strategies and policies in other domains. For instance, since at this time UAS are largely teaching schools with a relatively small part of research, the fate of research activities depends critically on decisions concerning education and thus coordination between education and research strategies is essential. Also, a research strategy depends on the availability of human resources and on the organization of the careers and this has to be considered jointly for all UAS activities. Finally, while a research strategy could try to develop specific collaborations with universities, this will depend to a large extend on the general framework of relationship between these institutions and on issues like mobility of students or research assistants.

3) Finally, UAS develop their research strategies in an environment offering limitations, but also opportunities. These include for example the conditions specified by the UAS act and by different federal and cantonal regulations; the availability of resources; the evolution of the number of students and the integration of new sectors in existing UAS. What is more important in this context, UAS are part of a system composed – both nationally and internationally – by other higher education institutions, which can be their partners or competitors in research activities. In particular, in the Swiss context, UAS are confronted to the presence of cantonal universities and FIT which have in many cases a stronger research tradition and mass, extending also into applied research and technological development. The positioning in this system – including the definition of a research profile, the search for niches where it is possible to achieve or to keep a strong position and the creation of cooperation and alliances with other institutions – is an essential element of a strategy.
Finally, we should consider that for schools with a largely regional orientation, different locations might offer very different potentials for applied research and for collaboration with the private economy, concerning the more promising sectors, but also the existence (and the type) of available partners. The research strategy might be also affected by these regional factors.

3.2 Main study issues and questions

Based on this general framework, we will focus in the evaluation of research strategies on the five following issues. Below, we shortly present these issues and a preliminary list of questions to be investigated, which will be completed during the first phase of the project. For each of these issues, we will be interested in analyzing the following items:

- The existence of clearly-defined and shared objectives and concepts.
- The measures and instruments put in place to achieve these objectives.

- The degree of implementation of the measures and of achievement of the objectives.
- Finally, the perception of researchers concerning the adequacy and effectiveness of these measures.

a) The research positioning of the school

In a general way, the research positioning of UAS is defined in the law attributing them a mandate for applied research and development. In a very general way, this should distinguish UAS from universities and federal institutes of technology, which should also be active also in fundamental research. However, this apparently simple distinction needs to be further précised:

- Concerning the type of application and development envisaged. In domains like biotechnology or material sciences, major technological progresses are possible only if researchers are leading also fundamental sciences, while more incremental developments could be possible also on the basis of already existing knowledge.
- Concerning the scientific domain. The relationship between fundamental and applied research – and the possibility of a relatively clear separation - is largely different even in natural sciences and technology. In social sciences and economics the whole distinction is doubtful, especially for domains where also university research is closely linked to practice like marketing or some social sciences.
- Concerning the relationship and competition with other institutions. Thus, even if the state can try to define some general rules individual schools increasingly have to define their position according to their strengths, but also the presence of competitors in the same domains, for recognition, funds, but also collaboration with public and private actors. Positioning requires thus having a clear picture of the quality of its own research portfolio.

This leads to following main questions:

- Have UAS tried to define more precisely their role in the Swiss research system than what is stated by the law. In which direction (more towards basic research or towards application)?
- Has this profile been differentiated according to the research domains? Are school directions aware of these differences?
- How is the research profile linked to technology transfer and service activities, respectively to the policies in these domains?
- Do school directions have a clear picture of the state of research in their main activity domains, relatively to other Swiss and international institutions? Have they identified some more promising domains?

We notice that this issue has been discussed in recent paper of the research commission of the KFH; it will be important to assess to which extent individual schools are aware of this debate (and of its importance).

b) The definition and implementation of priority domains and competences centers

Research in UAS is in many cases too small-scale to achieve a sufficient critical mass. Thus, concentration around some domains is an important issue. This is of course closely linked the issue of positioning, since the size required differs strongly according to the type of activity envisaged. Some central questions here are:

- Have UAS developed a clear definition of priority domains in research?
- According to which criteria have these domains been selected?
- How is this strategy influenced by the different structures of the schools?
- Which measures (organizational and financial) have been put in place to enforce these priorities?
- How is this policy perceived by researchers and research groups?

c) The policy concerning personnel recruitment and careers

Human resources are of course a central concern for a research strategy. This means not only recruiting personnel and training it where necessary, but also defining and implementing careers of research and professors in UAS. While historically universities have defined some possible models of scientific careers, organized around steps like the PhD, the habilitation, tenure track

positions, UAS are too young, at least in Switzerland, to have fully performed this process. Moreover, the issue is complicated by the fact that it is not feasible to organize separate UAS careers, since some basic steps of university careers - like the PhD – are essential also for a part of the researchers in UAS; permeability between UAS and universities is essential for human resources development, even if the profile of research personnel in UAS should probably provide a greater permeability with the private sector. In this context, we would like to examine following issues:

- Have UAS developed a clear definition of the organization of the personnel careers?
- How is recruitment and training of scientific personnel organized?
- Is there some permeability with universities (for example joint appointment or UAS researchers preparing the PhD)?

d) Allocation of financial means, incentives for research and fund raising

Funding is of course a central issue concerning research activities and, in many cases, a source of complaints by researchers. The issue concerns not only overall funding levels, but also the composition of funding, internal and external incentives for research and fund-seeking strategies. This are central issues dealt in the European project on Changes in university funding and their impact on research activities where the proposer participates (see later).

Some central issues are:

- Do research strategies take into account the future financial framework (UAS master plans)?
- Have UAS clear rules for allocating research funding? According to which criteria?
- Are funding mechanisms used to implement a priority domains policy in research?
- Are there incentives for specific research activities and for external fund-seeking?
- Do UAS dispose of support structures for external fund-seeking (both in the public and in the private domain)?

e) Cooperation between UAS and with other higher education institutions

Cooperation is a central concern of the Swiss higher education policy and it is even of greater importance for UAS given their size and research potential which is, in most cases, smaller than in universities. Thus development of cooperation at all levels should be a central concern for research strategies. In some domains, forms of cooperation could even be the only possibility for keeping research in a school. Some issues to be investigated are the following:

- To which extent research strategies of the schools integrate the development of research cooperation with other UAS and with universities?
- Which measures have been taken to favor or reinforce this cooperation?
- Are national competence networks taken adequately into account in UAS individual research strategies?

3.3 Expected results and valorization

From this analysis, we expect the two following main results.

1) Firstly, to get an overview at the Swiss level of the strategies for research and development in the UAS, as well as of related policies. This will allow to:

- Give an overall assessment of the strategies and framework conditions for applied research in UAS ten years after their establishment.
- Identify the success domains, where major progress has been realized, but also (at a general level) the most problematic areas where action is needed, both at the national level and at the level of individual schools.
- Identify the main bottlenecks and possibly changes to be suggested in the framework conditions of UAS in Switzerland.

The main product will be a synthesis report of about 30 pages covering the following main items:

- Outline of the issue presentation of the main topics.
- Methodology and data sources.

- Main results of the analysis:
  - Overview.
  - Analysis of each topic including possibly good examples.
  - Selected international examples.
- General conclusions and recommendations.

The report could have a similar format than the report on elearning strategies of UAS (Lepori and Succi 2004) except that (as requested by the CTI) it will not present the situation in the individual schools. We propose also to organize an internal workshop with CTI to discuss more in depth the results, including details and recommendations for policy which are not suited to be set in a public report.

2) Secondly, these results will give a support to the individual UAS directions, as well as to the directions of individual departments, to further develop their research strategy. To this aim, we foresee the following actions:

- Firstly, the general results will be discussed in a workshop with the KFH research commission to the end of the project.
- Secondly, each UAS direction will receive a short assessment of the results concerning its school (of course, individual answers will be anonymised). It will be left to school to decide how to use this document (either for the use only of school direction or internal diffusion).
- Finally, the project team will be available to organize a meeting at each UAS to present and discuss the results. Since this goes beyond the scope of the contract, the schools will be asked a small reimbursement for the organization and preparation time (we envisage 1000.- for a half-day workshop).

4 Methdology and Workplan

The design of the methodology and the workplan have to take into account three relevant (and constraining) aspects:

- Firstly, the complexity of the issues and its systemic nature. Thus, even if we focus on two-three main dimensions, at least basic information on most of the elements discussed in the previous section is needed to frame the analysis.
- Secondly, the decentralized nature of the Swiss UAS and of their research activities. Thus, it is unrealistic to think that only looking to official documents and interviewing a person in charge of research in the school direction is sufficient to get a fairly complete picture.
- Finally, the tight schedule and timing constraints due for example to summer holidays.

The workplan is based on the assumption that the work can begin June 1st, even if the contract will be finalized slightly later.

4.1 Background information and preliminary analysis

This activity has the objective of collecting general information on the schools for the further work. Some background knowledge is already available in the team thanks to the study on elearning strategies of Swiss UAS performed in 2004 (Lepori and Succi 2004). In this project, a general description of the organization of each UAS was produced, largely based on information from official documents and from the UAS peer review.
This information will be completed through following means.

1) The analysis of the official documents of the schools, including (if existing) written research strategies, master plans, etc, as well as of information available on the web site.

2) A series of interviews to the members of the KFH research group. For these interviews we will use the questionnaire being developed in the European project on Changes in university funding ant their impact on research activities (CHINC; annex). This questionnaire covers five domains:

research orientation and strategies; information management; trends in research income and activities; policies for research and funding; perspectives. It can be delivered by mail and completed during a phone interview. In the framework of CHINC, it was foreseen to adopt this questionnaire to universities and FIT, but it can be easily extended also to all UAS. Besides exploiting already done methodological work, the use of this questionnaire will be very interesting for comparability, since it will be applied in CHINC to over 100 higher education institutions in Europe (including 20 to 30 UAS in other countries) and to all Swiss universities and FIT.

This activity will lead to two main products:

- A description sheet for each school covering both the structural aspects and preliminary findings concerning the five issues identified previously.
- A background document of about five pages summarizing the first results and deepening the main questions to be further investigated.

These results will be discussed in a meeting with CTI at the mid-July 2005.

Person in charge of the work
Benedetto Lepori and David Fischbach (interviews and collection of information)

Main steps and milestones
Kick-off meeting with CTI: 10 June 2005.
Collection and analysis of documents: 1-30 June 2005.
Phone interviews: 15-30 June 2005.
Analysis and production of summary: 20 June – 15 July 2005.
Discussion meeting with CTI: 15 July 2005.

4.2 Questionnaire to research group leaders

As a second step, we will deliver a questionnaire to selected UAS researchers, especially to leaders of research units and groups. This questionnaire will have the following aims:

- Firstly, to test the knowledge of the researchers of the school strategy and of its contents;
- Secondly, to get their appreciation of the effectiveness of the measures to promote research and to identify major bottlenecks;
- Thirdly, to ask their opinion concerning the five major issues identified before.

The questionnaire will be delivered on-line with mostly closed questions and some opportunities for comments. It will be anonymous, but respondents will be asked to indicate some features like their school, the research domain and their position, to allow for the analysis.
Contact addresses will be recovered from Web sites of the schools and research units. The aim is to have a rather large coverage of researchers in the UAS. This is essential since we cannot assume at this moment that the view of the people in the school directions reflect the experience and the perceptions of researchers.
The results will be analyzed statistically (for closed questions), but also qualitatively for the open comments.

Person in charge of the work
Benedetto Lepori and Liliana Attar

Main steps and milestones
Preparation of a draft questionnaire and collection of the addresses: 15 June – 15 July
Delivery of the questionnaire: 10 August – 31 August
Analysis of the results: 1 September – 30 September

4.3 Interviews with research responsibles

Finally, we will realize a series of face-to-face interviews with people in charge or research (or directors of school or departments) in the seven UAS.
We assume that is not generally sufficient to interview a single person for each UAS since in many cases individual schools enjoy of a very large autonomy. However, practical considerations

make it impossible to visit each school and thus we will concentrate on the establishments having a more developed research activity. Below, we give a preliminary list, which we however cleaned with the CTI in the first phase of the project.

UAS	*Schools/departments to be visited*
FHNW	1 person at FHBB, FHSO and FHA
FHO	1 person in Sankt Gallen, Rapperswil and Chur.
SUPSI	The three directors of the Departments.
ZFH	1 person at the ZHW and 2-3 persons in the schools in Zurich.
FHZ	At least HTA and HSW.
HES-SO	At least Fribourg, Lausanne and Wallis.
BFH	1 person for technology and informatics, 1 for construction and 1 for economy.

Since most of the background information will have been collected in the previous phases, the focus of the interviews will be, firstly, on general strategic issues, and, secondly, to discuss the result of the previous phases. A guide specifying the themes to be collected and summarizing the already available information will be sent to the correspondents before the interview.

Person in charge of the work
David Fischbach

Main steps and milestones
Preparation of the guide for interviews: 1. August – 20 August
Realization of the interviews and transcription: 20 August – 30 September.

4.4 Report and valorization

The final phase will involve the writing of the final report and of a set of specific descriptions to be provided to the individual UAS.
We propose to discuss a draft report both with the CTI and with the KFH research group (either together or on a separate meetings on the same day); this procedure worked well in the elearning strategy study to get feedback from the involved parties before the publication of the report and, actually, contributed largely to the diffusion of the results since the schools were involved already before the publication of the final report.

Person in charge of the work
Benedetto Lepori + contributions of other team members

Main steps and milestones
Redaction of a draft report: 15. September – 30 October
Discussion workshop: first week of November
Revision: 10. November – 31 November

4.5 Project plan

The following table shows the overall project plan and the persons involved in the work.

Activity	People	June	July	Aug.	Sept.	Oct.	Nov.
Kick-off meeting with CTI	Lepori						
Collection and analysis of information	Fischbach						
Phone interviews	Fischbach						
Analysis of results	Lepori						
Intermediary meeting with CTI	Lepori, Fischbach						
Development of the web questionnaire and collection of the addresses	Lepori, Attar						
Delivery of the questionnaire	Attar						
Coding and analysis of the results	Attar						
Guide for face-to-face interviews	Lepori, Fischbach						
Realization of the interviews and transcription	Lepori, Fischbach						
Preparation of the summary on UAS	Fischbach						
Draft report preparation	Lepori						
Discussion workshop	Lepori, Fischbach						
Revision and finalization of the report	Lepori						

4.6 Ownership of data and confidentiality

All data and information collected specifically for this contract will be owned by the CTI, which will receive a copy of all report, including the assessment of the situation in the individual schools. However, for confidentiality requirements, the answers to interviews (non anonymised) will be kept only by the project team, except if the concerned persons explicitly agree to their disclosure.
Finally, the project group will be free to exploit the data and results of the study for scientific publications, provided that confidentiality requirements are respected and that the support of CTI is explicitly mentioned.

5 Project organization and budget

5.1 Project team

The project team will be composed as follows:

- Dr. Benedetto Lepori will be in charge of the direction and coordination of the project, of the contacts with CTI and lead of the meeting and of the redaction of the reports.
- Lic. Oec. David Fischbach will be in charge of most of documentary analysis and of the face-to-face interviews.
- Lic. Oec. Liliana Attar will be in charge of the organization and management of the on-line survey and of the analysis of its results.

5.2 International experts

The proposer has good international contacts both from previous work concerning elearning, where we performed school visits abroad, and from the CHINC project, where participate some countries with a dual higher education system (Germany, Norway, The Netherlands).
We plan to use these partners for getting background information on their countries and, especially, for expert evaluation of the results. A budget to this aim has been reserved; details have to discussed further with the CTI at the start of the project.

5.3 Budget

The proposed budget is presented in the following table. The personnel costs are calculated on a worktime percentage based on the normal salary at the Università della Svizzera italiana (including social charges). A 20% overhead is included to cover partially general costs (this is the normal rate for research institutions in European Research Projects).
Other costs are calculated as follows:

- 2 meetings in Bern with the CTI and two meetings with the KFH research group for two persons; 8 travel Lugano -.Bern at 45.- = 360.-
- interviews: 10 days for interviews in UAS at 200 Sfr per day (travel and accommodation): 2000.-
- Workshop: travel and accommodation for two people for two days: 500.-
- invitation to external experts: participation to a two-day discussion workshop: travel and accommodation 700.- + 1000.- honorary for preparation for three persons: 5100.-

We assume that representatives of the CTI and UAS will participate to the meetings and the workshop at their own costs.

Activtiy	Person	Rate	Time	
Project direction	B. Lepori	115000	0.2	11500
	D. Fischbach	100000	0.2	10000
	L. Attar	70000	0.3	10500
Travel (meetings, interviews)				2860
Invitation to external experts				5100
Overhead		0.2		6400
VAT				3523.36
Total				**49883.36**

5.4 Past experience of the proposer

The proposer has a large experience concerning research activities in higher education institutions, both from the scientific point of view and in practice. He has also a long professional experience concerning research activities in higher education.

1) Benedetto Lepori is since 1997 the responsible of the joint research service of USI and SUPSI. The Service has the general mandate of promoting research activities in both schools, supporting researchers in project funding and organization and the school directions in defining their strategies (for example producing the needed indicators). David Fischbach has worked since 2000 in the Research service and was especially in charge of the preparation and management of CTI projects and in the preparation of indicators concerning research for SUPSI. Thus the research teams knows very well the features of research in the UAS and already has excellent contacts with most of the Swiss UAS; this will make much simpler to identify the contact persons for collecting information.

2) Benedetto Lepori finished in 2004 his PhD in Communication sciences with a thesis on the Swiss research and higher education policy (Lepori 2004). This work, to be published by Haupt, is the most recent and complete analysis of research and higher education in Switzerland and covers largely also the UAS domain. Thus, he brings an excellent knowledge of the general governance structure of Swiss UAS, including all relevant reports (Confédération Suisse 2002; OECD 2003). Moreover, he is actually involved in many international projects on research and higher education, including the EU-funded Network of Excellence PRIME.
Of particular relevance for this proposal is the contract on “Changing incomes of European universities and their impact on research activities” (CHINC) attributed by the Institute of prospective in Science and Technology of the European Commission. This project will analyze the change in the funding of higher education institutions (including UAS) in ten European countries and assess their impact on research strategies and practices of these schools. Many of

the materials and tools elaborated for CHINC can be reutilized at least partially for this proposal; moreover, CHINC is an excellent source of expertise and comparable information on the situation of other countries.

3) During 2004, Benedetto Lepori has realized a study on the elearning strategies in the Swiss UAS on a contract of the Federal Office for Professional Education and Technology. Besides its specific information on elearning activities, this contract brought a good knowledge of the general situation of all Swiss UAS, based on documentary analysis and interviews (Lepori and Succi 2004). These materials can be exploited for this contract.

4) Finally, the proposer has successfully managed in the last ten years a series of contracts and research project financed by the federal administration, the Swiss Science Foundation and European Programs. Some of these projects are much larger than the current contract – like the Educational Management in the Swiss Virtual Campus Mandate. References on these projects can be delivered on request.

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- 2004. Evaluation of the elearning strategies of Swiss Universities of Applied Sciences (contract of the Federal Office of Professional Education and Technology).
- 2002-2003. Educational Management in the Swiss Virtual Campus contract, financed by the Swiss Virtual Campus Programme.
- 1997-2001. Swisscast» project on customized information delivery (Swiss National Science Foundation).
- 1996. SNF Project on the spatial effects of high-speed trains in Switzerland (EPFL, resp. Prof. Michel Bassand).
- 1996. Analysis of research and research funding on transportation and mobility (contract of the Swiss Science Council).
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7 Annexes

Curriculum Vitae of the proposer.
CHINC questionnaire
Report on elearning strategies of UAS