

'HIIT 2008' – strategy draft for the Helsinki Institute for Information Technology

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1 Introduction

HIIT (*Helsinki Institute for Information Technology*) is a research co-operation between the University of Helsinki and Helsinki University of Technology. HIIT was founded in 1999. In 2002, the ordinance of the institute was changed and the separate Basic Research Unit was established. At the moment, HIIT consists of the Advanced Research Unit (ARU) located in Ruoholahti and the Basic Research Unit (BRU) based in the Otaniemi and Kumpula campuses.

There are four thematic research areas and a total of nine research groups in ARU. The themes are mobile information and communication technology, adaptive and intelligent systems, digital economy, as well as new content services based on digital contents and the IT infrastructure they require. After rapid growth at the beginning of its existence, the unit's activities have now levelled out (see table), though some degree of growth is expected in 2004. Of total funding, the quota of external funding has increased while budgeted funding has decreased steadily since operations commenced. In 2003, external funding made up 90 % and budgeted funding 10 % of total funding.

	2000	2001	2002	2003
Total funding (circa)	0.6 M€	2 M€	3 M€	3.4 M€
Person years (circa)	5	24	40	53

Table: ARU operations 2000-2003

The research at BRU focuses on adaptive data processing and data analysis, as well as computational neuroscience since 2003. The total budget for the unit when it was established in 2002 was 1.1 M€ and the staff consisted of 25 person years. In 2003, the corresponding figures were 1.4 M€ and 33 person years. The estimated budget for 2004 is c. 1.8 M€ and estimated staff 36 person years.

The contract between the universities for founding HIIT was made for five years in 1999, for the period 1 August 1999-31 July 2004, but so that the contract will continue for a year at a time unless it is specifically discontinued. At its meeting on 10 February 2004, the board of HIIT determined as its goal to continue the contract so that the new contract becomes valid on 1 August 2005, i.e. the institute will continue

for one year more on the basis of the present contract. At the same time, the board formed a committee (Olli Simula, Esko Ukkonen, Martti Mäntylä, Heikki Mannila) to work out the strategy for the institute. This strategy draft is the result of the work of the committee and the board processing it twice.

2 Operational settings of HIIT

The main changes to the institute's operational settings, which will influence its future, are as follows:

1. The fusing of information technology with research, industries and different end users in society is an ongoing process. The authorities and various parties in society are still investing strongly in the dynamic development of the Finnish information society. More and more attention is paid to making a seamless chain of innovation from research to practical applications and utilisation.
2. The universities will reform their degree structure to conform to the so-called Bologna model in the coming years. Though most emphasis has been laid on establishing a lower (Bachelor's) degree, the new degree structure will potentially reform the role and status of post-graduate studies, and will create a need to develop post-doc education, as well.
3. The competition for research funding and staff is intensified every day, even on an international scale. Especially the European Research Area (ERA) may make the competition fiercer if it makes Finnish research funding available to projects in other EU countries, and may also move the emphasis of basic research funding to EU funding.
4. With the event of globalisation, Finnish enterprises will probably outsource their R&D to developing areas like China, India, and possibly Brazil (all of which have high-class university systems). What remains in Finland will increasingly focus on scientific excellence.

3 Duties of HIIT

It is the duty of HIIT to carry out cutting-edge basic and strategic research in information technology internationally, in close co-operation with the IT industry and research that applies information technology, and to offer research education at the highest level.

The goals of HIIT are to raise the research, visibility and impact of information technology in Finland to the highest level internationally, and thus make the interaction more efficient between the universities and the IT industry on the one hand, and the main international research institutes and universities in the field on the other. One of the main goals of HIIT is to increase the co-operation between its partner universities.

HIIT attempts to improve the long-term competitive edge of the Finnish IT industry and the IT society, so that the scientific research carried out at the universities can be connected with the far-reaching and risky strategic R&D of the IT industry and with the development of the computerised society.

4 Precepts of action

The precepts of action at HIIT are based on the strategies of the University of Helsinki and Helsinki University of Technology. Some of the main areas for improvement mentioned in the UH strategy for research include foregrounding basic research, research-based teaching, increasing interdisciplinary research and teaching, as well as increasing international contacts and co-operation. All of these issues are important to HIIT, as are the themes in the HUT strategy: science on an advanced level, good research schooling and challenging co-operation with the private sector.

The precepts for operations at HIIT are:

Research at HIIT aims at an international advanced level.

HIIT is one organisation with e.g. 4-6 research programmes.

The research programmes are chosen in co-operation between the board, a scientific advisory board, an industrial advisory board and the groups working in HIIT. Programmes are evaluated periodically.

In all its operations, it is the main goal of HIIT to maintain and increase the co-operation between its partner universities. The institute combines the resources of UH and HUT and benefits both universities in many ways.

HIIT co-operates with other computer science departments, other university departments and the industries, as well as with international universities and research institutes.

Internationality and international recruiting are important components of the institute's operations.

The research personnel at HIIT takes an active part in teaching.

HIIT offers the environment for advancement of research careers.

There are no permanent positions at the institute, which maintains the diversity of the personnel.

HIIT operates both at the Kumpula and the Otaniemi campuses.

The funding of HIIT is arranged to give the best conditions for long-term research of good quality. The targeting of funds is based on competition. Both universities participate in funding.

5 Background to precepts

The highest level internationally:

The research groups in HIIT are among the top groups in the world in their own fields. In addition to the international top groups, there is also room for rising new groups in

HIIT; however, it is of utmost importance to make sure that new groups have what it takes to reach the top of their fields.

Selecting research programmes:

Research programmes are selected proactively, with a creative approach to new and important areas. The programmes target fields where we can reach the highest international level of research, as well as significant scientific, industrial and societal impact on those who apply the results in universities, the industries and society. The various partners of HIIT are widely utilised for the forming, evaluation and election of research programmes.

The institute combines resources and benefits both universities in many ways.

The close co-operation of the best researchers in the partner universities is one of the most important factors in the success of HIIT. At the same time, an institute like HIIT should be largely beneficial inside each university. This means e.g. that the institute actively looks for research and teaching co-operation opportunities with other units of the universities.

Co-operation:

HIIT works in co-operation with the industries and other university and computer science departments to maximise the significance of the institute. Co-operation with the industries and other computer science end users is a key element in HIIT operations, while the work with departments in other disciplines is essential to research and teaching. The close interaction between groups working inside HIIT is one of the main goals of the institute.

Internationality

It is the purpose of HIIT to submit added value to research in its field and end users. International head-hunting is a significant medium for reaching this goal. By seeking close and long-term co-operation with the best international universities and research institutes in the field, HIIT can ensure successful recruiting and promote research by increasing the opportunities to compare the institute's standards with the best corresponding ones on an international scale. The research programmes of the EU offer an important channel for the realisation of European co-operation.

Teaching:

The precept 'everyone carries out research, everyone teaches' is an important one. The goals of HIIT are further supported when researchers teach, as this encourages gifted students to choose a career in research. The emphasis of teaching at HIIT is naturally on post-graduate education, while post-doc education and Master's studies foregrounding research are increasingly given more attention.

Furthering research careers:

Along with its partner departments, HIIT supports young researchers aiming at an independent career, especially at the post-doc stage. Together with its partner

departments, HIIT offers career opportunities that favour the generation of new cutting edge research teams.

No permanent positions:

Permanent positions are not in accordance with the precepts and duties of HIIT. After a certain number of years on institute funding, researchers transfer to the business world or computer science departments.

Organisation:

The present bipartite organisation is working well. However, the bipartite structure is difficult to understand from the outside. The administration of the institute will be changed so that it consists of one unit in which e.g. 4-6 research programmes are carried out. As a general rule, each programme operates in both Kumpula and Otaniemi.

Location:

The close interaction between teaching and research, and between researchers and research groups, is one of the emblems of a creative research environment. The co-operation between teachers and researchers on the one hand, and university departments and other end users on the other, speaks for a location on the campuses. We will not fragment the two-campus operations into 'HUT-HIIT' and 'UH-HIIT', though; instead there are people from both UH and HUT working on both campuses.

Funding:

In order to combine HIIT into one organisation, the funding from UH and HUT must be balanced. In addition, we should keep in mind that a healthy research group structure requires positions of a post-doc type, among others, where funding demands long-term planning and stability. The budget should be planned so that the research infrastructure can be maintained at the high level presumed by the goals of the institute. External project funding is ill suited for both the aims listed above.

6 Developing HIIT further

The present state of HIIT answers to the precepts described above fairly well. Below are some changes that will be made on the basis of these precepts:

- The institute will hardly grow larger. The correct size depends on the research areas targeted by the institute, and the chosen methods of research. In order to attain the impact sought for, the institute must operate on a large enough scale for implementing large and demanding research projects that comprise a great number of components.
- Participation in teaching and co-operation with other departments will be increased.
- In choosing research themes, more use will be made of the scientific advisory board and the industrial advisory board than so far.

- The organisational structure will be reformed by combining the advanced research unit and the basic research unit. A new research programme structure will be created.
- The facilities of the institute help to promote a creative research environment as well as co-operation with other universities and institutes in the larger Helsinki area. The Advanced Research Unit will relocate to Kumpula and Otaniemi. The schedule depends on the availability of suitable locations, among other things. According to the schedule, the locations of Kumpula V will be finished in autumn 2007. As for Otaniemi, it is important to find a location close to the computer technology building.
- Presently, the financing of ARU in particular relies too much on external funding. To ensure long-term operations and stability, there should be more post-doc positions, among others.

7 Schedule for the strategy process

Spring 2004: discussions with the partners and preparation of the strategy draft.

Autumn 2004: meetings of the science advisory board and the industrial advisory board. Strategy draft updated on the basis of feedback and preparation of a new ordinance.

Spring 2005: the directors of HUT and the University Senate at UH will process the new founding contract.

Autumn 2005: meeting of the scientific advisory board to choose and launch research programmes.

The new HIIT will commence operations at the beginning of year 2006.