



Euroopan unioni
Euroopan aluekehitysrahasto

Research & development & learning environments with EU funding in Pohjois-Savo

2000-2011



Adopted from
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1. ENERGY AND ENVIRONMENT TECHNOLOGY

1.1 Energy technology laboratory (Savonia University of Applied Sciences)

The energy technology laboratory in Varkaus is a research, development and innovation environment serving both education and companies. The goal of the education is to produce innovative employees with basic engineering skills for companies, who know how to plan metal structures, have a strong technical knowledge of energy and material and manufacturing technology. The laboratory offers expertise in measurement and test services for corporate use. The strengths of the unit serving the research, development and innovation activities of technology companies are particularly in energy, manufacturing and material technology sectors.

The laboratory uses extensive analysis devices for defining the structure, contents and material characteristics of products, measurement sensors and systems for laboratory and field testing of products and systems, and testing environments enabling the measurement of devices designed for energy production, transfer and storage, and determining the function key figures based on the measurement results. The measurement and testing services of the laboratory include flue-gas analysis, fibre-based distributed temperature measurements (DTS), fuel analysis, battery testing, heat exchanger and water heater testing and high-temperature corrosion testing. Additionally to the measurement and testing of systems, the development is facilitated by flow calculation software suitable for thermal modelling and flow phenomena modelling, and equipment and software suitable for energy production unit simulations. Research projects are made in collaboration with universities and other research units, which expands the range of services offered for businesses.

ERDF projects

New measurement method development environment for energy technology operation and maintenance

Institute: Joint Authority of the Savonia University of Applied Science

Implementation time: 1.9.2009 - 31.8.2010

Responsible authority: Regional Council of Pohjois-Savo

The project has built a modern energy technology R&D environment in which measurement methods differ from traditional temperature probing. The goal of the project has been to develop new measurement methods for operation and maintenance sites where measurements have been difficult to implement, or their results are not reliable or sufficient. The aim has been to test the suitability of various measurement methods for different maintenance application sites. In addition, the aim has been to strengthen and diversify the expertise at energy technology companies and educational institutions and to deepen the functions and collaboration forms between universities and higher education institutions.

Operation

Research, development, innovation and teaching

The devices at the energy technology laboratory are used for research, development and innovation activities, and teaching purposes as well. The devices are generally slightly more frequently used for RDI activities than for education and student projects, although the two cannot always be completely separated. Two laboratory technicians work at the laboratory environment, and laboratory core services of-

Energy, power plant and pressure device knowledge development environment

Institute: Joint Authority of the Savonia University of Applied Science

Implementation time: 1.1.2008 - 30.6.2010

Responsible authority: Regional Council of Pohjois-Savo

One goal of the project has been to develop the functions of Savonia University of Applied Science in form of equipment and resources. Environments for testing fuel and Lithium Ion batteries, a CFD modelling environment, a fiber optic-based temperature measurement environment, an accelerated high-temperature corrosion research environment, a flue-gas analysis environment, a material testing environment, a liquid and gas flow testing environment, a furnace diagnostics environment, a power plant and process simulation environment, a renewable energy research environment, a heat exchanger and a water heater testing environment have been built as parts of the project. The environments, except the last one, are located at the Varkaus campus area. The heat exchanger and water heater testing environment is located at Stora Enso's mill site, as no suitable premises were found at the campus area.

ferred include fuel and flue-gas analysis. Expert and testing services have also been offered for a variety of research projects. Service sales efforts have been made to involve the school in research and development operations, besides routine testing. For example, the field of fuel testing includes commercial operators whose markets we do not wish to intervene on.

The equipment located at Stora Enso's mill site has been so far primarily in research, development and innovation use. Its use in education has been sporadic; the well-controlled factory environment offers a good framework for R&D and innovation, but is a problematic environment from a teaching perspective. The equipment does not currently, however, have a better location, but moving it in the future may become a reality.

Equipment acquired with projects a prerequisite for operation

Energy technology education could not be arranged without the equipment that have been acquired with ERDF projects; these devices are essential for education. Energy technology education has only been organized for one academic year, but the learning method consisting of a relatively large amount of education in form of projects has already raised the laboratory utilization to a reasonably good level. Naturally, the utilization grows as new students are admitted and current students proceed with their studies. So far, student projects have been of elementary level, because the more advanced students are yet missing.

In addition to arranging education, the equipment is also a prerequisite for the school to be able to involve itself in research and development activities of businesses. The laboratory has the most to offer for the relatively small operators who do not have the opportunity to maintain their own research and development resources. Larger companies often have their own departments and equipment for research and development, consequently, the service offered by the school is not of similar importance for them. The involvement of larger companies in projects is often based on a long-term plan. The project develops a certain operational environment

and education, which in the future provides a better workforce for the companies with the involvement of graduate students.

Regional awareness wider in the future

Companies in the economic zone were estimated to be aware of the possibilities offered by the energy technology laboratory. The businesses interested are easily identifiable and manageable, because they are quite few. The awareness outside the vicinity is weaker and the need for further development is a result of the fact that SMEs would need to be reached from a little greater distances as well. By participating in trade fairs and by communicating to key partners identified the laboratory is regularly informed about current and future activities. The laboratory also has a website and is publicised at the local newspaper. In addition, a key information channel is the campus advisory board consisting of various economic stakeholders, which has been experienced as an excellent way of spreading information about the school's activities. Lots of information is also exchanged in informal networks of local businesses. Awareness within the school was evaluated as follows: the technical education was estimated to be good, but otherwise it was estimated that there is room for improvement. As an example the Iisalmi farm know-how and the related energy solution opportunities were broadened.

Companies' experiences of the energy technology laboratory

Two different company representatives who had been involved in laboratory-related research activities were interviewed to gather experiences from companies. The other interviewee also told about having participated in the education.

Laboratory assisting a study, data for product development as a result

The most tangible benefit from the energy technology laboratory as seen by the interviewed companies was the fact that the laboratory had contributed to making the Lappeenranta University of Technology's research project possible. The companies were involved in this project and benefited from it through the laboratory; the project results were verified in the energy technology laboratory. The study of the project in turn enabled the companies to test their ideas and the resulting data could be used in product development.

Effective cooperation, skilled workforce and R&D potential

The Varkaus unit of the university was seen as a suitable sized and flexible partner with good project leaders and participants. Previous project cooperation and networks between persons were reported to lower the threshold to contact the school. Cooperation with the school was experienced to work well from the companies' perspective. The cooperation of businesses with the school was also seen as an opportunity to receive suitable workforce in the future. The interviewee who had participated in the education evaluated the education received as good. The services of the energy technology laboratory were seen comprehensive and they were believed to have a lot to offer for companies and their research and development activities.

Combining forces with universities

The cooperation between the University of Technology and the University of Applied Science received appreciation from company representatives, and the expertise of both parties were often seen necessary in research and development. In addition to the topic raised by the business interviewees regarding cooperation, possibilities for cooperation with the University of Eastern Finland's energy experts could be considered.

1.2 Water laboratory (Savonia University of Applied Sciences)

The Environmental Technology Education and Research unit of Savonia University of Applied Science has two priorities, either of which is the water sector. The overall mission of the unit is to provide research, development and measurement services for companies and organizations and to practise applied research and development activities in cooperation with various companies and research institutes. Water-related applied R&D activities focus on water treatment processes (including drinking water and waste water) as well as method development related to the rehabilitation of water.

ERDF projects

Water research and related centralized education and development environment applications

Institute: Joint Authority of the Savonia University of Applied Science

Implementation time: 1.4.2009 - 30.9.2010

Responsible authority: Regional Council of Pohjois-Savo

The project resulted in a centralized, joint use water sector education and a R&D environment at the Kuopio region. The project consisted of the necessary space modifications, equipment purchases and installation, deployment and user training where needed. An internationally competitive business environment is formed during the project, which is able to respond effectively and comprehensively to the new challenges in the future regarding education and R&D, and to provide high-quality research, testing and education services for firms of this branch.

1.3 Biogas technology research and teaching environment (Savonia University of Applied Science)

The bio-energy sector is another priority of the Savonia University of Applied Science. The overall mission of the unit is to provide research, development and measurement services for companies and organizations and to perform applied research and development activities in cooperation with various companies and research institutes. Bio-energy operations are specifically focused on biogas technology and on the development of agriculture slurry utilization. The portable biogas plant of Savonia University of Applied Science is a plant suitable for research, education and product development, which is functionally equivalent to biogas plants producing energy using the wet process. The biogas plant is built in its entirety in one container, so it can easily be transferred with a truck to a set up where biogas experiments are done.

ERDF projects

Investment in biogas plant; biogas technology research and development of teaching environment

Institute: Joint Authority of the Savonia University of Applied Science

Implementation time: 1.1.2008 - 31.12.2009

Responsible authority: Regional Council of Pohjois-Savo

The project has resulted in a portable biogas research, education and method development environment for Eastern Finland. The portable biogas plant will bring new opportunities for biogas research, which leads to finding raw materials and new potential uses for biogas. The biogas plant has been put to use in 2010 for research in cooperation with MTT and a two-year-long research project, after which it will be released to other future research needs. The equipment is being used and is also intended to be used in the future for education purposes.

1.4 Renewable energy learning laboratory (Savo Educational Consortium)

The renewable energy learning laboratory will consist of a well-equipped building engineering environment, which can be utilized for teaching and education, and also as a well-equipped learning laboratory where monitoring and simulation of different approach models can be done with ICT. The learning environment also includes a building energy maintenance-related technical installation and adjustment, measuring and monitoring laboratory environment. The learning environment is formed to be the centre point of renewable energy education. The environment serves education in its different forms: research, product development, method and device testing. As a result of the ongoing project at the Savo Educational Consortium, in collaboration with Savonia UAS, it is a modern, technology-related renewable energy learning environment, which is further expandable for bio-energy utilization, and provides the opportunity for basic education, adult education, research and development.

ERDF projects

Toivala - renewable energy learning laboratory

Institute: Savo Educational Consortium

Implementation time: 1.1.2011 - 31.12.2012

Responsible authority: Regional Council of Pohjois-Savo

The project will produce a physical activity/learning environment needed by the learning laboratory for renewable energy. The laboratory consists of well-equipped buildings in a production environment, which can be utilized in teaching and education. The learning environment also includes a building energy maintenance-related technical installation, adjustment, measuring and monitoring laboratory environment with related sensors, machines, instruments and other equipment. The energy laboratory learning environment combines both laboratory-like experimenting, measuring, monitoring and testing activities and workshop-like installation and configuration training activities. As a learning environment, the energy laboratory combines education, development and innovation, practical expertise and equipment testing. The project is related to the Toivala campus investment of Savo Educational Consortium, whose first phase is realized during the period 5/2011 - 3/2012 and second phase during the period 2013 - 2015.

1.5 KANTIVA Bioenergy Research Centre (University of Eastern Finland)

The KANTIVA Bioenergy Research Centre is a competence centre of research institutes at the University of Eastern Finland's Kuopio campus area, which works in cooperation with the Joensuu campus of University of Eastern Finland and companies. The objectives of the research centre are to carry out high level international research regarding bio-energy production and usage impact, and to promote Eastern Finland's comprehensive environmental research and development together with companies in the region and with other organizations. In addition, its goal is to provide unbiased research-based information about the bio-energy production and the different stages of the usage chain and their impacts on the environment and human health, and to promote the use of the own renewable energy sources of the region in a sustainable manner, and also, to deepen regional, national and international cooperation between the leading actors of the branch.

ERDF projects

Air pollution harmfulness research and testing equipment

Institute: University of Kuopio (1.1.2010 University of Eastern Finland)

Implementation time: 1.1.2010 - 31.12.2011

Responsible authority: Regional Council of Pohjois-Savo

The goal of the project is to support and strengthen the activities of the KANTIVA Research Centre. The goal is to build an internationally unique laboratory infrastructure containing aerosol transformation and cell exposure equipment. The equipment can be used for researching and testing air pollution in situations similar to actual exposure. Additionally, the new equipment substantially enhance and diversify the use of existing infrastructures, and bring toxicological health research and testing as an integral part of the new technology and development processes.

KANTIVA Bioenergy Research Centre: equipment acquisition

Institute: University of Kuopio

Implementation time: 1.1.2008 - 31.12.2009

Responsible authority: Regional Council of Pohjois-Savo

The project has helped develop bio-energy production and the infrastructure related to usage effect research at the University of Eastern Finland and sector research institutes in the region. Acquired devices improve substantially the capabilities and capacity of the research centre to solve open questions related to bio-energy production and use in the future. The acquisitions strengthen the national and international status and attractiveness of the research centre from the perspective of external partners.

Equipping the University of Kuopio to strengthen technical know-how regarding natural sciences

Institute: University of Kuopio

Implementation time: 1.2.2004 - 30.6.2007

Responsible authority: Regional Government of Eastern Finland

The research equipment of the project consist of applied physics, environmental science, pharmacy technology and central analytical laboratory equipment. The goal has been to create a research environment which serves the research and development activities of the Kuopio region for environmental and medical technology companies. The equipping has been designed in such a way that it complements as well as possible to the joint use of the sensor technology laboratory created for paper industry sensor development and the Mediteknia research environment.

Equipping the University of Kuopio's Environmental Technology Laboratory for cooperation with fireplace and construction machine companies

Institute: University of Kuopio

Implementation time: 1.5.2003 - 31.12.2004

Responsible authority: Regional Government of Eastern Finland

The goal of the project was to strengthen the competence in the Environmental Technology Laboratory of the University and its capabilities to respond to increased requirements of measurement activities and company development activities. The equipping has been allocated to the use of bio-energy and low-emission equipment for process technology sectors, which are seen as key factors in the development of Eastern Finland's status as a key region of environmental technology. Key equipping items were: a mobile analytical equipment for all emission measurements and equipment needed for fireplace, pellet technology and catalyst research.

Product development operating platform for environmental informatics

Institute: University of Kuopio

Implementation time: 1.12.2001 - 30.6.2003

Responsible authority: Regional Government of Eastern Finland

The goal of the project has been to build an operating platform for environment informatics product development which serves the companies in North Savo and supports the product development of new companies. A main goal of the product development environment was to combine the Finnish high-end information technology and the internationally recognized environmental expertise. The goal has been to provide a secure and user-friendly project environment, experts and a equipment/software base, and also to make high-quality education possible. In addition, the goal has been to test and, at the same time, to provide public environmental services for various target groups.

Operation

Operations will continue as the cutting-edge project of the University

The activity of KANTIVA Bioenergy Research Centre has continued from the beginning of 2011 in the form of a cutting-edge project for the University of Eastern Finland. The University has formed 13 cutting-edge research projects as a part of its strategy implementation plan and it funds these projects with 15 million Euros in 2011-2015.

Research projects from applied research to basic research

Acquired equipments are mainly in research and development use, but they also serve educational purposes. Several research projects are ongoing ones, some of which are conducted internationally. Projects are carried out with different types of research ranging from basic to applied research. Actual product development is not done, but companies can take advantage of research carried out at their own product development fields. Company cooperation, for example, has resulted in a low-emission pellet burner, which has already become a commercial product. Equipment purchases could possibly be benefited to higher extent if companies were involved more closely in the operations and if they could use the research results better.

Few companies in the region; among them great renown

The equipment has continuously been in active use due to the large amount of research projects. Moreover, the cooperation with companies was evaluated to have worked well. There is, however, not a large amount of companies in the region, so the research centre has cooperative companies outside the area as well.

Target companies were estimated to be aware of the possibilities KANTIVA has to offer, as they have been involved in various projects and in their management teams. Various events have also been organized, where the companies have been invited to visit, and laboratories and research results have been presented to them. Universi-

ty-internal marketing has not been seen as necessary, but the available equipment is presented on KANTIVA's website.

Companies' experiences of KANTIVA

Two company representatives who had been involved in KANTIVA-related projects were interviewed for the study.

Research centre has a functional idea - present situation unclear

KANTIVA appeared somewhat anonymous in the eyes of the companies because it consists of two separate research units in Joensuu and Kuopio. On the other hand, the thought about combining complementary areas of expertise was seen as a fruitful conception. The different ways of linking the areas of expertise of the campuses was seen as an area which still needs further development. The interviewees had the perception that KANTIVA was supposed to be a permanent research centre that would combine the expertise and the scattered targets of research units within the University. During the interview, however, they were unclear on what KANTIVA's current situation is and whether it still exists.

Supporting a long-term beneficial basic research as a point of view

Based on interviews, accurate expectations were not focusing on KANTIVA's project cooperation, but the meaning of company presence was merely to promote basic research. The projects were generally seen to be more important for the University's research groups than for companies, as the companies enabled research teams to purchase research equipment which otherwise would not have been possible to obtain. It was told in the interviews that companies do not have expectations of direct and fast advantages from projects containing equipment procurements, but that they serve mainly as a support for basic research. The research was seen as potentially beneficial for the company and the whole region over a longer term.

Ideas, networks and new ventures out of projects

It was told that projects do however provide companies with ideas and the steering group working style seemed to bring participants together and raise important dialogues between the University, research and educational institutes and companies. They were considered to provide a good opportunity to network with such businesses one would otherwise not meet. Project-related seminars and other meetings were also considered fruitful. In addition, the projects promoting basic research were believed to create possibilities for more directly usable and more specific projects.

Cooperation could be deepened

Generally, the cooperation with the university was reported to have gone well. The gap between the companies' practical problems and the basic research performed by the university was, however, sometimes seen too wide. It was explained that the situation of the university and the problem at hand have a large effect on how well the university can serve companies with their practical problems. For example, the final assignments are often very specific with clearly defined problem solutions, but e.g. Technical University know-how is also needed. On the other hand, it was also emphasized that the Centre of Expertise Programme (OSKE) should work on applying the basic research made by universities to practice for companies.

In order to deepen KANTIVA's company cooperation in the region, e.g. the cooperation with the Varkaus unit of Savonia University of Applied Science could be considered. If the two institutes have complementary areas of expertise, then the cooperation could also serve the region's energy sector business needs better.

2. MEASURING AND SENSOR TECHNOLOGY

2.1 PROMIS Centre (University of Eastern Finland)

Pharmaceutical Process Measurement and Simulation, a.k.a. the PROMIS Centre is a pharmaceutical industry process analytics research consortium formed by the University of Eastern Finland, VTT and the Savonia University of Applied Science which carries out research projects together with companies, and promotes technology transfer projects to develop the processes and equipment of the pharmaceutical industry. The activities of PROMIS Centre are based on national and international business cooperation. PROMIS carries out research projects accordingly with the pharmaceutical industry's needs, with the involvement of multidisciplinary research teams. In addition, the research centre's own technology transfer projects enable the birth and development of commercially and socially important products.

ERDF projects

PROINFRA - Supplementing the PROMIS Centre's research and educational infrastructure

Institute: University of Eastern Finland

Implementation time: 1.1.2011 - 31.12.2012

Responsible authority: Regional Council of Pohjois-Savo

PROINFRA is PROMIS Centre's infrastructure development project which modifies the existing infrastructure to be compatible with research and development activities of continuous pharmaceutical manufacturing processes. The research environment enables the project partners to develop measuring, automation and control systems for continuous processes. The new infrastructure enables the University to obtain a better access to the network of European and U.S. manufacturers and research institutes.

PROFIT - developing the infrastructure and business environment of PROMIS

Institute: University of Kuopio

Implementation time: 1.1.2008 - 31.12.2009

Responsible authority: Regional Council of Pohjois-Savo

The project is a start-up project of PROMIS Research Centre, which has developed the operational environment of the R&D activities of the pharmaceutical industry in Eastern Finland. The necessary operational environment equipment investments have been made as part of the project. The goal has been to create a versatile pharmaceutical manufacturing infrastructure in Eastern Finland, in which medicine manufacturing and process analytics can be researched and developed. The medicine manufacturing process equipment acquired can be used for research and educational use and as a pilot environment for new technologies at local businesses.

PROMET: Manufacturing process measurement and sensor technology research and development project for the pharmaceutical industry

Institute: University of Kuopio

Implementation time: 1.1.2008 - 31.12.2009

Responsible authority: Tekes

The project is with PROMISENS: PAT Sensors and Applications in Pharmaceutical Development a part of the New Methods of Pharmaceutical Manufacturing. The project is associated with pharmaceutical medicine manufacturing processes, the monitoring of these processes and developing simulation and modelling tools. The project as a whole affects the biotechnology/pharmaceutical research and development, the knowledge level, growth and internationalization of universities and research organizations working with measurement technologies, process analytics and simulation methods.

PROMISENS: PAT Sensors and Applications in Pharmaceutical Development

Institute: VTT Technical Research Centre of Finland

Implementation time: 1.1.2008 - 31.12.2009

Responsible authority: Tekes

The project is as the above described PROMET: Manufacturing process measurement and sensor technology research and development a part of the New Methods of Pharmaceutical Manufacturing. The project is associated with pharmaceutical medicine manufacturing processes, the monitoring of these processes and developing simulation and modelling tools. The project as a whole affects the biotechnology/pharmaceutical research and development, the knowledge level, growth and internationalization of universities and research organizations working with measurement technologies, process analytics and simulation methods.

2.2 The Finnish Brain Research and Rehabilitation Center Neuron

The Finnish Brain Research and Rehabilitation Center Neuron is a private neurological research and rehabilitation centre in Kortejoki, Kuopio which is owned by The Finnish Brain Research and Rehabilitation Foundation. It is responsible for the rehabilitation, treatment and research of neurological patients, especially stroke patients. The project related to the centre is, however, funded by operational line 3 (regional accessibility and operational environment development) instead of operational line 2.

ERDF projects

Virtual rehabilitation systems development and testing activities for promoting production and arrangement of rehabilitation activities

Institute: The Finnish Brain Research and Rehabilitation Foundation and the Finnish Brain Research and Rehabilitation Center Neuron

Implementation time: 1.4.2009 - 31.12.2010

Responsible authority: Regional Council of Pohjois-Savo

The main goal of the project has been to develop virtual methods and test newest rehabilitation technology in small groups accordingly with the new neurological NEKTI Educational Model. The project is partly implemented by the Social and Health Management Institute and the Institute of Physics and Mathematics of University of Eastern Finland. With the equipment of NEKTI environment, rehabilitators can practise effectively and individually in small groups guided by physiotherapists and occupational therapists. The new rehabilitation technology increases the diversity of rehabilitation, gives room to education and, at the same time, facilitates the work of the rehabilitation staff, because the physical work-load can be reduced with the use of e.g. electronic hoists. The development of NEKTI rehabilitation activities will continue in 2011, funded by TEKES.

3. COMMERCIALIZATION AND BUSINESS DEVELOPMENT OF WELLNESS INDUSTRY PRODUCTS AND SERVICES

3.1 Biocenter Kuopio (University of Eastern Finland)

Biocenter Kuopio was founded in 2007 to strengthen the interdisciplinary research at the University in molecular medicine and the related pharmaceutical research and biotechnology. Biocenter Kuopio is a part of Biocenter Finland, which is a network of university biocentres. Its goal is the structural development of biocentres in a manner that promotes biosciences, biomedicine and supporting technology services at a national level and improves cooperation between stakeholders. The goal of this operation is to avoid duplicate and unnecessary investments.

Biocenter Kuopio includes more than 35 research teams from the University of Eastern Finland and is the only biocentre which also includes 10 biotech companies. The seven service centres of the biocentre are: Eastern Finland's Genome Centre, Gene-Transfer Centre, Imaging Centre, Disease Modelling Centre/Phenotyping Centre, Stem Cell Centre, Structural Biology Research Centre, Bioinformatics Centre, Chromatin Centre and Metabolomics Centre.

ERDF projects

Strengthening the operational prerequisites of molecular medicine in the Kuopio region

Institute: University of Eastern Finland

Implementation time: 1.1.2011 - 31.12.2012

Responsible authority: Regional Council of Pohjois-Savo

One of the main objectives of the project is to provide relevant disease models, research methods, the latest methods and tools (such as new viral vectors and stem cell techniques) in molecular biology to those groups and companies with the potential to search for and find potential medicine molecules and materials, genes and nucleic acids, but do not have the full resources for last stage pre-clinical testing. The goal of the project is to obtain special equipment for specialized laboratories. Upgrading the research equipment helps the whole project to develop a network that brings together the various research branches, participants and projects aiming at health and medical research, medicine, viral and cellular treatment by arranging press conferences and seminars, where the available disease models are presented along with related methods and equipment.

Strengthening the infrastructure of the disease model and stem cell research at Biocenter Kuopio

Institute: University of Eastern Finland

Implementation time: 1.4.2010 - 31.8.2011

Responsible authority: Regional Council of Pohjois-Savo

The goal of the project has been to build on BCK's infrastructure with equipment acquisitions, which allow a high international standard of technology for disease pattern and stem cell research and which correspond to the needs of the competitive product development of Kuopio's biotech companies. The result of the project is supposed to be, among others, an international high-level disease model and stem cell centre, serving the biotech companies of the Kuopio region. In addition, the goal has been to create several new molecular medicine methods, to increase the number of joint projects of companies and the university and to create high quality scientific publications and patents that can be used in business operations.

Development of the Stem Cell Centre in Bio Centre Kuopio

Institute: University of Eastern Finland

Implementation time: 1.1.2009 - 30.4.2011

Responsible authority: Regional Council of Pohjois-Savo

The goal of the project has been to strengthen the strategically important Molecular Medicine expertise, especially in the field of stem cells and the stem cell research equipment in BCK as an operational environment for Kuopio's business functions. The focus is on chronic disease and cancer gene research, stem and medicine therapy and diagnostics enabling technologies, which are the specialized expertise of University of Eastern Finland and the biotech companies of the Kuopio region acknowledged both nationally and internationally. The goal has been to strengthen the product development of Kuopio's new technology biotech companies and to give birth to new international businesses.

Magnetic resonance imaging development platform

Institute: University of Kuopio

Implementation time: 1.1.2009 - 31.12.2010

Responsible authority: Tekes

The goal of the project was to create a development environment for MRI, in which both technological (hardware level) and diagnostic and medicine development-supporting imaging applications (pulse sequences, data analysis, software level) could be developed. The project will offer even higher standards of imaging and new implementation aspects (pre-clinical cardiac MRI, pharmacological MRI), which were previously impossible.

Infrastructural development of Biocenter Kuopio

Institute: University of Eastern Finland

Implementation time: 1.1.2008 - 30.6.2010

Responsible authority: Regional Council of Pohjois-Savo

The goal of the project has been to expand and modernize the equipment of the different service centres of the biocentre, as well as the hardware-based technologies. Eastern Finnish Genome Centre has had as a goal to acquire equipment for multifactorial disease and cancer research. The Imaging Centre has had the goal to acquire a new console for a new MRI device, the confocal microscope equipment has been meant to be renewed so that the study of protein kinetics and imaging-based molecular screening become possible. The expertise of the Disease Model Centre has been meant to be developed by acquiring angiography equipment for heart and cardiovascular research. The goal of these acquisitions has been to strengthen BCK's level of molecular medicine, business cooperation and to create innovations leading to new companies.

Operation

Different types of research and forms of business cooperation

The equipment acquired for the service centres of Biocenter Kuopio are in different types of research use. The starting point is that the operation is not only a provision of services, but also serves research and education. Some devices will also be used for research from other universities and hospitals, while some are only used by a few people who possess the needed knowledge.

There are many existing models of cooperation between companies and the biocentre. These could be for example university-run academic Tekes projects involving corporate partners. On the other hand, the form of the operation can be company-driven Tekes projects or other projects that are more closely related to the activities of the company. Moreover, direct service studies ordered by the company from the biocentre could come to question. In these cases efforts are made to involve elements that serve the interests of the University, such as the ability to do, for example, method development at the same time.

Courses and internationality

A variety of courses are organized around the infrastructures, participated by people from companies and the University, as well as from other universities from Finland and abroad. The activities enhance the biocentre renown and create new relationships with companies home and abroad, and also with other Finnish universities. Participation can also be a way for pharmaceutical companies to create new foreign connections; companies get the chance to meet different institutes and businesses and hear about their work. The courses have also led to international researcher exchanges.

New equipment brings new perspectives

The acquired equipment help open up new opportunities on many different levels. Procurements are often associated with technical and methodological skills development that companies, the Kuopio University Hospital's doctors and a part of the Savonia University of Applied Science's students can benefit from. Learning to use the equipment often happens by going abroad which in turn brings new knowledge to the region. After this, the know-how gained by the University can be transferred to companies. With new procurements, the knowledge of the teaching staff increases and the teaching staff becomes more qualified. The new equipment can be utilized in research and can open new teaching topics. In addition, a modern equipment base and top know-how creates better conditions for international networking and increases foreign teachers' willingness to visit the University.

Known activities and needs of companies in the region

People at the biocentre were estimated to be aware of what the companies of the industry are doing, as many of them are university spin-off companies. As a result, they are familiar with matters of interests and expertise. The companies also follow what happens at the centre and they are also involved in developing and planning its infrastructure. Corporate cooperation exists outside the region too. There are a few large pharmaceutical companies in Finland cooperating with the biocentre and they can act together with local participants of the same projects. There are also EU-funded international projects and service research for international companies.

The communications of the biocentre has been in focus; however activities comparable to mass marketing have not yet been done. The activities and needs of companies in the region are known, so they will be contacted if needed, regarding, for example, a research project. Communications of the infrastructure and activities at Biocenter Kuopio are published on Biocenter Finland's website. There is still room for improvement regarding the internal communication within the school.

A company's experience of Biocenter Kuopio

Unlike the other environments, only one company's representative was interviewed regarding Biocenter Kuopio. The company has been involved in the cooperation since the opening of the biocentre.

Important equipment base, know-how and networks

Biocenter Kuopio's development projects have been very important for the company because of its operating model; the projects have brought vital equipment base and know-how to the region. As a result, the company has been involved in building and developing the region's research resources. New equipment acquisitions were believed to be beneficial for the company. The company utilizes the acquired equipment actively even right now and the new knowledge gained by the acquisitions was seen beneficial for the company.

The company has benefited from projects developing the biocentre's infrastructure especially through the improvement in knowledge, networks and the equipment base. The company can buy this knowledge and equipment usage time as a service when the university staff is trained to use the equipment. The pilot research resulting from the infrastructure development projects was also seen as beneficial for the company in form of experience regarding the new equipment, its results and the implementation of these results.

Transferring of research results to companies must be improved

It was believed that the biocentre could offer more for the company if the research results could be better transferred to benefit the companies. The transfer of innovations created by university research to companies was seen as unsuccessful and the innovation services of the university seemed powerless. A change in the present operational method was desirable.

3.2 Dental research and learning environment (University of Eastern Finland)

Dentistry education began in the University of Eastern Finland's Kuopio campus in the autumn of 2010 when 25 new students began their studies. The number of students admitted increases to 40 starting from 2011. The dentistry education creates about 40 new positions in the University and 30 positions for clinical education in the teaching clinic of the Hospital District. New premises and a modern learning environment are built for dentistry education in the Canthia building at the Savilahti campus. The skill workshop facilities are shared with the dental hygienist education of the Savonia University of Applied Science.

ERDF projects

Equipping the dental research and learning environment 2011-2013

Institute: University of Eastern Finland

Implementation time: 1.1.2011 - 31.12.2013

Responsible authority: Regional Council of Pohjois-Savo

New premises for dentistry are created in the Canthia building (renovation). Equipping is scheduled for 2011-2013: in 2011 university offices, a part of the necessary research equipment, seminar and research facility furniture, in 2012-2013 the rest of the research equipment and in 2012 the University's and Savonia's Skill Workshop. A detailed list of research equipment acquisitions is formed when the new professors are assigned to their tasks in 2011-2012.

3.3 Mediteknia (University of Eastern Finland)

Mediteknia is a pharmacy, medicine, nutrition and biotechnology development centre located in the University of Eastern Finland's Kuopio campus. The research centres of Mediteknia are the Clinical Research Centre (KTK), the Pharmaceutical Medicines Research Centre (FLK) and the Food and Health Research Centre (ETTK). The role of the research centres is to promote implementation of research results of the University of Eastern Finland, further development of innovations and transferring of the university knowledge according to the needs of the economic life.

ERDF projects

<p>Promoting the research and product development environment of Mediteknia Institute: University of Kuopio Implementation time: 1.6.2002 - 31.3.2003 Responsible authority: Regional Government of Eastern Finland A quantitative PCR-device, Sequence Collector Software and an autoradiography development device have been acquired during the project to promote the pharmacogenomic research and product development environment. The equipment is meant for joint use between the Mediteknia centres, i.e. the Clinical Research Centre (KTK), the Food and Health Research Centre (ETTK) and the Pharmaceutical Medicines Research Centre (FLK) to strengthen the infrastructure of medicine development. The equipment enables the research of medicine pharmacogenomic responses and both patient and cell culture samples including but not limited to gene expression studies in the context of medicine treatment. In addition, the equipment can be effectively used for genetic risk factor genes analytics.</p>
<p>Equipping the Food and Health Research Centre Institute: University of Kuopio Implementation time: 1.10.2001 - 30.9.2002 Responsible authority: Regional Government of Eastern Finland Laboratory equipment is acquired during the project for the use of the Food and Health Research Centre (ETTK). The meaning of the project has been to support the food and nutrition related research and education and development activities at Kuopio University.</p>

3.4 Suupirssi (Savonia University of Applied Sciences)

Suupirssi is a mobile oral care services unit which facilitates an oral hygienist's, dental hygienist's, and dentist's work. Services can be provided at the client's own environments with the mobile oral care unit in places such as therapeutic communities, work places, schools and daycare centres. The mobile oral care unit is also used as a learning environment, which will improve the vocational skills of oral health care students.

ERDF projects

<p>Hambulanssi - mobile oral care unit Institute: Joint Authority of the Savonia University of Applied Science Implementation time: 1.8.2009 - 31.7.2011 Responsible authority: Regional Council of Pohjois-Savo The goal of the project has been to acquire and produce a mobile oral care unit and equipment for the unit and to develop the communications technology for the unit in cooperation with businesses, work life and educational units.</p>

3.5 Simulation Centre (Savonia University of Applied Sciences)

A health simulation centre will be established in the renovated premises of Technopolis building of the Savonia University of Applied Science in Savilahti, where the health unit moves from Sairaalakatu's campus in 2013. The simulation centre is equipped with the most modern high-technology. The new centre will consist of simulation and debriefing facilities, a diverse AVS video and audio recording system, patient simulators, possibly a virtual IV world, basic CPR technique self study devices and required applications.

ERDF projects

Developing a simulation centre to the Savonia University of Applied Science (Simula)
Institute: Joint Authority of the Savonia University of Applied Science
Implementation time: 1.3.2011 - 31.12.2013
Responsible authority: Regional Council of Pohjois-Savo
The project's main goal is to establish a simulation centre to the Savonia University of Applied Science's health unit. The centre will be equipped with the newest health simulation technology including separate patient simulators and supporting AVS systems.

4. OTHERS

4.1 Emergency Services College

The Emergency Services College is a school accountable to the Ministry of the Interior, which is responsible for rescue and emergency response centre vocational training, with education regarding disruptions in normal conditions, preparing for emergencies and international civil crisis management training. In addition to the educational role, the Emergency Services College cares for the research and development of the emergency services. The Emergency Services College aims to prepare its students for the requirements of the labour market, with real life learning environments. The education is done in accordance with the multi-form principle; college students are educated in mixed environments, depending on the subject.

ERDF projects

Dangerous goods training field
Institute: Emergency Services College
Implementation time: 1.1.2010 - 30.9.2011
Responsible authority: Regional Council of Pohjois-Savo
The goal of the project is to produce a controlled dangerous goods R&D environment at the college's training premises. Training areas and simulators needed for dangerous goods R&D and education are built during the project.

<p>Pressurized combustible fluid simulators Institute: Emergency Services College Implementation time: 2.1.2007 - 30.11.2007 Responsible authority: Regional Government of Eastern Finland The acquired system consists of three separate pressurized combustible fluid simulators. The combustible fluid is fed pressurized through a nozzle. The technology has made it possible to reach new research and development actions and education goals, as well as better environment protection and work safety requirements. The new system is built on the training premises in an oil storage tank, which is located on a fire tile with portable combustion tanks in an industrial hall, and is designed for training initial fire-fighting.</p>
<p>Responsible authority: Regional Council of Pohjois-Savo Gas-fueled fire simulators have been acquired for the project, which helped form a versatile fire-fighting and fire research environment at the new fire house. The goal of the project has been to create a controlled environment for R&D needs focusing on fire events and temperature.</p>

4.2 Forestry culture research and development environments (Metla, Suonenjoki office)

The Forest Research Institute (Metla) is a research and specialist organization which develops products, services and solutions for the management and use of forests and responds to challenges and questions regarding intangible values. The Suonenjoki office is specialized in the research and development of forestry culture. A fundamental part of the office is a research plant nursery, with an annual cultivation of ca. 1-2 million plants for Metla's research forests and for commercial sale. A nursery information service is an essential part of the nursery knowledge, which transmits research data for the participants of the sector.

ERDF projects

<p>New generation technology research greenhouse Institute: Forest Research Institute Implementation time: 1.1.2011 - 31.12.2012 Responsible authority: Regional Council of Pohjois-Savo Metla's old research greenhouse in Suonenjoki will be renovated during the project with new generation greenhouse technology. The cooling is carried out with water curtain technology, and the lighting with LED technology, where applicable. The new technologies enable the development of new forest seeding production methods.</p>

Suonenjoki Mole Research Unit

Institute: Forest Research Institute

Implementation time: 1.1.2006 - 31.12.2006

Responsible authority: Regional Government of Eastern Finland

The Forest Research Institute has, as a part of its regionalization, moved the administrative activities, its mole population monitoring and mole repellent testing activities along with the related mole research from the Vantaa unit to the Suonenjoki unit. The project has comprised building a mole stall, in accordance with experiment animal laws, on a finished foundation.

Suonenjoki Seed Laboratory

Institute: Forest Research Institute

Implementation time: 1.5.2005 - 30.6.2007

Responsible authority: Regional Government of Eastern Finland

The goal has been to set up a seed laboratory at the Suonenjoki research station and to build a research greenhouse to serve practitioners (seed producers, forest nurseries and forest cultivation professionals) and universities. The project has strengthened the role of Suonenjoki research station as a forestry culture knowledge centre.

4.3 Halola Research Barn (Maaninka municipality & MTT)

The Halola Research Barn is located in the village of Halola, municipality of Maaninka in connection with MTT Agrifood Research Finland's research station. The municipality of Maaninka has been the contractor and they have rented the building to MTT with a 15 year lease. MTT practises research related to dairy cattle production in cooperation with the University and the Savonia University of Applied Science in the premises. There is also a biogas research unit built as a separate project by MTT, in connection with the research barn.

ERDF projects

Halola Research Barn construction

Institute: Maaninka municipality

Implementation time: 1.1.2008 - 31.8.2009

Responsible authority: Regional Council of Pohjois-Savo

The goal has been to build a research barn in the municipality of Maaninka, village of Halola, in connection with MTT's research station.

NYT Modern barn technology

Institute: MTT Agrifood Research Finland

Implementation time: 1.1.2008 - 31.8.2009

Responsible authority: Regional Council of Pohjois-Savo

The goal of the project has been to build a versatile data collection and sensor technology platform to MTT Maaninka's barn environment. The comprehensive sensor and measuring technologies at the CowLab environment facilitates comprehensive data collection regarding animal health, physiology and behaviour.

4.4 Muuruvesi Teaching Barn (Savo Educational Consortium)

The Muuruvesi unit of Savo Educational Consortium focuses on agricultural and horticultural education. The college has a teaching barn focusing on organic milk production, which serves students, farmers and researchers as an observation place for animal feeding, care and work.

ERDF projects

Skilled organic chain

Institute: Savo Educational Consortium

Implementation time: 1.5.2000 - 30.4.2004

Responsible authority: Regional Government of Eastern Finland

The project led to the formation of a networked and functioning Organic Chain Competence Centre and a network of organic entrepreneurs. The competence centre builds on the Muuruvesi, Kuopio and Suonenjoki units of Savo Educational Consortium, with University of North Savo/Savonia Food Center, Runni Organic Data Centre, University of Kuopio, Agricultural Research Center and North Savo Rural Center also participating in the network.

4.5 Food Development Laboratory (Savonia University of Applied Science)

The joint use food development laboratory, to be established in the Savilahti campus of the Savonia University of Applied Science, is intended to develop and commercialize new foodstuffs and further processed products. The product development laboratory opens up the possibilities to research and develop foodstuffs, prepare different test batches and test products.

ERDF projects

Future Food - Food and product development in North Savo

Institute: Joint Authority of the Savonia University of Applied Science

Implementation time: 1.1.2011 - 31.12.2013

Responsible authority: Regional Council of Pohjois-Savo

The project equips a food development laboratory for the joint use of businesses in the region and develops and commercializes new foodstuffs and further processed products. The project analyzes the quality management needs of future food processing companies and local producers and arranges education and training regarding quality for national and international markets at custom-made company workshops. The project also develops nutritional quality analysis programs and package labelling programs for the product development environment.

