EUROPEAN UNION
European Structural and Investment Funds
Operational Programme Research,
Development and Education

MINISTRY OF EDUCATION,
YOUTH AND SPORTS

HR EXCELLENCE IN RESEARCH

CEBIA-Tech Inter-sectoral Cooperation Development Strategy

Project Title: Development of Capacities for Research and Development of TBU in Zlín (RoKaVaV-TBU)
Reg. no.: CZ.02.2.69/0.0/0.0/16_028/0006243
Case: 2018CZ353848

FOREWORD

This document defines strategies for the development of cross-sectoral cooperation in the Centre for Security, Information and Advanced Technologies – (CEBIA-Tech), at the Faculty of Applied Informatics – (FAI), of Tomas Bata University in Zlín – (TBU).

1. Analysis of the current Situation

Definition of Cross-sectoral Cooperation

In accordance with the national economic structure, we generally distinguish between the Not-For-Profit and the For-Profit sectors, while the Not-For-Profit sector can be further divided into the Non-Profit Public sector, the Non-Profit Private sector and the Household sector. In the classification according to similar features, we usually differentiate economic sectors into Primary – (primary production), Secondary – (secondary production), Tertiary – (activities related to services provision), and Quaternary – (education, science and research). As the name suggests – Cross-Sectoral Cooperation is when entities from different sectors cooperate with one another. From the cooperation between universities point-of-view, the most frequently mentioned factor is cooperation with the application sphere – represented by the For-Profit sector.

Main FAI / CEBIA-Tech Orientation

The main FAI / CEBIA-Tech goal is to create, implement or deepen cooperation within partnerships with the application sphere; where their emphasis is mainly on strengthening these cooperation relationships in the long-term.

FAI has long been involved in developing R&D activities in the Information Technology, Automatic Control and Safety / Security Technology areas. Information Technology covers the areas of Cyber Security, Software Engineering and Artificial Intelligence. Automation research activities are focused on Measurement, Embedded Systems and the Automation and Robotisation of Production and Technological Processes in accordance with the "Industry 4.0" concept. Research activities in the Security Technologies field are directed not only on current issues of Soft Target Protection, Critical Infrastructure Protection, but also the Technical Security of Buildings in Connection with Intelligent Systems in Buildings.

A component of FAI includes the CEBIA-Tech Regional Research Centre built within the OP RDI programme framework. The Centre, which has laboratories with state-of-the-art instruments and equipment, cooperates with students of follow-on Master's and Ph.D. (Doctoral Studies) programmes.

FAI also includes the Information and Communication Technologies Science and Technology Park (VTP ICT), whose aim is to expand cooperation between the university environment and industry. VTP ICT thus creates a synergy centre for companies that utilise academics' experience in Information and Communication Technologies.

The FAI research environment is already relatively closely linked to the Industrial or Corporate Environments and the Public Sector. FAI's interaction with the Non-university Application Sphere mainly takes place at the following levels:

- Resolving joint applied research projects, contract-research, complementary activities and innovation vouchers.
- The existence of an Industrial Board – which, in addition to its internal members, also consists of 34 representatives of major industrial companies – mostly from the region.
- The Council discusses the cooperation of companies with the academic environment in the Contract Research and Projects fields, comments on their Study Programmes Study Plans – with an especial regard to market needs.
- Cooperation with companies based in the VTP ICT, located in close proximity to FAI
- Professional cooperation at the dissertation and diploma these levels.

Arising from the results of cooperation in previous years, our most important partner entities include:

- Siemens, spol. s.r.o., Elektromotory Frenštát Branch Plant – Activity focused on the analysis of manual assembly tools used in the assembly of electric motors.
- TREVOS a.s., Mašov – The design and optimisation of prototypes and their production by 3D printing.
- ITC a.s. Zlín – Optical Scanning and Analysis of Deformation Behaviour of Parts.
- KAPA Zlín spol. s.r.o. – Plastic Parts Plating Technology and Production by 3D Printing.
- HM Model Bučovice – A Study of the Mechanical Behaviour of Materials and Prototype Production by 3D Printing.
- To-do spol. s r.o. Chomutov – Optimisation and 3D Printing of a Car Dashboard.
- DOMA GmbH, Maraposching, SRN – Materials Mechanical Behaviour Tests and Production Optimisation.
- Devro, s.r.o. – The Development of Technology for the Production of Auxiliary Products.
- Tonak, a.s. – The Development of Waste Treatment Technology.

Technology Transfer and Intellectual Property Protection System

FAI uses the university-wide Technology Transfer Centre workplace services for the Industrial Legal Protection of Research and Development Results and their Commercialisation. Procedures for Ensuring Legal Intellectual Property Protection are regulated by Rector's Directive No. 1/2013 – "Application and Protection of Intellectual Property Rights Arising in Connection with the Creative Activities of TBU Employees and Students in Zlín".

Applied Research Projects

In recent years, FAI has been relatively successful in obtaining Applied Research projects – especially from providers in the Czech Republic. In its role of main beneficiary, cumulative annual support in recent years has been at the level of approximately 3.5 million CZK; and the annual funds from projects in which FAI is a co-participant have, in recent years, exceeded 10 million CZK. The situation is worse for projects from providers from abroad – where the annual FAI support is orders of magnitude lower than for Czech Republic providers.

Examples of successful Applied Research Projects include:

Title: AN INTELLIGENT ADVANCED FOREST SEEDLING CLASSIFICATION SYSTEM

Project No.: FV20419

Provider: Ministry of Industry and Trade, Programme TRIO

The basic goal of this project is the design, production and commissioning of equipment for the automated sorting of tree seedlings. As a result of significant climatic excesses, the demand for flow-rooted planting material is increasing – not only in the Czech Republic, but also in surrounding countries. The sorting device is primarily intended for angiosperms grown in plastic containers. The subsequent sorting-line will find a wider application in a number of forest nurseries in the Czech Republic and abroad. The sorting line is a globally unique device.

Title: PLATFORMA INFOS

Project No.: CZ.01.1.02/0.0/0.0/15_019/0004580

Provider: Ministry of Industry and Trade, Programme OP PIK

The project aim is the development of an identification terminal with a universal reading-head controlled by the INFOS SW platform, and the development of a commercial INFOS SW platform. In terms of HW for identification, this means the development of universal scanning heads to support various identification media types with support for Wiegand, RS 485, NFC. The INFOS SW platform will become a trademark for the commercialisation of SW abroad.

Title: DISTRIBUOVANÝ SYSTÉM ŘÍZENÍ REGIONÁLNÍ SOUSTAVY ZÁSOBOVÁNÍ TEPLEM A CHLADEM KONCIPOVANÉ JAKO SMART ENERGY GRID

Project No.: TH02020979

Provider: Technology Agency of the Czech Republic, Program EPSILON

The aim of this project is the development and implementation of a simulation model of the production, distribution and consumption of thermal energy in a Smart Energy Grid (SEG) – the design, development and verification of software for Co-generation Energy Management systems in a dominant thermal energy distribution source and in a regional Heat and Cold Supply system – (REZATECH); conceived as SEG.

Title: RESILIENCE 2015: A DYNAMIC ASSESSMENT OF THE RELATED CRITICAL INFRASTRUCTURE SUBSYSTEMS RESILIENCE

Project No.: VI20152019049

Provider: Ministry of Defence, Programme: Programm Security Research of the Czech Republic

An assessment of the correlation of important European sectors – (Energy, Transport and Information and Communication Technologies) and their elements, a description of the synergistic effect of failure of these systems – and their influence on predicting impacts and determining dynamic assessments of Critical Infrastructure Resilience.

Title: SECURITY SYSTEM FOR NAVIGATION AND COMMUNICATION OF AIRPORT VEHICLES

Project No.: EG16_084/0010327

Provider: Ministry of Industry and Trade, Programme OP PIK

The project aims to develop a new system for monitoring and controlling the movement of airport ground service vehicles. The project will develop proven monitoring and control of ground airport vehicles technology based on the HW / SW units on each vehicle, signal transmission stations, control SW implemented in the server and dispatcher workstations and data transmission software for today's motion control systems of aircraft at the airport.

Contractual Research

The average volume of contract research in the last 6 years has exceeded 5 million CZK per year. In recent years, it exceeded the limit of 7 million CZK. In the long-term, the increasing trend of contract research is evident – which is very positive. It is, of course, a question of to what extent this trend can be maintained in future years – especially for capacity reasons. Key Partners in the contract research field are mainly companies operating in Production and Testing. Examples include Tonak – (Hat Manufacturers); Siemens – (Electrical Product Manufacturer); Devro – (Meat Packaging Manufacturer); HC Model – (Special Castings and Prototype Manufacturer), and ITC – (Testing and Certification Institute). It can be seen that key FAI partners can mainly be found in the Czech Republic – however, there are already significant orders from foreign customers, such as for instance, Vietnam.

Applied Research Results

FAI produces solid Applied Research results – among which we can mainly include European and Czech patents, utility models, industrial designs, proven technologies, research reports, functional samples or software. The annual patent numbers per year is – at a maximum of individual pieces; but, in total, the Applied Research results attained several tens of pieces per year. A number of these results were predominantly created during especial projects and cooperation with application sphere partners. On the contrary – in some cases, the industrially protected result of FAI employees was applied in the form of a license agreement.

Among the most interesting applied research results examples belong the following:

A Method for the Deproteinisation of Waste Fats and Oils – (European Patent, 2015)

The waste fats and oils deproteinisation method – especially of leather, meat and food industries wastes – enables the subsequent processing of both fractions; especially for bio-stimulator and bio-fuel production, lies in the removal of protein solids and free fatty acids. In Social Relevance terms, thanks to this innovative process, it is possible to process waste fats and oils much more rationally than existing solutions based on the use of protein content significantly improves the overall economy of the processing process.

Patent ČR No. 306083 – A Percussion Tool with a Replaceable Functional Part (Validated)

This is a new solution for assembly tools used in assembling electric motors on the assembly line in the Siemens Company, Branch Plant – Elektromotory Frenštát. The novelty of this solution lies in the ergonomic design of the gripping part and a completely new solution of functional parts / pressure. A license agreement has been concluded with SIEMENS for this patent.

Patent ČR No. 307307 – A Hand-held Percussion Tool Pressure Positioning and Percussion Tool Implementation Method – (Validated).

This involves a proposal for positioning the beat of a hand-held percussion tool for the more efficient use of its functional surfaces. After wear of the functional surfaces working parts at both ends, it is repositioned so that – after releasing the fixation, it is removed from the support rod, and rotated 180° around its axis of symmetry to a new position so that the working parts become unworn parts of the functional surfaces. In this position it is put back on the support rod and re-fixed. A license agreement has been concluded with SIEMENS for this patent.

Collagen Waste Processing Technology – (Proven Technology, 2015)

Innovative technology for the processing of Collagen Waste, which has been successfully applied in industrial practice. The proposed procedure can be used to process a specific feedstock without costly and complicated pre-treatment – (degreasing). Collagen Waste is processed into ecological nitrogen fertilizer – for which a bio-stimulating effect has also been recorded. The output product is of natural origin and is applied in Organic Farming. This is also favourable from the soil fund point-of-view, where there is a long-term shortage of natural origin organic substances. The technology is used in commercial production – (see www.bioforce.cz).

Optimised Technology for the Production of Auxiliary Products – (Proven Technology, 2017)

This involves the optimisation of the refining products process, and adjusting output composition, which led to an increase in the quality of the product – a preparation for the Food Industry. The result originated from the request of a food company – which thanks to the proposed technology, its verification and very successful operational tests, was able to replace the original products based on petroleum products from a health and nutritional point-of-view with much better natural products. The social benefit lies in the production of foods that do not contain synthetic-based substances. This optimised technology was then introduced into the production practice

of a purely Czech company. In addition to the above Applied Research results, whose primary goal is financial benefit, FAI employees also generate results with a non-economic impact on society.

In this area, one can only raise the matter of the organisation of conferences or specialised conference sections -especially at the international level, in a wide range of R&D&I areas relevant to FAI can be highlighted. These events have contributed to the dissemination of the acquired expertise among the professional community and among the general public. In recent years, FAI has exceeded the average number of 5 organised events of this type per year.

The Commercialisation of R&D&I Results

In close proximity to FAI, the VTP ICT became operational in 2012. In the "Business Project of the Year 2012" competition, the VTP ICT Park also won first place in the "Infrastructure for the Support of Innovative Entrepreneurship Prosperity" category. The Park is integrated into the FAI structure in order to create ideal conditions for the incubation and development of companies. Companies are often established from the ranks of graduates with the cooperation of faculty researchers; e.g. in the 2014 – 2018 period, 28 incubation companies were established at VTP ICT. VTP ICT thus significantly contributes to the transfer of R&D&I knowledge into working practice through incubation companies. The creation of spin-off companies is not currently supported by the FAI management as a suitable form of the commercialisation of R&D&I results. (Establishing Spin-off Companies Methodology – for CTT needs (https://tenderarena.cz/dodavatel/seznam-profilu-zadavatelu/detail/Z0001377/zakazka/27248).

2. Intersectoral cooperation strategy for the next three years

- The maintenance and further development of CEBIA-Tech.
- The maintenance and further development of VTP ICT.
- The continued operation of the FAI Industrial Board.
- Maintaining the number of Applied Research projects from national funding sources.
- Increasing the number of Applied Research projects from international funding sources.
- Maintaining or increasing the number of Applied Research results, with an emphasis on potentially applicable – (Licensed) results.
- Maintaining the Contract Research Volume of Czech Republic customers.
- Increasing Contractual Research Volume from foreign customers.
- Increasing licensing agreement revenue.
- Support of permanent interaction with the non-academic sphere.
- Support of the participation of FAI staff in national and – in particular, international professional societies.
- Maintaining the number of conferences or conference sections organised by FAI staff.