SmartEIZ

Strengthening scientific
and research capacity
of the Institute of Economics,
Zagreb as a cornerstone
for Croatian socioeconomic growth
through the implementation
of Smart Specialization Strategy

smartEIZ

European Union

About the project

The SmartEIZ project aims to strengthen scientific and research capacity, narrow networking gaps and deficiencies of the Institute of Economics, Zagreb (EIZ) in comparison to leading institutions in the field of Economics and Management of Innovation and Technology (EMIT).

The objectives of the project

• Strengthen the cooperation between EIZ and leading international partner institutions in the EU in the field of EMIT

• Improve EIZ's overall research on EMIT through training activities

• Enhance EIZ's capacity to design and implement public policies to favour the internationalisation of the Croatian production system in the globalizing economy

• Improve the capacity of EIZ to study University/Industry models of collaboration, including Science Parks and technological clusters, their performances and their relation and impact on the territory

• Empower EIZ to contribute to RIS3 implementation by stimulating inclusive innovation and sustainable development in selected technological domains.

Expected impacts

• Improvement in the overall scientific and research capacity in the field of EMIT of the applicant through the implementation of the project that fits EIZ needs.

• EIZ's improvement in scientific methodological skills needed to support RDI and Public Policy Design and Evaluation (PPD&E).

• Increased scientific excellence, research and training capacity in the field of EMIT.

• Integration of project activities into RIS3 analyses and activities of Croatia as a direct result of the activities of the project.

• Improving EIZ's quality of research activities in the field of EMIT and turning it into a key promoter of cluster development in response to the socio–economic needs of Croatia.

• Adoption of "best–practices" approach in policy analysis and evaluation by at least one stakeholder in Croatia.

• Improvement of EIZ research project capacity, at a national, European and international level – measured by the number of projects that EIZ participates in.

• Production of a series of positive spillover effects for high–potential organizations.

• Increase staff mobility in EIZ.

• Identification of a suitable set of S&T indicators for Croatia to address the needs of the policy–makers.

Partners

The Institute of Economics, Zagreb (EIZ) is a public scientific institute with seventy–nine years of experience in conducting scientific and development research in the field of economics. Owing to the impartiality and quality of its research team, it has gained the reputation of the country's leading research institute in the field of economics.
EIZ carries out scientific and development research in the field of economics and provides specialized services of education and training as well as publishing and consulting services. The Institute's main long-term strategic goal is to be recognized as the leading Croatian research institute in the field of economics and the regional center of excellence in economic research.

The quality of its work is also reflected in an interdisciplinary approach to research, which enables a comprehensive understanding of contemporary issues in economics. One of the areas of expertise within EIZ is research on Economics and Management of Innovation and Technology (EMIT) which is visible from the number of articles published and projects conducted covering the following range of topics:

- innovation policy and evaluation of innovation policy;
- regional innovation system;
- cross border innovation cooperation;
- innovativeness within the SME sector;
- collaboration between academic institutions and industry;
- technology transfer;
- investments in Research and Development (R&D) and R&D tax incentives;
- interpreting Research, Development and Innovation (RDI) data.

Within this project, EIZ is responsible for creating a knowledge platform aimed at increasing research and teaching/training capacity to support RDI and Public Policy Design and Evaluation (PPD&E). The knowledge platform will have significant spillover effects on the overall quality of research and international integration of Croatia in these areas, as well as on significantly improved policy capacity for implementation Croatian Research and Innovation Smart Specialization Strategy (RIS3).

Bocconi University, founded in 1902, was the first Italian university to grant a degree in economics.

For a century, Bocconi has played a leading role in Italy's social and economic modernization. It has remained true to its founding values of being a major research university, with democratic values and open to the world, as well as financially and politically independent. Bocconi University believes that excellence can only be based on a person's academic profile as well as on his or her values and cultural and ethical background. This is why the University offers numerous activities, special occasions for people to enrich their knowledge. CRIOS – Centre for Research on Innovation, Organization and Strategy is a research institu-

tion of Bocconi University. It consists of a group of researchers affiliated to the Department of Management and Technology at Bocconi University and it is internationally recognized for its contributions to the scientific debate in its respective fields of activity.

CRIOS was founded with the goal of developing new knowledge in an area of study very wide, ranging from strategy to organizational behaviour, entrepreneurship, innovation, and it intends to be a reference point for all researchers interested in working on major collaborative, multi–disciplinary and international research projects. CRIOS aims at becoming a leading European centre, in the themes of its relevance.

CRIOS's experience in implementation of joint projects and international cooperation will be a very important contribution towards project objectives achievement.

CRIOS's experience of participation in EU Framework programs will facilitate the technical implementation of the project. CRIOS's wide range of partner organizations throughout Europe will enable EIZ to integrate into this European research area and establish partner relations for further joint projects and other activities. The transfer of CRIOS's innovative experiences will be done by way of joint trainings, workshops, seminars, training modules, etc. Given the theoretical and practical experience in the dissemination of economic knowledge and innovation and technology findings, CRIOS will carry out the development of methodological tools for the implementation of strategic objectives of the project and lead the consortium in preparing and implementing the strategy for EIZ capacity development as a key promoter of cluster based policy in Croatia.

University College London (UCL), formerly styled University College, London, is a public research University in London, England and a constituent college of the federal University of London. Founded in 1826 as London University, UCL was the first university institution established in London and the first in England to be entirely secular, to admit students regardless of their religion, and to admit women on equal terms with men. UCL became one of the two founding colleges of the University of London in 1836. It has grown through mergers, including with the Institute of Neurology (in 1997), the Eastman Dental Institute (in 1999), the School of Slavonic and East European Studies (in 1999), the School of Pharmacy (in 2012) and the Institute of Education (in 2014).

School of Slavonic and East European Studies is one of the world's leading specialist institutions, and the largest national centre in the UK for the study of Central, Eastern and South–East Europe and Russia.

UCL is an expert in the area of technologies of industrial transformations in Central Europe and Russia. Being an expert in the European Programme, UCL will contribute to the enhancement of EIZ's competence as regards participation in the Program. Among all the partners UCL is the most experienced as regards twinning activities, conducting surveys and pilot studies, development of toolboxes and methodologies. With regard to the sustainability of the project, the best practices and experience of UCL will add to the general outcome of the project a comprehensive character. UCL is responsible for twinning activities for several reasons. Indeed, the improvement of EIZ's scientific capacity and enhancement of its poten-

tial as regards innovation and technology and cluster policies as well as ensuring practical outcomes of the project through general cluster methodology development.

Maastricht University was officially established in 1976. Faced with a shortage of medical professionals, the Dutch government decided in the late 1960s that a new public institution of higher education was needed in order to expand the country's medical training facilities. Political leaders in the province of Limburg, most notably Sjeng Tans, the chairman of the Labour Party and former member of the Limburg provincial council and Maastricht city council, successfully lobbied for the new medical school to be established in Maastricht. This academic institution would be vital to sustain the intellectual life of the city, and indeed the whole province.

The United Nations University – Maastricht Economic and Social Research Institute on Innovation and Technology (UNU–MERIT) is a joint research and training institute of United Nations University and Maastricht University, based in the south of the Netherlands. The institute explores the social, political and economic factors that drive technological innovation, with a particular focus on creation, diffusion and access to knowledge. Working with its School of Governance (MGSoG), UNU–MERIT covers all aspects of governance in domestic and global organisations, from risk assessment to policy analysis, design and evaluation.
Overall the institute functions as a unique research centre and graduate school for around 100 Ph.D. fellows and 100 Master's students. It is also a UN think tank addressing a broad range of policy questions on science, innovation and democratic governance.
UNU–MERIT's research mission is to provide more insights into the social, political and economic inter-national and local context within which innovation and technological change is created, adapted, selected, diffused, and improved upon. The Institute's research and training programmes address a broad range of relevant policy questions dealing with the national and international governance of innovation and intellectual property protection, and the creation and diffusion of knowledge. With a research staff of approximately 50 persons, including 16 professors, plus 80 Ph.D. researchers, UNU–MERIT is a leading research institute on innovation and technology. At present it is ranked worldwide at the first place of the REPEC ranking of institutions in the field of Innovation.

TRAINING WORKSHOPS

Assessing Innovation Policy:
Overview of Theoretical, Design and Implementation Issues

This training workshop provides an introductory and systematic overview of theoretical, design and implementation issues related to the innovation policy studies – body of knowledge scattered between academic papers, consultancy reports, policy documents and evaluations. The three days training workshop covers the wide of range of theoretical, design and implementation issues relevant to the practice of innovation policy. The main part of the workshop was exploration of Croatian innovation policy in all three dimensions: its theoretical basis, design issues and implementation opportunities and challenges.

Technology, Growth and Productivity, including KET

The two days training workshop covers a wide of range of theoretical and empirical issues related to interaction of technology and productivity. The first part of the workshop takes a macroeconomic growth orientation and reviews the descriptive and econometric evidence on the link between human capital and growth. The second part continues at the micro-level but shifts from private to public policy strategies for technology enabled growth and productivity. A central question for the second part is: How to develop a growth oriented innovation strategy to advance manufacturing?

Companies, Innovation, Productivity

The workshop is divided in two parts. In the 1st part of the TW is fully embedded into the CSSES international conference "Exploring Technology Upgrading in Emerging and Transition Economies: from "Shifting Wealth I" to "Shifting Wealth II", held at SSEES on the 26-27th June 2017 (https://www.ucl.ac.uk/ssees/comparative-studies-emerging-economies/workshops). In the 2nd part, on the 28th June, the TW isstructured around presentations of EIZ researchers, presentations of their respective (with discussants) and one external speaker. Marco Grazzi has delivered his Keynote, focusing on the intertwined relationship between the three 'thematic' concepts of "Companies", "Innovation" and "Productivity". In the second part of the morning three EIZ researchers have presented their findings, with a focus on firm level data from Croatia. Finally in the afternoon Marco Grazzi has presented a paper based on recent findings on Italian firms' productivity dynamics, Randolph Bruno on firm-level technological catch-up within the European Union (including the data from the youngest member, Croatia) and Zoran Aralica on innovation policies in Croatia.

Cluster Evolution

The fourth SmartEIZ Training Workshop on "Cluster Evolution" was held at ICRIOS, Department of Management and Technology, Bocconi University.During the three days, EIZ researchers had the opportunity to listen to and interact with international experts discussing

the topic of cluster evolution from different perspectives – industrial cluster demography and performance, cultural clusters, role of clusters in fostering SMEs performance, methods and policies for cluster evaluation. Furthermore, they also had the opportunity to present their own work and visit RSE, an energy-oriented research centre that belongs to the Lombardy Energy CleanTech Cluster, and to listen to a very comprehensive presentation by the Director of the Cluster.

Smart Skills

The fifth training workshop (TW) covers a wide of range of theoretical and empirical issues related to skills and technical change and their policy issues.The first part of TW is focused on the analysis of effort on how to identify skills requirements and design skill formation in advanced economy. The second part continued with exploring national framework related to skill requirements and skill formation. Key focus of this TW is exploring various aspects of skills' policy (designing and implementing) and related labour policy in Croatia. Special focus was devoted to smart industrial specialisation and attempts of digital transformation in Croatia.

Evaluations of Innovation Policies

This two days training workshop is devoted to the evaluation of innovation policies. Day one is more suited to policy makers, but can also be very interesting for economic researchers and advanced students. Various methods (quantitative and qualitative) used in program evaluations are presented. Examples of some of those methods applied to concrete evaluations of R&D tax incentives and R&D subsidies in various countriesare given. Day two is more suited to scholars. This part kicks off with a short introduction of econometric methods for program evaluations and continues with presentations of researchers and students of their own work for formal and informal discussions.

Global Value Chain, including FDI

This three days training workshop is focused on GVC. The key consideration is how much value is captured by the country in terms of jobs, income, technology diffusion and sustainable development. Then, the focus is on the ability of a country to participate in global trade and benefit from the transfers that will generate growth and development and that is partially due to its ability to join GVCs. This fact is linked to competitiveness that is not measured in terms of a country's capacity to develop an integrated industry, but in its capacity to identify its best position in GVCs. All these aspects are inserted into the context of RIS3 and Digital Transformation through four main characteristics of RIS3 industry: vertical networking of smart production systems, horizontal integration via a new generation of global value chain networks, through-engineering across the entire value chain and the impact of exponential technologies.

Science – Industry link

The Science-Industry link training workshop, organized at UNU-MERIT in Maastricht (the Netherlands), is divided into three parts. The first part focuseson academic lectures related to relevant topics of science industry linkages and innovation performance, and how it differs between sectors and industries. There is room for researchers to present and discuss research ideas and work in progress, related to relevant topics. The second main part is more of a policy oriented focused, where policy makers from the Netherlands as well as Brussels are invited to present topics related to their work.Also, current topics are discussed at a round table. The third part, interlinked with the policy part, is of industry itself, where representatives from industry in the area and science parks are invited to join, both with presentations and to join in the discussion.

Entrepreneurship & Knowledge Based Economy

A three-days' training workshop on 'Entrepreneurship and knowledge-based economy' that aims to cover the state of the art research in this field, starting from defining the concept of entrepreneurship and its measures; looking at its role for economic growth; entrepreneurial eco-system; and discussing the topics of strategic entrepreneurship; social entrepreneurship; and public policy towards developing entrepreneurship and knowledge-based economy. A separate session is focused on the introduction to Global Entrepreneurship Monitor data, commonly employed in undertaking research on entrepreneurship. The panel discussion of the policy challenges in the field of entrepreneurship and knowledge-based economy follows up, bringing together academics, policy-makers, representatives of think tanks and international organisations. The final day of the session focuses on bringing together EIZ-Smart consortium researchers to discuss current work and potential research ideas to be seen as potential research agenda for EIZ researchers to explore on future.

TRAINING SCHOOL ON METHODS FOR SCIENCE, TECHNOLOGY AND INNOVATION DATA ANALYSIS

Training School on Methods for Science, Technology and Innovation Data Analysis was organised by EIZ and Bocconi University (ICRIOS). 27 researchers coming from 10 institutions participated in four-day training school. It was focused around four main topics:

- the development of questionnaires and surveys
- network analysis
- limited dependent variables and panel data analysis
- management of Big Data

VISITING TRAINING SESSIONS

Firm Level Data Analysis

The interactive training sessions isdesigned to boost individual participants' research on innovation and/or firm performance using firm level data as well as to address the problems encountered in their current research projects and to develop –individually and in group sessions – ideas for future research based on firm level evidence. The course includes lectures on 'Measuring innovation at the micro level'; 'The use of econometrics to link innovation and firm performance'; and 'The use of firm level data for impact evaluation of innovation policies'. Participants are given opportunity to presentand discuss their research projects or plans as well as to meet and interact individually.

Developing questionnaires/surveys and Household level survey data analysis

The nuts and bolts of survey design and implementation

This is an intermediate mini-course (3 one-hour lectures plus 2 one and a half hour workshops) that builds on the lecture on survey research and questionnaire design that was part of Training school. This VTS is of interest to researchers/students who plan to conduct a survey or who frequently use surveys. The lectures and workshops provide detailed instructions on how to design and implement a survey, from initial preparation to data editing. Workshop on cognitive testing is of interest to people who conduct or plan to conduct interviews.

Applied Workshop: Surveys and Satellites

In this mini-workshop simple methods to illustrate and analyse geographic information in household survey datageographicare discussed. Almost all household surveys cover at least some basic geographic variables such as the area of residence, which are rarely explicitly analysed in economic research. Yet, geographic variables can contain powerful information. Besides that, geographic information allows the researcher to append external data that describe the environment in which our units of analysis are embedded. The course gives a first introduction on how you can use geographic information for your research. The aim of the workshop is to answer a research question based on the merged geographical data.

Panel Data Analysis

A panel dataset contains observations on multiple entities (individuals, states, companies…), where each entity is observed at two or more points in time. The idea is that with panel data we can control for factors that vary across entities but do not vary over time, for factors that could cause omitted variable bias if they are omitted, and finally for factors that are unobserved or unmeasured – and therefore cannot be included in the regression using multiple regression. In particular the basic intuition being the panel is that if an omitted variable does not change over time, then any changes in the dependent variable over-time cannot be caused by the omitted variable. In order to fully appreciate the theoretical and econometrics

underpinnings of such technique the VTS develops a fully-fledged module starting form a description of databases in panel form, to FE vs. RE estimations and finally into dynamic panel data.

Multilevel Modelling

The visiting training session on 'Multilevel modelling' will introduce the key concepts and methodology of multilevel modelling. It will also illustrate various applications of ML modelling in empirical research, using STATA software. Multilevel modelling takes account of the fact that the dataset has a hierarchical structure in which in this specific example individuals represent level one and country-year samples represent level two. In other words, it allows controlling for clustering of the data within a country-year subsample. The module gives an overview of structures that underlie multilevel modelling, using various examples to show a range of population structures where multilevel modelling is useful, and often necessary. It further introduces EIZ research staff to the basics of multilevel modelling of continuous responses using random intercept and random slope models and models for longitudinal and panel data, and it will conclude with the discussion of multilevel modelling of categorical responses, focusing in particular on binary or dichotomous responses, and within this extending the application of ML modelling to models that account for a selection bias problem.

Bibliometric and Patent Analysis

This VTS is focused on patents and data repositories. It gives the opportunity of understanding and deepening practical knowledge (through exercises) of: different types of databases and their characteristics, patent data with a focus on patent database for business intelligence, patent data analysis examples (in Adriatic area and Italian patenting from 1978), some patent indicators and how to get them, bibliometric data (Wos, Scopus etc.), trademarks, matches across database (in particular matching PATSTAT and crunchbase), concordance schemes with reclassification of tech and scientific classes and advanced patent data such as PATSTAT. The second part concerns several repositories such as RISIS, Harvard dataverse, Re3data / DATACITE and a comparison in order to identify pros and cons.

Big Data and Network Analysis

This VTS is focused on the techniques used in order to work with big data within the R environment such us manipulating, analysing and visualizing big data structures. After a brief introduction to databases, the VTS deals with how connecting with them through R and tools provided in the tidyverse (dplyr and tidyr). The second part is dedicated to distributed infrastructure and distributed systems, such as Spark and Hadoop and how to deal with them through the tools provided by R. Finally, this VTSis focused on the sparkML libraries for out of memory data modelling and ad hoc techniques for big data visualization.

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