

ISCCRO'18

Book of Abstracts

of the ISCCRO -
International Statistical Conference in Croatia

Opatija, Croatia, 10-11 May 2018

CONFERENCE TOPIC:

*„New Advances in Statistical Methods Applications for
a Better World “*

Vol. 2, No. 1



HRVATSKO STATISTIČKO DRUŠTVO
CROATIAN STATISTICAL ASSOCIATION

Print ISSN 1849-9864, Online ISSN 2584-3850
Zagreb, 2018

BOOK OF ABSTRACTS

of the ISCCRO -
International Statistical Conference in Croatia

The logo for ISCCRO'18 features a stylized bar chart with three vertical bars of increasing height (red, blue, red) to the left of the text 'ISCCRO'18' in a bold, blue, sans-serif font.

The Second International Statistical Conference in Croatia, 10-11 May 2018,
Opatija, Croatia
Conference topic:
“New Advances in Statistical Methods Applications for a Better World”

Vol. 2, No. 1

Editors-in-Chief:

Ksenija Dumičić, Nataša Erjavec, Mirjana Pejić Bach, Berislav Žmuk

Print ISSN 1849-9864
Online ISSN 2584-3850



Zagreb, 2018

Impressum

Book of Abstracts of the ISCCRO – International Statistical Conference in Croatia

-

ISCCRO'18: The Second International Statistical Conference in Croatia, Opatija, Croatia, 10-11 May 2018
Conference topic: "New Advances in Statistical Methods Applications for a Better World "

EDITORS-IN-CHIEF

Ksenija Dumičić, Nataša Erjavec, Mirjana Pejić Bach, Berislav Žmuk

PUBLISHER

Croatian Statistical Association (CSA) / Hrvatsko statističko društvo (HSD)

Ilica 3, HR-10000 Zagreb, Croatia

www.hsd-stat.hr

PUBLISHING EDITOR: Berislav Žmuk

ISCCRO'18 LOGO DESIGNER: Žarko Dumičić

PRINT: Recom d.o.o., Kamenarka 31, HR-10010 Zagreb, www.recom.hr

ORGANIZER OF THE ISCCRO'18 CONFERENCE

The International Statistical Conference in Croatia (**The Second ISCCRO'18**) has been organised by *Croatian Statistical Association*

The ISCCRO'18 General Chair: Marko Kristof, Vice-President, Croatian Statistical Association & Director General at Croatian Bureau of Statistics, Zagreb, Croatia

The ISCCRO'18 Conference Program Chair: Ksenija Dumičić, President, Croatian Statistical Association & Univ. of Zagreb, Faculty of Economics and Business, Dept. of Statistics, Zagreb, Croatia

PATRONAGE OF THE ISCCRO'18

The ISCCRO'18 Conference has been organised under the **patronage** of the *Ministry of Science and Education of the Republic of Croatia*.

ISCCRO'18 Supporters: *Croatian Bureau of Statistics (CBS); Croatian Biometric Society (HBMD)*.

ISCCRO'18 Sponsors: *University of Zagreb Faculty of Economics and Business; Ipsos d.o.o, Zagreb.*

ISCCRO'18 Conference Web Site: http://www.hsd-stat.hr/en/isccro_en/

Abbreviation: Book abstr. ISCCRO - Int. Stat. Conf. Croat.

Print ISSN 1849-9864

Online ISSN 2584-3850

Focus and Scope of the ISCCRO Conference

The ISCCRO - International Statistical Conference in Croatia is a scientific event in the area of statistics organized for the first time by the *Croatian Statistical Association (CSA)* in 2016 (ISCCRO'16) in Zagreb, Croatia. It became a biannual event important not only for Croatia, but also internationally, attracting scientists and professionals in statistics and related fields from many countries. Invited people gather both data producers and data users, scientists and professionals, educators and students. One should attend this international conference because of the range of theoretical and practical statistical topics, discussed by wider audience, which makes this conference unique in Croatia. Therefore, the conference ISCCRO has been the best place for sharing and exchanging information and building networks, for both domestic and international statisticians, where each learns from the other.

The Second International Statistical Conference in Croatia - ISCCRO'18, with the topic: **"New Advances in Statistical Methods Applications for a Better World"**, was held from the 10th to the 11th May 2018 in Opatija, Croatia. The conference, covering statistical and related cross and multi-disciplinary fields, topics and areas, provides a platform for international networking and exchange of ideas on various aspects of theory and applications of statistics and related professional and scientific areas.

At the ISCCRO'18 in Opatija 188 authors, coming from 19 countries and Croatia, gave 100 submissions for presentation, half of them as Abstract Only and half of them as Full Papers, split in a variety of sessions in two parallel lines during two conference days of presentations, four of them being Invited Lectures. *Croatian Statistical Association* co-organized five Special Sessions, as follows: *Spreading out Official Statistics in the Digital World*, organized by Maja Pekeč from Croatian Bureau of Statistics; *Econometric Modelling for Fiscal Policy Making in European Union Countries*, chaired by Assistant Professor Irena Palić, PhD, University of Zagreb, Faculty of Economics and Business, Zagreb, Croatia; *Economic and Social Effects of Demographic Trends*, chaired by Professor Ana Štambuk, PhD, University of Rijeka, Faculty of Economics, Rijeka, Croatia; *Modern Techniques for Handling Large Spatial Data*, organized by Professor Taps Maiti, PhD, Michigan State University, East Lansing, Michigan, USA & Croatian Statistical Association; and *Quantitative Analysis for Faster Development of the South East European Countries*, organized by Associate Professor Blagica Novkowska, PhD, from University of Tourism and Management in Skopje, Republic of Macedonia. Croatian Statistical Association organized the Special Session *Young Statisticians in Action*, too.

The conference hosted the authors from Austria, Belgium, Bosnia and Herzegovina, Croatia, France, Germany, Hungary, Italy, Luxembourg, Netherlands, Republic of Macedonia, Russian Federation, Poland, Serbia, Slovakia, Slovenia, South Africa, Sweden, Ukraine, United Kingdom and USA.

The *Book of Abstracts of the ISCCRO – International Statistical Conference in Croatia* (Online ISSN 2584-3850; Print ISSN 1849-9864), contains four Plenary Speech abstracts and 96 contributed abstracts of the talks presented at the ISCCRO'18 Conference. Besides that, the *Proceedings of the ISCCRO - International Statistical Conference in Croatia*, published after The Second ISCCRO'18, held in Opatija, Croatia, 10-11 May 2018, Volume 2, No. 1, 2018, Electronical ISSN: 1849-9872, includes 24 selected double-blind peer reviewed conference papers.

The International Scientific Program Committee, which is the Editorial Board of the ISCCRO'18, includes 118 scientists and professionals, from all over the World, 60% of them being from outside of Croatia. The ISCCRO'18 International Organizing Committee is comprised of the statisticians from four countries: Croatia, Serbia, Republic of Macedonia and Slovenia, which is the proof of the international importance of the ISCCRO conference.

International Scientific Program Committee and Editorial Board Members:

Mirta Benšić, J. J. Strossmayer Univ. of Osijek, Dept. of Mathematics, Unit for Probability and Mathematical Statistics, Osijek, Croatia – **Chair**

Maja Biljan August, Univ. of Rijeka, Faculty of Economics, Dept. of Statistics, Rijeka, Croatia – **Chair**

Lea Bregar, Univ. of Ljubljana, Faculty of Economics, Ljubljana, Slovenia – **Chair**

Ksenija Dumičić, Univ. of Zagreb, Faculty of Economics and Business, Dept. of Statistics, Zagreb, Croatia – **Chair**

Nataša Erjavec, Univ. of Zagreb, Faculty of Economics and Business, Dept. of Statistics, Zagreb, Croatia – **Chair**

Anamarija Jazbec, Univ. of Zagreb, Faculty of Forestry, Dept. for Forest Inventory and Management, Zagreb, Croatia – **Chair**

Zagorka Lozanov-Crvenković, Univ. of Novi Sad, Faculty of Science, Dept. of Mathematics and Informatics, Novi Sad, Serbia – **Chair**

Blagica Novkowska, Univ. of Tourism and Management in Skopje, Faculty of Economics, Skopje, R. of Macedonia – **Chair**

Snježana Pivac, Univ. of Split, Faculty of Economics, Dept. for Quantitative Methods, Split, Croatia – **Chair**

Josip Arnerić, Univ. of Zagreb, Faculty of Economics and Business, Dept. of Statistics, Zagreb, Croatia

Petar Atanasov, Ss. Cyril and Methodius Univ., Faculty of Sociology, Skopje, R. of Macedonia

Dragan Bagić, Univ. of Zagreb, Faculty of Humanities and Social Sciences, Dept. of Sociology, Zagreb, Croatia

Vlasta Bahovec, Univ. of Zagreb, Faculty of Economics and Business, Dept. of Statistics, Zagreb, Croatia

Tea Baldigara, Univ. of Rijeka, Faculty of Tourism and Hospitality Management, Dept. of Quantitative Economics, Opatija, Croatia

Bojan Basrak, Univ. of Zagreb, Faculty of Science, Dept. of Mathematics, Zagreb, Croatia
Mojca Bavdaž, Univ. of Ljubljana, Faculty of Economics, Academic Unit for Mathematics, Statistics and Operations Research, Ljubljana, Slovenia
Emira Bečić, Croatian Bureau of Statistics, Zagreb, Croatia
Predrag Bejaković, Institute of Public Finance, Zagreb, Croatia
Lynne Billard, Univ. of Georgia, Dept. of Statistics, Athens, Georgia, USA
Penelope Bidgood, Fac. of Science, Engineering and Computing, Kingston Univ. London, London, UK
Andrej Blejec, Univ. of Ljubljana, Biotechnical Faculty & National Institute of Biology, Ljubljana, Slovenia
Srđan Bogosavljević, Univ. of Belgrade, Faculty of Economics, Belgrade, Serbia
Vesna Bucevska, Ss. Cyril and Methodius Univ. Faculty of Economics, Dept. of Mathematics and Statistics, Skopje, R. of Macedonia
Jozef Bushati, Luigj Gurakuqi Univ. of Shkodra, Dept. of Mathematics, Statistics and Applied Informatics, Shkodra, Albania
Vesna Buško, Univ. of Zagreb, Faculty of Humanities and Social Sciences, Dept. of Psychology, Zagreb, Croatia
James J. Cochran, Univ. of Alabama, Dept. of Information Systems, Statistics, and Management Science, Tuscaloosa, Alabama, USA
Vesna Čančer, Univ. of Maribor, Faculty for Economics and Business, Maribor, Slovenia
Anita Čeh Časni, Univ. of Zagreb, Faculty of Economics and Business, Dept. of Statistics, Zagreb, Croatia
Draženka Čizmić, Univ. of Zagreb, Faculty of Economics and Business, Dept. of Statistics, Zagreb, Croatia
Mirjana Čižmešija, Univ. of Zagreb, Faculty of Economics and Business, Dept. of Statistics, Zagreb, Croatia
Marc-Arthur Diaye, Univ. of Evry Ile de France, Dept. of Economics, Evry Ile de France, France
Somnath Datta, Dept. of Biostatistics Univ. of Florida, Gainesville, Florida, USA
Susmita Datta, Dept. of Biostatistics Univ. of Florida, Gainesville, Florida, USA
Luca Di Gennaro Splendore, Statistical Consultant of European Union, European Union Election Observation Missions (EUEOM)
Adela Delalić, Univ. of Sarajevo, School of Economics and Business, Dept. of Quantitative Methods, Sarajevo, Bosnia and Herzegovina
Jasminka Dobša, Univ. of Zagreb, Faculty of Organisation and Informatics, Varaždin, Croatia
Samo Drobne, Univ. of Ljubljana, Faculty of Civil and Geodetic Engineering, Ljubljana, Slovenia
Fatih Destović, Univ. of Sarajevo, Faculty of Pedagogy Sarajevo, Bosnia and Herzegovina
Rajeev Dwivedi, Institute of Management Technology, Ghaziabad, India
Senad Fazlović, Univ. of Tuzla, Faculty of Economics, Tuzla, Bosnia and Herzegovina
Anuška Ferligoj, Univ. of Ljubljana, Faculty of Social Sciences, Ljubljana, Slovenia
Florin Fesnic, Univ. Babeş-Bolyai Cluj & Univ. of Illinois at Urbana-Champaign, Cluj County, Romania
Nancy Flournoy, Univ. of Missouri-Columbia, Dept. of Statistics, Columbia, Missouri, USA
Herwig Friedl, Graz Univ. of Technology, Graz, Austria
Davor Galinec, Croatian National Bank, Zagreb, Croatia
Jakov Gelo, Prof. Emeritus, Univ. of Zagreb, Faculty of Economics and Business, Dept. of Demographics, Zagreb, Croatia
Tom Gillpatrick, Portland State Univ. School of Business Administration, Portland, Oregon, USA
Amanda L. Golbeck, Univ. of Arkansas for Medical Sciences, Fay W. Boozman College of Public Health, Little Rock, Arkansas, USA
Sabina Hodžić, Univ. of Rijeka, Faculty of Tourism and Hospitality Management, Dept. of Public Finance, Opatija, Croatia
Jasna Horvat, J. J. Strossmayer Univ. of Osijek, Faculty of Economics, Dept. of Quantitative Methods and Informatics, Osijek, Croatia
Chen Hua, Shanghai Univ. of International Business and Economics, Dept. of International Economics, Shanghai, China
Miljenko Huzak, Univ. of Zagreb, Faculty of Science, Dept. of Mathematics, Zagreb, Croatia
Saša Jakšić, Univ. of Zagreb, Faculty of Economics and Business, Dept. of Statistics, Zagreb, Croatia
Hrvoje Jošić, Univ. of Zagreb, Faculty of Economics and Business, Dept. of Economic Theory, Zagreb, Croatia
Dubravka Jurlina Alibegović, The Inst. of Economics, Zagreb, Croatia
Djordje M. Kadijevich, Institute for Educational Research, Belgrade, Serbia
Gindra Kasnauskienė, Vilnius Univ., Faculty of Economics, Dept. of Quantitative Methods and Modeling, Vilnius, Lithuania
Sasho Kjosev, Univ. "Ss. Cyril and Methodius", Skopje, R. of Macedonia & President and Chairman of the Board of Directors, Association for Regional Development Balkan Economic Forum
Milorad S. Kovacevic, Chief Statistician, United Nations Development Programme, New York City, New York, USA
Péter Kovács, Univ. of Szeged, Faculty of Economics and Business Administration, Dept. of Statistics and Demography, Szeged, Hungary
Miladin G. Kovačević, Director General of the Republican Bureau of Statistics of Serbia, and Faculty of Economics, Belgrade, Serbia
Maria Králová, Masaryk Univ., Faculty of Economics and Administration, Dept. of Applied Mathematics and Computer Science, Brno, Czech Republic
Marko Krištof, Croatian Bureau of Statistics, Zagreb, Croatia
Mirjana Kujundžić Tiljak, Univ. of Zagreb, School of Medicine, Andrija Stampar School of Public Health, Zagreb, Croatia
Nataša Kurnoga, Univ. of Zagreb, Faculty of Economics and Business, Dept. of Statistics, Zagreb, Croatia
Éva Laczka, Hungarian Central Statistical Office (President of the Hungarian Statistical Association), Budapest, Hungary
Peter Laimer, Statistics Austria, Directorate Spatial Statistics – Tourism, Motor Vehicles, Road Safety, Vienna, Austria
Anita Lee-Post, Univ. of Kentucky, School of Management, Decision Science and Information Systems Area, Lexington, Kentucky, USA
Goran Lešaja, Georgia Southern Univ. College of Science and Mathematics, Dept. of Mathematical Science, Georgia, USA

Michael Loupis, Univ. of Applied Sciences of Central Greece, Lamia, Greece

Justyna Majewska, Univ. of Economics in Katowice, Dept. of Demography and Economic Statistics, Katowice, Poland

Aleksandra Marcikić, Univ. of Novi Sad, Faculty of Economics Subotica, Dept. of Business Informatics and Quantitative Methods, Novi Sad, Serbia

Suzana Marković, Univ. of Rijeka, Faculty of Tourism and Hospitality Management, Dept. of Quantitative Economics, Opatija, Croatia

Maja Meško, Univ. of Primorska, Faculty for Management, Koper, Slovenia

Josipa Mijoč, J. J. Strossmayer Univ. of Osijek, Faculty of Economics, Dept. of Quantitative Methods and Informatics, Osijek, Croatia

Andrija Mihoci, Brandenburg Univ. of Technology Cottbus-Senftenberg Humboldt-Univ. of Berlin, Berlin Area, Germany

Craig A. Molgaard, Univ. of Arkansas for Medical Sciences, Fay W. Boozman College of Public Health, Little Rock, Arkansas, USA

Srđan Mrkić, United Nations Statistics Division (UNSD), New York City, New York, USA

Danijel Nestić, The Inst. of Economics, Zagreb, Croatia

Emilija Nikolić Đorić, Univ. of Novi Sad, Faculty of Agriculture, Novi Sad, Serbia

Irena Ogriješek, Univ. of Ljubljana, Faculty of Economics, Academic Unit for Mathematics, Statistics and Operations Research, Ljubljana, Slovenia

Irena Palić, Univ. of Zagreb, Faculty of Economics and Business, Dept. of Statistics, Zagreb, Croatia

Mirjana Pejić Bach, Univ. of Zagreb, Faculty of Economics and Business, Dept. of Informatics, Zagreb, Croatia

Sanja Peković, Univ. of Montenegro, Podgorica, Montenegro

Tunjo Perić, Univ. of Zagreb, Faculty of Economics and Business, Dept. of Mathematics, Zagreb, Croatia

Lei Ping, Shanghai Univ. of International Business and Economics, Dept. of International Business, School of Business, Shanghai, China

Judit Poór, Univ. of Pannonia, Georgikon Faculty, Dept. of Economic Methodology, Keszthely, Hungary

Lovrenc Pfajfar, Univ. of Ljubljana, Faculty of Economics, Ljubljana, Slovenia

Božidar V. Popović, Univ. of Montenegro, Faculty of Science and Mathematics, Podgorica, Montenegro

Yichen Qin, Univ. of Cincinnati, Carl H. Lindner College of Business, Dept. of Operations, Business, Analytics and Information Systems, Ohio, USA

Željko Račić, Univ. of Banja Luka, Faculty of Economics, R. of Srpska, Banja Luka, Bosnia and Herzegovina

Gábor Rappai, Univ. of Pécs, Institute of Business Methodologies, Pécs, Hungary

Emina Resić, Univ. of Sarajevo, School of Economics and Business, Dept. for Quantitative Economics, Sarajevo, Bosnia and Herzegovina

Sead Rešić, Univ. of Tuzla, Faculty of Science and Mathematics, Tuzla, Bosnia and Herzegovina

Jože Rován, Univ. of Ljubljana, Faculty of Economics, Ljubljana, Slovenia

Ante Rozga, Univ. of Split, Faculty of Economics, Dept. for Quantitative Methods, Split, Croatia

Tamás Rudas, Center for Social Sciences, Hungarian Academy of Sciences and Eötvös Loránd Univ., Budapest, Hungary

Jasmina Selimović, Univ. of Sarajevo, School of Economics and Business, Dept. for Quantitative Economics, & Dept. of Finance, Sarajevo, Bosnia and Herzegovina

Rabija Somun-Kapatanović, Univ. of Sarajevo, School of Economics and Business, Dept. for Quantitative Economics, Sarajevo, Bosnia and Herzegovina

Zdenko Sonicki, Univ. of Zagreb, School of Medicine, Andrija Stampar School of Public Health, Zagreb, Croatia & President of Croatian Biometric Society, Croatia

Petar Sorić, Univ. of Zagreb, Faculty of Economics and Business, Dept. of Statistics, Zagreb, Croatia

Janez Stare, Univ. of Ljubljana, Faculty of Medicine, Dept. of Biomedical Informatics, Ljubljana, Slovenia & Institute of Biomedical Informatics, Ljubljana, Slovenia

Stevan R. Stević, Univ. of East Sarajevo, Faculty of Economics Brcko, Bosnia and Herzegovina

Željko Šain, Univ. of Sarajevo, School of Economics and Business, Dept. for Quantitative Economics & Dept. of Finance, Sarajevo, Bosnia and Herzegovina

Ensar Šehić, Univ. of Sarajevo, School of Economics and Business, Dept. for Quantitative Economics, Sarajevo, Bosnia and Herzegovina

Ana Štambuk, Univ. of Rijeka, Faculty of Economics, Dept. for Statistics, Rijeka, Croatia

Nenad Šuvak, J. J. Strossmayer Univ. of Osijek, Dept. of Mathematics, Unit for Probability and Mathematical Statistics, Osijek, Croatia

Josip Tica, Univ. of Zagreb, Faculty of Economics and Business, Dept. of Macroeconomics and Economic Development, Zagreb, Croatia

Orsolya Tóth, Research Institute of Agricultural Economics, Rural Development Policy Dept., Budapest, Hungary

Grażyna Trzpiot, Univ. of Economics in Katowice, Dept. of Demography and Economic Statistics, Katowice, Poland

João Varajã, Univ. of Trás-os-Montes and Alto Douro, Trás-os-Montes and Alto Douro, Portugal

Emir Veleđar, Florida International Univ. Robert Stempel College of Public Health and Social Work, Dept. of Biostatistics, Miami, Florida, USA

Maruška Vizek, The Inst. of Economics, Zagreb, Croatia

Lidija Zadnik- Stirn, Univ. of Ljubljana, Biotechnical Faculty, Ljubljana, Slovenia

Sejfudin Zahirović, Univ. of Tuzla, Faculty of Economics, Tuzla, Bosnia and Herzegovina

Davor Zoričić, Univ. of Zagreb, Faculty of Economics and Business, Dept. of Managerial Economics, Zagreb, Croatia
Janez Žerovnik, Univ. of Ljubljana, Institute of Mathematics, Physics and Mechanics & Faculty for Mechanical Engineering, Ljubljana, Slovenia
Saša Žiković, Univ. of Rijeka, Faculty of Economics, Dept. for Finance and Banking, Rijeka, Croatia
Berislav Žmuk, Univ. of Zagreb, Faculty of Economics and Business, Dept. of Statistics, Zagreb, Croatia

International Organizing Committee Members:

Davor Galinec, Croatian National Bank, Croatia – Chair
Sabina Hodžić, Univ. of Rijeka, Croatia – Chair
Tea Baldigara, Univ. of Rijeka, Croatia – Chair
Ana Štambuk, Univ. of Rijeka, Croatia – Chair
Anamarija Jazbec, Univ. of Zagreb, Croatia – Chair
Ksenija Dumičić, Univ. of Zagreb, Croatia – Chair
Lea Bregar, Univ. of Ljubljana, Slovenia – Chair
Zagorka Lozanov-Crvenković, Univ. of Novi Sad, Serbia – Chair
Blagica Novkovska, Univ. of Tourism and Management in Skopje, R. of Macedonia – Chair
Dubravka Rogić-Hadžalić, Croatian Bureau of Statistics, Croatia
Jasna Pugar, Croatian Bureau of Statistics, Croatia
Mario Gavrić, Croatian Bureau of Statistics, Croatia
Nino Mrša, Croatian Bureau of Statistics, Croatia
Maja Pekeč, Croatian Bureau of Statistics, Croatia
Nataša Kurnoga, Univ. of Zagreb, Croatia
Nenad Šuvak, J. J. Strossmayer Univ. of Osijek, Croatia
Anita Čeh Časni, Univ. of Zagreb, Croatia
Saša Jakšić, Univ. of Zagreb, Croatia
Hrvoje Jošić, Univ. of Zagreb, Croatia
Irena Palić, Univ. of Zagreb, Croatia
Petar Sorić, Univ. of Zagreb, Croatia
Davor Zoričić, Univ. of Zagreb, Croatia
Berislav Žmuk, Univ. of Zagreb, Croatia
Tea Poklepović, Univ. of Split, Croatia
Danijel Grahovac, J.J. Strossmayer Univ. of Osijek, Croatia
Ema Kelin, Univ. of Rijeka, Croatia
Ivana Lolić, Univ. of Zagreb, Croatia
Zrinka Lovretin Golubić, Univ. of Zagreb, Croatia
Maja Mamula, Univ. of Rijeka, Croatia
Ana Pavković, Univ. of Zagreb, Croatia
Ivan Papić, J.J. Strossmayer Univ. of Osijek, Croatia
Jasmina Pivar, Univ. of Zagreb, Croatia
Matea Bogdanić, Univ. of Zagreb, Graduate Student, Croatia
Marta Cota, Univ. of Zagreb, Graduate Student, Croatia
Matea Pavić, Univ. of Zagreb, Graduate Student, Croatia
Ante Šterc, Univ. of Zagreb, Graduate Student, Croatia

Contents

	Page
<i>Adela Delalić, Rabija Somun Kapetanović, Emina Resić</i> Analysis of poverty determinants in Bosnia and Herzegovina	1
<i>Alen Mrgud, Ivona Bulić</i> Dissemination of statistical data via website as the main channel of online communication	2
<i>Aleš Toman</i> Improving statistical and financial literacy through a high school competition – experience from Slovenia	3
<i>Almira Arnaut-Berilo, Tea Baldigara</i> Applying linear programming in optimizing food consumption: a comparative analysis of Bosnia & Herzegovina and Croatia	4
<i>Amanda L. Golbeck</i> Ingram Olkin: a vocal advocate for women in statistics	5
<i>Ana Andabaka, Martina Basarac Sertić, Martina Harc</i> Eco-innovation and economic growth in the European Union: a panel data analysis	6
<i>Ana Bilandžić</i> Modelling growth of small and medium sized enterprises in Croatia using panel analysis	7
<i>Ana Pavković, Nikolina Pejović, Petra Palić</i> A revisit to the determinants of immigration in the European Union: evidence from count panel data models	8
<i>Ana Slavec, Barbara Rovere, Uwe Kies, Andreas Kleinschmit</i> Exploring connections between researchers and ideas in the European Hardwoods Innovation Alliance using two-mode network analysis	9
<i>Ana Štambuk, Goran Karanović, Alen Host</i> Business and economics graduate competencies: employers' perceptions on importance and performance	10
<i>Anamarija Jazbec, Svjetlana Kolić-Vehovec, Tamara Sladoljev-Agejev</i> Analyzing different regression methods: the case of predicting text comprehension	11
<i>Andrea Andrejević Panić, Zagorka Lozanov-Crvenković</i> Analysis of interrelation between financial and performance indicators in higher education in Central East Europe	12
<i>Andrej Srakar</i> Modelling discrete transitions in labour status using epidemiological models: an application to SHARE data	13

<i>Andrej Srakar</i> Symbolic input-output analysis: an application to the Eurostat data	14
<i>Anita Čeh Časni</i> The housing wealth effect before and after the 2008 financial crisis: PVAR approach	15
<i>Anita Lee-Post</i> Clustering of high dimensional and unbalanced data	16
<i>Antonija Buljan, Hrvoje Šimović, Milan Deskar-Škrbić</i> Public expenditure efficiency in CESEE region	17
<i>Berislav Žmuk</i> Impact of the number of shown questions on response rates in business web surveys	18
<i>Biljana Tashevska, Marija Trpkova-Nestorovska, Borce Trenovski</i> Estimating a fiscal reaction function for the South East European countries	19
<i>Craig A. Molgaard</i> Factors in the diffusion of Islamic mathematics in the Mediterranean	20
<i>Damir Plesac, Lidija Gligorova, Dubravka Rogić-Hadžalić</i> Census quality control: performance, lessons learned and directions for the next Post Enumeration Survey in Croatia	21
<i>Dániel Kehl, Gallusz Abaliget, András Gyimesi</i> Automated data collection of sports data with R	22
<i>Daria Maltseva</i> Network researchers in Russia: collaboration and scientific citation	23
<i>Darja Boršič, Jani Bekő</i> A note about the validity of purchasing power parity in selected Asian economies	24
<i>Darko Šiško, Vesna Polančec, Sanja Jerković</i> Challenges in organization of city statistics – case study Zagreb	25
<i>David Bolin</i> The SPDE approach for Gaussian random fields with general smoothness	26
<i>Davor Galinec, Jadranka Vuglar, Dario Cvrtila</i> Residential property price index in Croatia: from experimental to official statistics	27
<i>Denis Dolinar, Davor Zoričić, Zrinka Lovretin Golubić</i> Application of semi-deviation as a proxy for the expected return estimation in the Croatian equity market	28
<i>Denis Dolinar, Ena Pecina, Saša Jakšić</i> Applied panel data analysis in the field of corporate finance – Analysis of stock returns and capital structure of Croatian companies	29

<i>Denis Dolinar, Tihana Škrinjarić, Davor Zoričić</i> Application of Luenberger shortage function on the Zagreb Stock Exchange: analysis of efficient market portfolio	30
<i>Diana Ivett Fűrész</i> Network of transfers in European football	31
<i>Djordje M. Kadijevich</i> Challenging key activities in data modelling with interactive charts	32
<i>Doris Schadler, Ernst Stadlober</i> Model based methods for fault diagnostics at engine test beds	33
<i>Dušan Mundar</i> Sensitivity analysis of population structure dynamics: the case of Croatia	34
<i>Enes Dozović</i> Industry level real effective exchange rates: evidence from Croatia and other European Union countries	35
<i>Éva Laczka</i> Role of economic statistics in the 21st century	36
<i>Ewa Anna Witkowska</i> Detecting earnings management with discretionary accruals	37
<i>Fahir Kanlić, Ademir Abdić</i> The short-term turnover estimates in Bosnia and Herzegovina based on the Value Added Tax data	38
<i>Gàbor Rappai, Diána Ivett Fűrész</i> Special demand curves in the sports economy	39
<i>Gary Sharp, Carmen Stindt, Michelle Mey, Willem Daniel Schutte</i> Goodness-of-fit compilation in structural equation modelling	40
<i>Gloria Gheno</i> A new link function for the prediction of binary variables	41
<i>Gloria Gheno</i> A new statistical method to choose the best innovative initiatives	42
<i>Hrvoje Jošić, Berislav Žmuk, Ksenija Dumičić</i> Measuring of export market concentration for largest European regional economic integrations: various concentration measures performance	43
<i>Igor Britchenko, Maksym Bezpartochnyi</i> Optimization of commodity stocks the enterprise by means of statistical methods	44
<i>Irena Palić, Sabina Hodžić, Ksenija Dumičić</i>	

The impact of selected labour market indicators on personal income taxation in Federation of Bosnia and Herzegovina: evidence from error correction model	45
<i>Irena Žaucer, Helena Puc</i>	
Impact of land tenure on the participation in factor income in agriculture of Slovenia	46
<i>Ivan Čipin, Mario Brnić</i>	
Demographic and socio-economic profile of the oldest-old in Croatia	47
<i>Ivan Papić</i>	
Simulation study of parameter estimators for Fisher-Snedecor diffusion	48
<i>Ivan Sever, Miroslav Verbič, Zrinka Marušić</i>	
Modelling heterogeneity in trail users' perception of crowding in a peri-urban nature park	49
<i>Ivana Levačić</i>	
A new approach for dealing with multivariate stratification in agricultural surveys in Croatian Bureau of Statistics	50
<i>Ivana Vidaković Peruško, Katarina Kovač, Miroslav Jošić</i>	
Integration in global value chains: case of Croatia	51
<i>Janez Stare</i>	
On generalizing the c index for survival data	52
<i>Janez Žerovnik, Darja Rupnik Poklukar</i>	
On computation of quartiles – the differences among methods do matter!	53
<i>Jasminka Dobša, Henk A. L. Kiers</i>	
Classification of textual documents represented in lower dimensional space by supervised Reduced k-means method	54
<i>Ksenija Dumičić, Ivana Đundek Kokotec, Jelena Gusić</i>	
Business performance and ownership types: evidence from Croatia	55
<i>Lea Bregar</i>	
Modernization of official statistics and implications for users	56
<i>Luca Di Gennaro Splendore</i>	
Electoral observation: experiences from Kenya, Tunisia, Kosovo, Nigeria, Honduras and Peru - implementation, methodological and ethical issues	57
<i>Maja Mamula, Kristina Duvnjak</i>	
Artificial neural networks implementation potentials – a literature review	58
<i>Maja Pekeč, Tihana Sabolek</i>	
Can National Statistical Institutes solely initiate the change in the area of statistical literacy?	59
<i>Maja Rožman, Sonja Treven, Vesna Čančer</i>	
The impact of stress of older employees on their work engagement	60

<i>Marija Gojević</i> Importance of the non-financial sector accounts in the macroeconomic statistics	61
<i>Marija Karašičević, Jelena Suzić</i> Sample coordination of statistical business surveys in Serbia	62
<i>Marija Vukovic, Snjezana Pivac, Duje Kundid</i> Application of the technology acceptance model in the field of Internet banking acceptance in the City of Split	63
<i>Marijana Zekić-Sušac, Rudolf Scitovski, Adela Has</i> Cluster analysis and artificial neural networks in predicting energy efficiency of public buildings as a cost-saving approach	64
<i>Marijana Zunic, Krunoslav Teslak</i> Private forest owners conceptualisation of forest management: a Multiple Indicators and Multiple Causes (MIMIC) model	65
<i>Mario Gavrić</i> Experimental statistics on income inequality and poverty indicators	66
<i>Marko Krištof</i> How European Union legislation changed official statistics? – development of statistical legislation and its influence on statistical systems	67
<i>Marko Senekovič, Jani Beko, Alenka Kavkler</i> Determinants of the size of fiscal multipliers: new empirical evidence for EU countries	68
<i>Markus Loecher</i> Parallelized boosting machine	69
<i>Marta Cota, Ante Šterc</i> Multivariate Gaussian data clustering and its application in macroeconomics	70
<i>Martin Noveski</i> Economic effects of the budget deficit in the Republic of Macedonia: analysis from the view point of its European Union membership aspirations	71
<i>Martina Pezer</i> Maternity support policies: a cluster analysis of 22 European Union countries	72
<i>Matija Klarić</i> Diffusion processes for modeling brain parameters	73
<i>Melinda Tokai</i> Sampling frames construction using the Hidiroglou algorithm	74
<i>Milenka Crnogorac</i> Deficiencies of the concept of the gross domestic product calculation	75

<i>Milica Maricic, Milica Bulajic, Zoran Radojicic, Veljko Jeremic</i> Clustering approach to the Composite I-distance indicator methodology: the case of the Doing Business Index	76
<i>Mirjana Pejić Bach, Jovana Zoroja, Vanja Šimičević</i> Digital readiness for new industrial development: European leaders and followers	77
<i>Mirko Savić, Zorana Lužanin, Milena Kresoja</i> Higher educational policy based on statistical analysis	78
<i>Mirta Benšić, Kristian Sabo, Safet Hamedović</i> The width of a uniform distribution: estimation in additive error models	79
<i>Mojca Bavdaž, Irena Bolko</i> Messages in official statistics visualizations	80
<i>Nataša Kurnoga, Nika Šimurina, Jurica Šimurina</i> Income inequalities in the European Union: a cluster analysis	81
<i>Niels Wesselhöfft, Wolfgang K. Härdle</i> Estimating low-frequency risk measures by high-frequency data	82
<i>Péter Kovács, Eva Kuruczleki, Klara Kazar</i> Let the real world in statistics classes	83
<i>Predrag Bejaković, Slavko Bezeredi</i> Determinants of tax morale in Croatia: an ordered logit model	84
<i>Renata Benda-Prokeinova, Martina Hanova, Johana Paluchova</i> Using the discreet choice model in the questionnaire	85
<i>Rudi Seljak, Lea Bregar, Sanda Colić, Maja Dozet</i> Probabilistic sampling strategy as a means for improving quality of price indexes	86
<i>Samo Drobne, Urška Drešček</i> Analyses of the impact of internal migration on population redistribution in Slovenia	87
<i>Sasho Kjosev, Blagica Novkovska</i> Developing Social Accounting Matrix methodology for regional analysis of the SEE countries	88
<i>Stanislav Moiseev, Daria Maltseva</i> Reconstruction of the research field development: complementarity of the traditional and network approaches	89
<i>Šime Smolić, Lucia Ukalović</i> Patterns of health across age groups of the population 50+ in Croatia	90
<i>Tea Poklepović, Josip Arnerić, Zdravka Aljinović</i> Non-structural approach to implied moments extraction	91

<i>Tihana Škrinjarić, Boško Šego</i> Exploring herding investment behaviour on Zagreb Stock Exchange	92
<i>Una Radojičić</i> Application of Adaptive Annealing method to generalized incremental algorithm	93
<i>Vesna Bucevska, Goran Mojanoski</i> Identifying the determinants that cause the value movements of currencies Denar, Kuna and Dinar	94
<i>Wolfgang K. Härdle, Cathy Yi-Hsuan Chen</i> Data science and digital society	95
<i>Zagorka Lozanov-Crvenković, Emilija Nikolić-Đorić</i> Measures of complexity of stock returns	96
<i>Zagorka Lozanov-Crvenković, Gabrijela Grujić, Ivana Štajner-Papuga</i> A note on some statistical notions with fuzzy integration	97
<i>Zrinka Marušić, Ivan Sever</i> A contingent valuation of public goods in tourism: estimating the preservation value of bottlenose dolphins in the Cres-Lošinj archipelago	98
<i>Želimir Kurtanjek</i> Big data analytics and synergism	99
<i>Željko Račić</i> Application of principal components analysis and I-distance method in the process of ranking countries by level of development	100
Appendix: List of Authors	101

Exploring connections between researchers and ideas in the European Hardwoods Innovation Alliance using two-mode social network analysis

Ana Slavec

InnoRenew CoE, Livade 6, SI-6310 Izola, Slovenia
ana.slavec@innorenew.eu

Barbara Rovere

InnoRenew CoE, Livade 6, SI-6310 Izola, Slovenia
barbara.rovere@innorenew.eu

Uwe Kies

InnovaWood, The European Forestry House 66, Rue du Luxembourg BE-1000 Brussels, Belgium
uwe.kies@innovawood.com

Andreas Kleinschmit von Lengefeld

FCBA, the French Institute of Technology for Forest-based and Furniture Sectors, 10 Galilée street, FR-77420 Champs-sur-Marne, France
Andreas.Kleinschmit@fcba.fr

Abstract:

Two-mode social network analysis (SNA) can be applied to data that consists of two sets of units, from analysing persons and societies to authors and papers. The objective of this paper is to evaluate the possibilities of this approach for the analysis of connections between researchers and their future research ideas based on survey data. As a case study we used the data of the 2016 membership survey of the European Hardwoods Innovation Alliance, a transnational collaboration of experts in wood science and related fields. They were asked to propose research programmes dedicated to the sustainable, innovative, added-value use of hardwood species in Europe. 199 different contributors from 38 countries participated and provided 219 validated innovation ideas that were classified into 17 different topic categories. Based on two-mode SNA we found that most ideas belong only to one topic, while a small number of researchers suggested research programmes on more than one topic and thus represent intergroup nodes in the network. However, we also identified researchers and topics isolated from the larger group of respondents. The case study highlights the suitability of SNA as a tool for the exploration and visualisation of research communities. The spotted groups, whose members do not necessarily know each other, suggest an interest for potential exchange and collaboration, which is a basis for the formation of new research consortia in innovative fields.

Keywords: innovation, research mapping and clustering, social network analysis.

JEL code: D85, O32.

Acknowledgement: The authors gratefully acknowledge the European Commission for funding the InnoRenew CoE project (Grant Agreement #739574) under the Horizon2020 Widespread-Teaming program.

The Second International Statistical Conference in Croatia

ISCCRO'18

PATRONAGE OF THE ISCCRO'18

Ministry of Science and Education of the Republic of Croatia



Ministarstvo
znanosti i
obrazovanja

ISCCRO'18 Sponsors:

University of Zagreb Faculty of Economics and Business



&

Ipsos d.o.o, Zagreb



ISCCRO'18 Supporters:

Croatian Bureau of Statistics (CBS)



&

Croatian Biometric Society (HBMD)



ORGANIZER OF THE ISCCRO'18 CONFERENCE



ISCCRO'18 Conference Web Site: http://www.hsd-stat.hr/en/isccro_en/

Print ISSN 1849-9864
Online ISSN 2584-3850

The Second International Statistical Conference in Croatia

ISCCRO'18

PATRONAGE OF THE ISCCRO'18

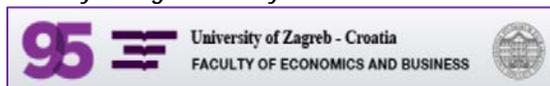
Ministry of Science and Education of the Republic of Croatia



Ministarstvo
znanosti i
obrazovanja

ISCCRO'18 Sponsors:

University of Zagreb Faculty of Economics and Business



&

Ipsos d.o.o, Zagreb



ISCCRO'18 Supporters:

Croatian Bureau of Statistics (CBS)



&

Croatian Biometric Society (HBMD)



ORGANIZER OF THE ISCCRO'18 CONFERENCE



ISCCRO'18 Conference Web Site: http://www.hsd-stat.hr/en/isccro_en/

Print ISSN 1849-9864
Online ISSN 2584-3850