EWG-ORSDCE

NEWSLETTER OF EWG ORSDCE
DECEMBER 2020

ORSDCE - The OR in Sustainable Development and Civil Engineering Working Group of EURO
https://www.euro-online.org/websites/orsdce/

Content of the issue

Words of chairman

Dear Members of EWG-ORSDCE, dear Friends,

This issue of newsletter presents this year news, achievements and forthcoming events.

The active members of EWG-ORSDCE published several successful Special Issues in different Clarivate Analytics Web of Science journals and currently, some more issues open for submissions in journals related to the research field of our Working Group presented in this newsletter.

EWG-ORSDCE have launched the new website last year. Please visit https://www.euro-online.org/websites/orsdce/ register or update your personal information on members' portal.

As usual, we invite you to submit the papers to the journals published by the active members of EWG-ORSDCE: *Technological and Economic Development of Economy*, *Journal of Civil Engineering and Management*, *Journal of Business Economics and Management*, *International Journal of Strategic Property Management*, and *Engineering Structures and Technologies*.

In the year 2021 EURO Working Group "OR in Sustainable Development and Civil Engineering (ORSDCE)" will organize invited session in the field "OR for Sustainable Development" in forthcoming 31st EURO Conference, that will be held on 11-14 July 2021 in Athens, Greece.

Congratulations on all your achievements and best wishes for future activities.

With my best wishes, yours sincerely,
Edmundas Kazimieras Zavadskas, Chair of EWG-ORSDCE

Forthcoming events

© EURO 2021 | 31st European Conference On Operational Research | Athens 11-14 July 2021 | www.euro2021athens.com | info@euro2021athens.com

EURO 2021 is the largest and most important conference for Operational Research and Management Science (OR/MS) in Europe organized by EURO – the European Association of Operational Research Society and the Hellenic Operational Research Society (HELORS).

The conference will be held at the University of West Attica (UNIWA) in Athens located in the area of the Holy Olive Grove 'Eleonas' of the ancient Athenians, where Plato taught his students.

The organizers invite researchers, academics, practitioners, and students interested in any branch of Operational Research, mathematical modelling or economic analysis to submit abstracts or organize sessions and attend a high quality and safe conference.

Oral presentations will be organized in parallel sessions. Authors can present only one paper at the Conference. Submission invited on, but not limited to, the following areas:

- Behavioral OR and Problem Structuring
- Continuous optimization
- Data Science and Analytics
- Decision support
- Discrete optimization algorithms
- Economics and game theory
- Financial modeling and risk management
- Foundations and history of OR
- Humanitarian and healthcare applications
- OR Education and Development
- Practice of OR (Making an Impact)
- Production and logistics and revenue management
- Queueing and stochastics
- Specific Applications of OR
- WISDOM - Women in Society Doing OR and MS

Abstracts must be written in English and contain no more than 1500 characters (no formulas or mathematical notation are allowed). Each attendee is allowed to present ONE paper at the conference. The deadline for abstract submission is 28th of February 2021.

Key dates & deadlines:

Abstract Submissions Start	Sunday, September 20, 2020
Registration Opens	Sunday, February 14, 2021
Abstract Submission Deadline	Sunday, February 28, 2021
Notification of Abstract Acceptance Deadline	Sunday. March 28, 2021
Early bird Registration Deadline	Sunday, May 2, 2021
Author Registration Deadline	Sunday, May 16, 2021
Late Registration Deadline	Sunday, May 16, 2021
Delegate Registration Deadline	Sunday, June 20, 2021

Registration information:

Regular Early Until May 2nd, 2021 (inclusive)	400 €
Regular Late Until May 16th, 2021 (inclusive, only authors)	500 €
Regular Late Until June 20th, 2021 (inclusive, just for attendants)	500 €
Student/Retired Early Until May 2nd, 2021 (inclusive)	200 €
Student/Retired Late Until May 16th, 2021 (inclusive, only authors)	300 €
Student/Retired Late Until June 20th, 2021 (inclusive, just for attendants)	300 €
Accompanying persons Until June 20th, 2021	120 €

The registration fee for a full delegate (Regular/Student/Retired) covers the following:

- Admission to all sessions and the exhibition
- Conference material
- Coffee and Lunch Breaks
- Admission to the Opening Cocktail Reception on July 11, 2021 (starting at 19:00) at the University of West Attica
- Admission to the Casual Closing Party on July 14, 2021 (starting at 19:00) at University of West Attica

Please note that the Conference Gala Dinner on Tuesday is not included in the registration fee. Participants will have the option to register for the Gala Dinner while completing the registration process.
The registration fee for an accompanying person covers the same except the admission to sessions and conference materials.

EWG-ORSDCE contributes to the organization of **Stream on "OR for Sustainable Development"**. Chair(s): Sadia Samar Ali (sadiasamarali@gmail.com), Vida Maliene (v.maliene@ljmu.ac.uk), Tatjana Vilutienė (tatjana.vilutiene@vilniustech.lt), Gerhard-Wilhelm Weber (gerhard-wilhelm.weber@put.poznan.pl)

Venue

University Of West Attica
(UNIWA - Campus 2)

The 31st European Conference on Operational Research will be held on the Campus 2 of the University of West Attica. The University was founded in March 2018 by the National Law 4521. The foundation of the newly established University came from the merging process of the former Technological Educational Institute of Athens and Piraeus University of Applied Sciences.

University of West Attica operates with high educational and research standards and strives to respond to the ever-increasing demands of a modern society for the creation of executives that have attained a solid scientific and technological background.

https://euro2021athens.com/venue-new/

About Athens

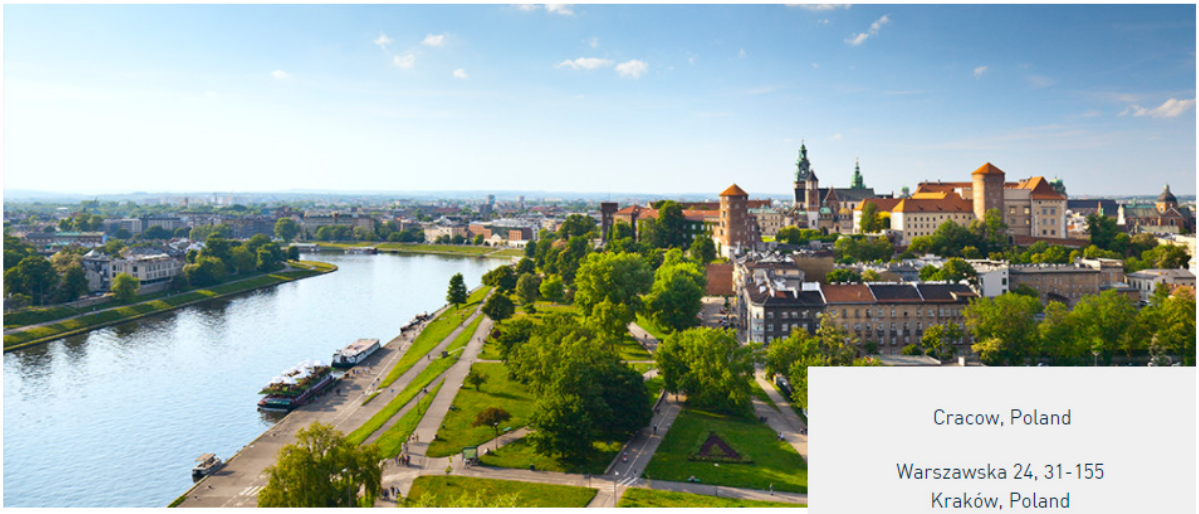
Athens, a historic city & capital of Greece. A bustling and cosmopolitan metropolis, Athens is the center of the economic, financial, industrial, political and cultural life in Greece. Located at the crossroads of three continents, the capital of Greece with an overall population of close to 4 million people has often been the melting pot of many cultures. Characterized by a hospitality culture and people that are welcoming, every visitor is sure to receive a warm welcome.

Being one of the most historically significant cities in Europe, Athens has much to offer to those who are interested in exploring some of the roots of our world's civilization. Today's capital integrates the ancient and medieval history into the contemporary era. Monuments can be found all around the city center, side by side with contemporary constructions.

https://euro2021athens.com/about-athens-new/

18th Colloquium & 8th meeting of EWG ORSDCE, 20 May 2021, Cracow, Poland

« All Events



Cracow, Poland

Warszawska 24, 31-155
Kraków, Poland

Google Calendar

iCal Export

RSDCEThe 18th Colloquium "New Trends in Construction Management" and 8th meeting of EURO working group Operational Research in Sustainable Development and Civil Engineering

Date: 20 May 2021

Venue: Cracow University of Technology

Important dates

Will be announced

Contact persons:

Chairman of scientific committee:

prof. Edyta Plebankiewicz; tel. +48 12 628 23 30; e-mail. eplebank@L3.pk.edu.pl

Chairman of organizing committee:

prof. Agnieszka Leśniak; tel. +48 12 628 23 93; e-mail. alesniak@L3.pk.edu.pl

Conference e-mail: **18IC@pk.edu.pl**

The IFORS conference has been rescheduled

IFORS 2021 – The 22nd Conference of the International Federation of Operational Research Societies

Hanyang University, Seoul, Korea

August 22-27, 2021

IFORS is an international conference held every three years to bring together academia, practitioners and experts in the field of Management Science from more than 60 countries and to contribute to its development through mutual academic and information exchange. Since its inaugural meeting in the United Kingdom in 1957, this conference has become a large international academic conference involving more than 2,000 professionals from the United States, Europe, Asia, Oceania and South America.

Since the 15th Conference held in China in 1999, IFORS 2021 will be the first international conference in Asia in 20 years. This is a momentous occasion for the Korean Operations Research and Management Science Society (KORMS) in hosting IFORS 2021 at the dawn of the Fourth Industrial Revolution era, where artificial intelligence, business analytics and big data analysis are becoming new trends in Management Science.

As the IFORS Conference is a platform for over 2,000 experts from around the world to showcase the diverse potential of their state-of-the art knowledge and experience, IFORS 2021 will be a great opportunity to interact and engage in a variety of marketing activities.

Title	The 22nd Conference of the International Federation of Operational Research Societies (IFORS 2021)
Date	August 22 (Sun) – 27 (Fri), 2021
Venue	Hanyang University, Seoul, Republic of Korea
Participants	Approx. 2,000 (Researchers, Scholars, Practitioners, Entrepreneurs, etc.)
Program	Opening · Closing Ceremony, Plenary Sessions, Parallel Sessions, Welcome Reception, Banquet, Exhibition, etc.
Official Language	English
Host Organizations	International Federation of Operational Research Societies (IFORS)
	Korean Operations Research and Management Science Society (KORMS)

Please visit the IFORS 2021 webpage (www.ifors2020.kr) to learn more about important dates, abstract submission, registration, special issues of journals, the social program and accommodation.

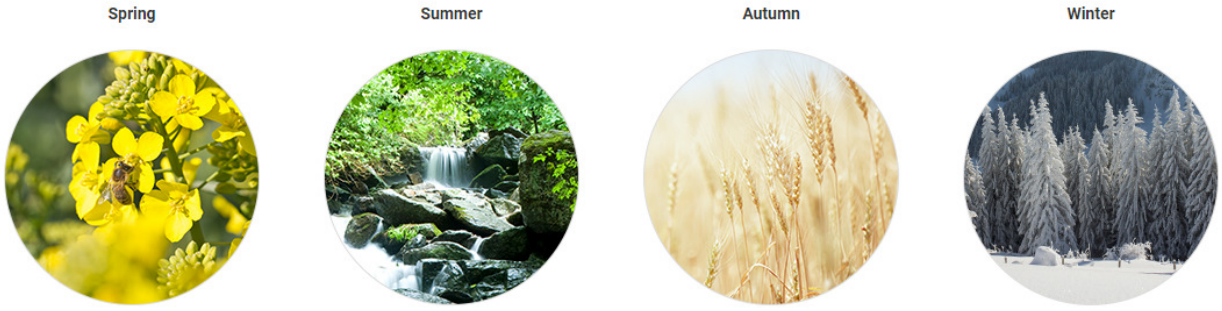
http://www.ifors2020.kr/sub07/sub03.php

The Republic of Korea is a country visited by approximately ten million international travelers every year. With its long history in culture and tradition, the country has a lot to offer to travelers. Continue reading to learn general information about Korea before visiting.

The Korean peninsula, roughly 1,030 km long and 175 km wide at its narrowest point, is located in Northeast Asia. With Seoul as its capital city, Korea's total land area is 100,033㎢. Korea's neighbors include Japan to the east, China to the west, and Democratic People's Republic of Korea (North Korea) across the northern border.

The total population of Korea is approximately 51,635,256 (as of September 2018), with most of the population residing in the Seoul metropolitan area. Outside of Seoul, other large and economically advanced cities such as Busan, Incheon, Daegu, Daejeon, Gwangju and Ulsan also have higher population densities than other cities in Korea.

Korea's climate is typically temperate with four distinct seasons. Conference Period is end of June which is one of the beautiful seasons in Korea. The weather is warm and humid, but is best to do outdoor activities. The average temperature is expected to be around 16-27℃ (60-80℉).

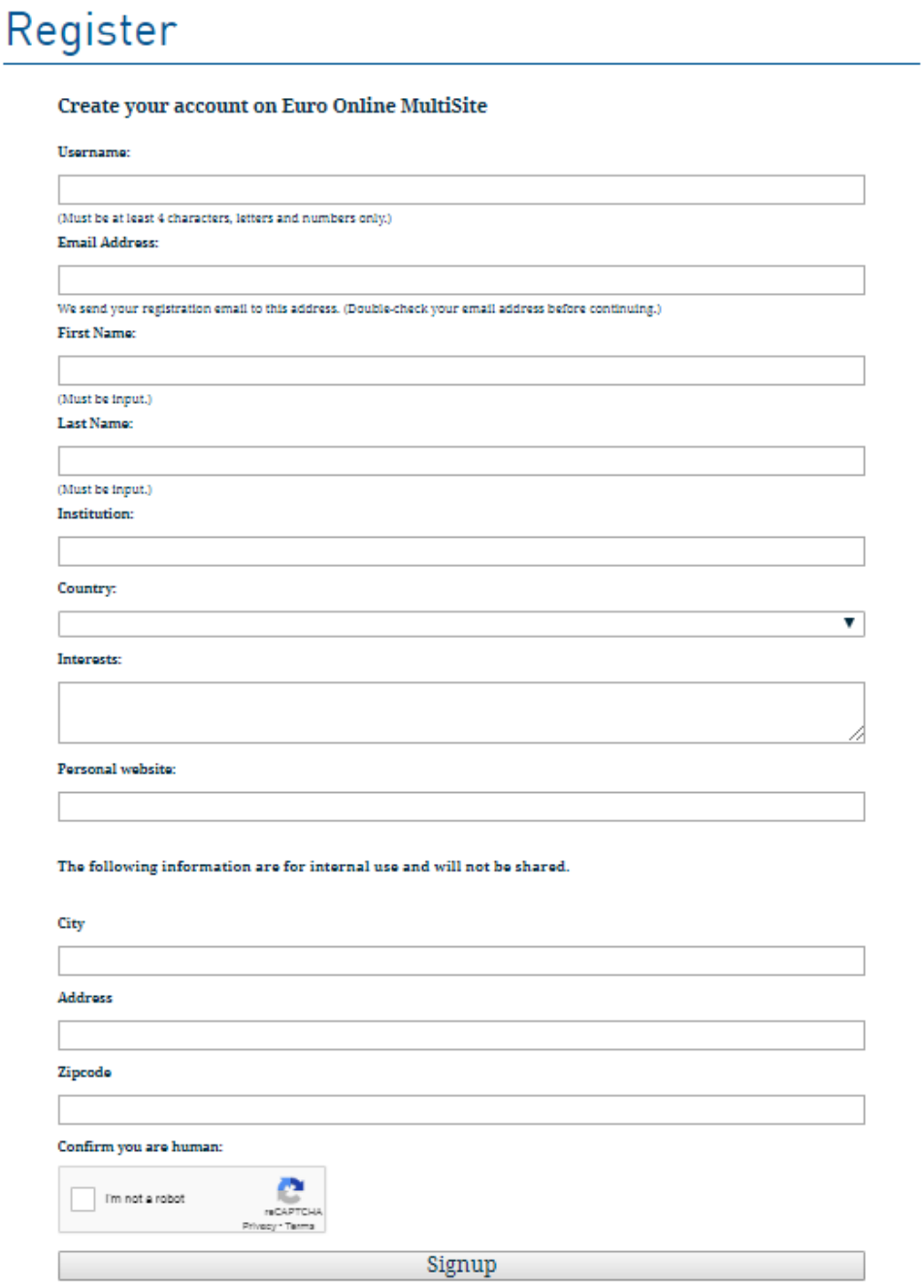


http://www.ifors2020.kr/sub07/sub03.php

The website for EWG ORSDCE

The website of EURO Working Group on Sustainable Development and Civil Engineering can be accessed using this link:
https://www.euro-online.org/websites/orsdce/

If you are a member of the working group, but your name is not yet on the list of members, please register here: https://www.euro-online.org/websites/orsdce/register/



To become a member of EURO Working group on Sustainable Development and Civil Engineering, please register and send the filled form to Coordinator. The form you can upload from the website.

Journal Special Issues aimed at optimization of processes in engineering and management

Edmundas Kazimieras Zavadskas, Jurgita Antuchevičienė, Tatjana Vilutienė, Audrius Banaitis

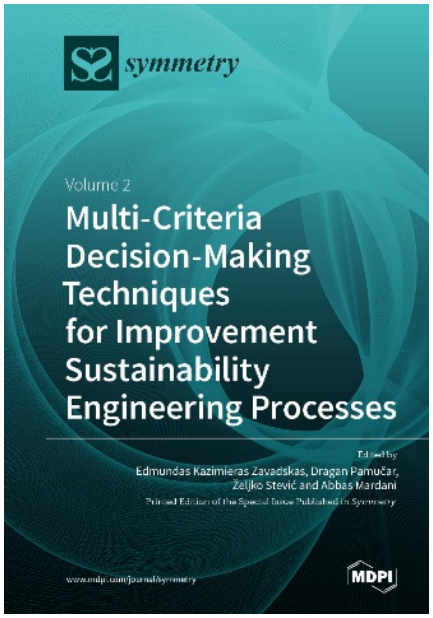
We are proud to announce that active members of EWG-ORSDCE published many successful Special Issues in different Clarivate Analytics Web of Science journals and currently some more issues are open for submissions in journals related to the research field of our Working Group.

Special Issues published in 2020:

symmetry

- Special Issue ***"Multi-Criteria Decision-Making Techniques for Improvement Sustainability Engineering Processes"*** in *"Symmetry"* journal (**closed on 1 January 2020**)

Guest Editors: Edmundas Kazimieras Zavadskas, Dragan Pamučar, Željko Stević, Abbas Mardani
https://www.mdpi.com/journal/symmetry/special_issues/Sustainability_Engineering_Processes
Printed Edition:



Volume 1
https://www.mdpi.com/books/pdfview/book/2623
Volume 2
https://www.mdpi.com/books/pdfview/book/3012

sustainability

- Special Issue "***Decision Support System and Sustainable Construction Management***" in Journal *"Sustainability"* (**closed on 30 September 2020**)

Guest Editors: Leonas Ustinovichius, Czeslaw Miedzialowski, Romuald Szelag
https://www.mdpi.com/journal/sustainability/special_issues/Decison_Support_System_Sus_Construction

- Special Issue "***Fuzzy Systems in Intelligent Systems and Applications***" in "International Journal of Fuzzy Systems"

Guest Editors: Huchang Liao, Abbas Mardani, Edmundas Kazimieras Zavadskas, Benjamin Bedregal
https://link.springer.com/journal/40815/volumes-and-issues/22-2

sustainability

- Special Issue ***"A Healthy Built Environment for an Ageing Population"*** in *"Sustainability"* journal (**closed on 30 June 2020**)

Guest Editors: Vida Maliene, Emma Mulliner, Mike Riley, Mantas Kazimieras Malys
https://www.mdpi.com/journal/sustainability/special_issues/Ageing_Population_Sustainability

buildings

- Special Issue "***Sustainable Development of Buildings: Design, Construction, Quality Inspection, Operation Management***" in Journal "*Buildings*" (**closed on 31 December 2019**)

Guest Editors: Tatjana Vilutiene, Heng Li, Chunlu Liu, Nuria Forcada, Audrius Banaitis
https://www.mdpi.com/journal/buildings/special_issues/Sustainable_Buildings

buildings

- Special Issue "***Architecture and Engineering: the Challenges - Trends - Achievements***" in Journal "*Buildings*" (**closed on 30 June 2020**)

Guest Editors: Oleg Kapliński, Wojciech Bonenberg
https://www.mdpi.com/journal/buildings/special_issues/Architecture_Engineering
Printed Edition:
https://www.mdpi.com/books/pdfview/book/3233

Special Issues in Press:

- Special Issue "***Probabilistic Preference Theory and Applications in Management Sciences and Engineering*** " in "International Journal of Fuzzy Systems" (closed on 1 April 2020)

Guest Editors: Zeshui Xu, Janusz Kacprzyk, Edmundas Kazimieras Zavadskas, Dengfeng Li, Pankaj Gupta
https://www.springer.com/journal/40815/updates/17750478

Open Special Issues:

- Special Issue "***Big data-driven large-scale group decision making under uncertainty (BiGDM-U)***" in Journal "Applied Intelligence" (Deadline for manuscript submissions: **30 April 2021**)

Guest Editors: Abbas Mardani, Edmundas Kazimieras Zavadskas, Hamido Fujita, Mario Köppen
https://www.springer.com/journal/10489/updates/18550380

symmetry

- Special Issue "***Symmetric and Asymmetric Data in Solution Models***" in Journal "Symmetry" (Deadline for manuscript submissions: **31 January 2021**)

Guest Editors: Edmundas Kazimieras Zavadskas, Jurgita Antuchevičienė, Zenonas Turskis
https://www.mdpi.com/journal/symmetry/special_issues/Symmetric_Asymmetric_Data_Solution_Models

symmetry

- Special Issue "***Sustainability Assessment using Uncertain Decision Making Approaches in the Era of Globalization***" in Journal "Symmetry" (Deadline for manuscript submissions: **30 June 2021**)

Guest Editors: Edmundas Kazimieras Zavadskas, Dragan Pamucar, Željko Stević, Abbas Mardani
https://www.mdpi.com/journal/symmetry/special_issues/Sustainability_assessment_globalization

sustainability

- Special Issue "***Decision Support Systems and Multiple Criteria Decision Making for Sustainable Development***" in Journal *"Sustainability"* (Deadline for manuscript submissions: **31 March 2021**)

Guest Editors: Artūras Kaklauskas, Ajith Abraham
https://www.mdpi.com/journal/sustainability/special_issues/dssmcdm_ma

mathematics

- Special Issue " ***Multi-criteria Decision Making and Data Mining***" in Journal *"Mathematics"* (Deadline for manuscript submissions: **31 May 2021**)

Guest Editors: James Liou, Artūras Kaklauskas
https://www.mdpi.com/journal/mathematics/special_issues/Multi_criteria_Decision_Making_Data_Mining

TRANSPORT

- Special Issue "***Multiple Criteria Decision Making (MCDM) and Sustainability in Transportation Systems***" in Journal „Transport" (Deadline for manuscript submissions: **31 January 2020**)

Guest Editors: Sarfaraz Hashemkhani Zolfani, Dragan Pamucar, Jurgita Antuchevičienė
https://journals.vgtu.lt/index.php/Transport/announcement/view/33

sustainability

- Special Issue "***Sustainable Construction Engineering and Management" in Journal „Sustainability***" (Deadline for manuscript submissions: **31 January 2021**)

Guest Editors: Edmundas Kazimieras Zavadskas, Jurgita Antuchevičienė, Reza Hosseini, Igor Martek
https://www.mdpi.com/journal/sustainability/special_issues/construction_engineering

sustainability

- Special Issue "***Sustainability and Risks in Construction Management***" in Journal *"Sustainability"* (Deadline for manuscript submissions: **28 February 2021**)

Guest Editor: Jolanta Tamošaitienė
https://www.mdpi.com/journal/sustainability/special_issues/Sustainable_Risk_Assessment_Construction

sustainability

- Special Issue "***Sustainable Decision Making in Civil and Construction Engineering***" in Journal *"Sustainability"* (Deadline for manuscript submissions: **31 December 2021**)

Guest Editor: Jolanta Tamošaitienė
https://www.mdpi.com/journal/sustainability/special_issues/Sustainable_Decision_Making

energies

- Special Issue "***Uncertain Decision Making Methods in Energy Policies for Sustainable Development***" in Journal "*Energies*" (Deadline for manuscript submissions: **25 February 2021**)

Guest Editors: Abbas Mardani, Edmundas Kazimieras Zavadskas, Madjid Tavana, George Philippidis
https://www.mdpi.com/journal/energies/special_issues/Decision_Making_Energy_Policies

International Journal of *Environmental Research and Public Health*

- Special Issue "***Occupational Safety and Risks in Construction***" in Journal "*International Journal of Environmental Research and Public Health*" (Deadline for manuscript submissions: **1 August 2021**)

Guest Editors: Jolanta Tamošaitienė, Jerzy Pasławski
https://www.mdpi.com/journal/ijerph/special_issues/occupational_safety_risks

energies

- Special Issue "***Innovations in Sustainable Architecture, Engineering and Construction***" in Journal "*Energies*" (Deadline for manuscript submissions: **1 September 2021**)

Guest Editors: Audrius Banaitis, Chunlu Liu, Nerija Banaitiene
https://www.mdpi.com/journal/energies/special_issues/innovations_architecture

energies

- Special Issue "***Construction Project Management 2021***" in Journal "*Energies*" (Deadline for manuscript submissions: **1 October 2021**)

Guest Editors: Nerija Banaitiene, Audrius Banaitis, Chunlu Liu
https://www.mdpi.com/journal/energies/special_issues/construction_project_management_2021

sustainability

- Special Issue "***Analysis on Real-Estate Marketing and Sustainable Civil Engineering***" in Journal *"Sustainability"* (Deadline for manuscript submissions: **1 August 2021**)

Guest Editors: Natalija Lepkova, Laura Tupėnaitė
https://www.mdpi.com/journal/sustainability/special_issues/estate_marketing

sustainability

- Special Issue "***Sustainable Design and Construction***" in Journal *"Sustainability"* (Deadline for manuscript submissions: **31 May 2021**)

Guest Editor: Laura Tupėnaitė
https://www.mdpi.com/journal/sustainability/special_issues/SDC

energies

- Special Issue "***Sustainable Energy Technologies for Transition to Energy Positive Buildings*** " in Journal "*Energies*" (Deadline for manuscript submissions: **31 August 2021**)

Guest Editors: Tatjana Vilutienė, Violeta Motuzienė
https://www.mdpi.com/journal/energies/special_issues/sustainable_energy_technologies_transition_energy_positive_buildings

Bibliometric analysis of journals published by Vilnius Gediminas Technical University

Edmundas Kazimieras Zavadskas, Zeshui Xu, Jurgita Antuchevičienė

Vilnius Gediminas Technical University (VINIUS TECH) publishes fifteen open access peer reviewed scientific journals. Seven of them are in the field of physical and technology sciences, five in the social sciences, one in humanities, and two are multidisciplinary. We are proud to declare that seven of these journals are indexed in Clarivate Analytics Web of Science database. The mostly of these journals are related to the research field of our Working Group.

Last year two journals founded by Professor Edmundas Kazimieras Zavadskas celebrated the twenty fifth anniversary since they have been launched (Journal of Civil Engineering and Management, and Technological and Economic Development of Economy).

Journal of Civil Engineering and Management (JCEM) is a prestigious journal in the field of engineering published eight issues per year:

https://journals.vgtu.lt/index.php/JCEM

The Journal was launched in 1995 as a per-reviewed quarterly journal under the title "Statyba" (Civil Engineering). In 2002, the current title "Journal of Civil Engineering and Management" was assigned. Since 2008, the Journal reached a new stage of development. The Journal was abstracted/indexed by international databases, including SCOPUS, COMPENDEX, INSPEC, Cambridge Scientific Abstract, EBSCO Publishing, etc. Since 2010, it has been encouraged by CIB (International Council of Research and Innovation in Building and Construction).

In 2008, JCEM was indexed by Clarivate Analytics Web of Science and the first Impact Factor (IF) was provided in 2010. The latest Journal Impact factor IF = 2.338, its quartile in the category is Q2 and it ranks 47th out of 134 'engineering, civil' categorized journals (data from the 2019 edition of Journal Citation Reports).

So far, the JCEM has published more than 1000 papers in the field of civil engineering. Therefore, a comprehensive analysis and summary of the journal from the perspective of bibliometric was conducted in the paper of Yu, Xu and Antuchevičienė, 2019 [1]:

https://journals.vgtu.lt/index.php/JCEM/article/view/9925/8713

This research [1] used the method of bibliometric to study the status and development trends of the journal. Information was collected from the Science Citation Index (SCI) database. Firstly, the general citation structure and basic characteristics of the JCEM journal were investigated. Then, the most influential institutions, countries as well as their networks of cooperation were identified. Finally, the main research topics of the JCEM journal were explored by using the frequently used keywords.

The main analysis results were as follows: 53 percent of the JCEM papers were equal to or less than 10 pages and there was clear evidence of an increase in the average number of pages. The number of references of the JCEM papers concentrated on 21-40, and the share of papers with more than 30 references increased significantly. The most popular pattern of co-authorship was 2 or 3 authors. Lithuania was the most productive country with more than twice the number of papers of Poland which is in the second place (Fig. 1).

Within the top 11 productive institutions, Lithuania and USA have two institutions, respectively. South Korea, China and Australia have strong cooperative relations with the USA. The partnership between Australia and China, Lithuania and Poland, Lithuania and Iran are also strong. VILNIUS TECH cooperated most with other institutions. In addition, Kaunas University of Technology from Lithuania, Wrocław University of Science and Technology from Poland, National Taiwan University of Science and Technology from Taiwan, Islamic Azad University from Iran and University of Malaya from Malaysia occupied important positions in the cooperative network (Fig. 2).

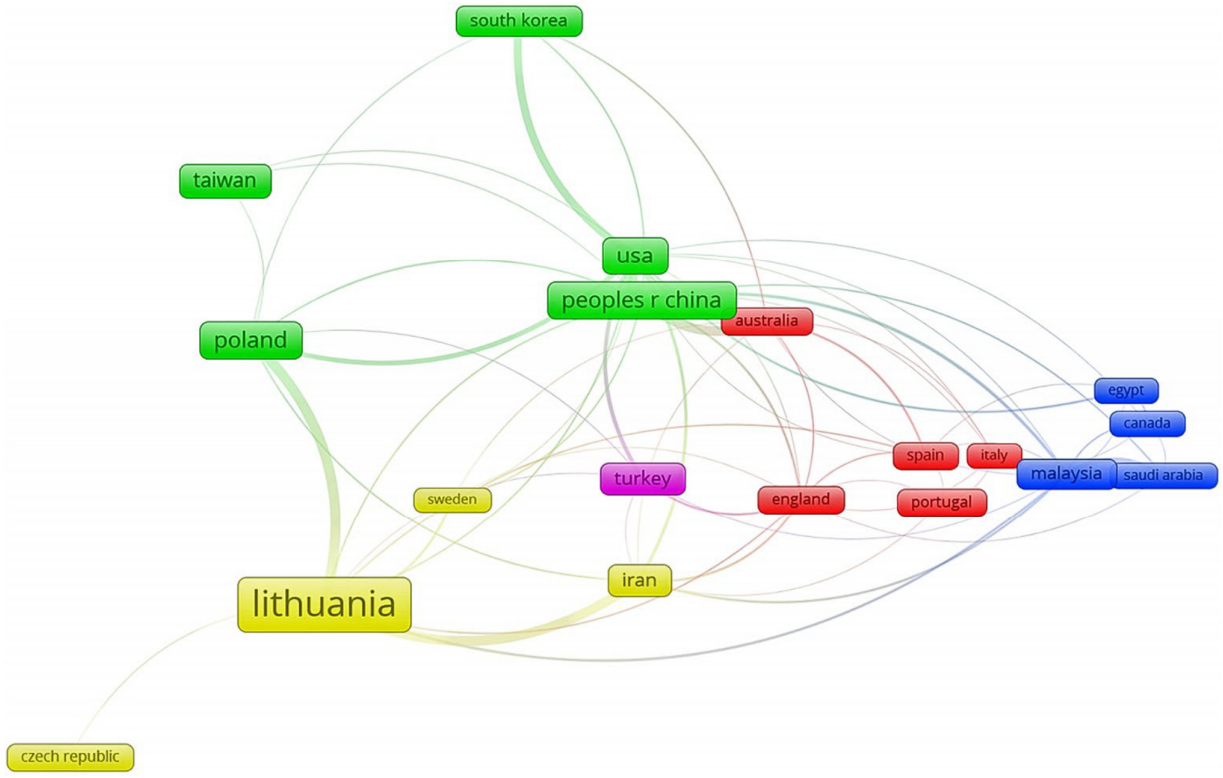


Figure 1. Cooperation networks at the country/territory level in JCEM publications [1]

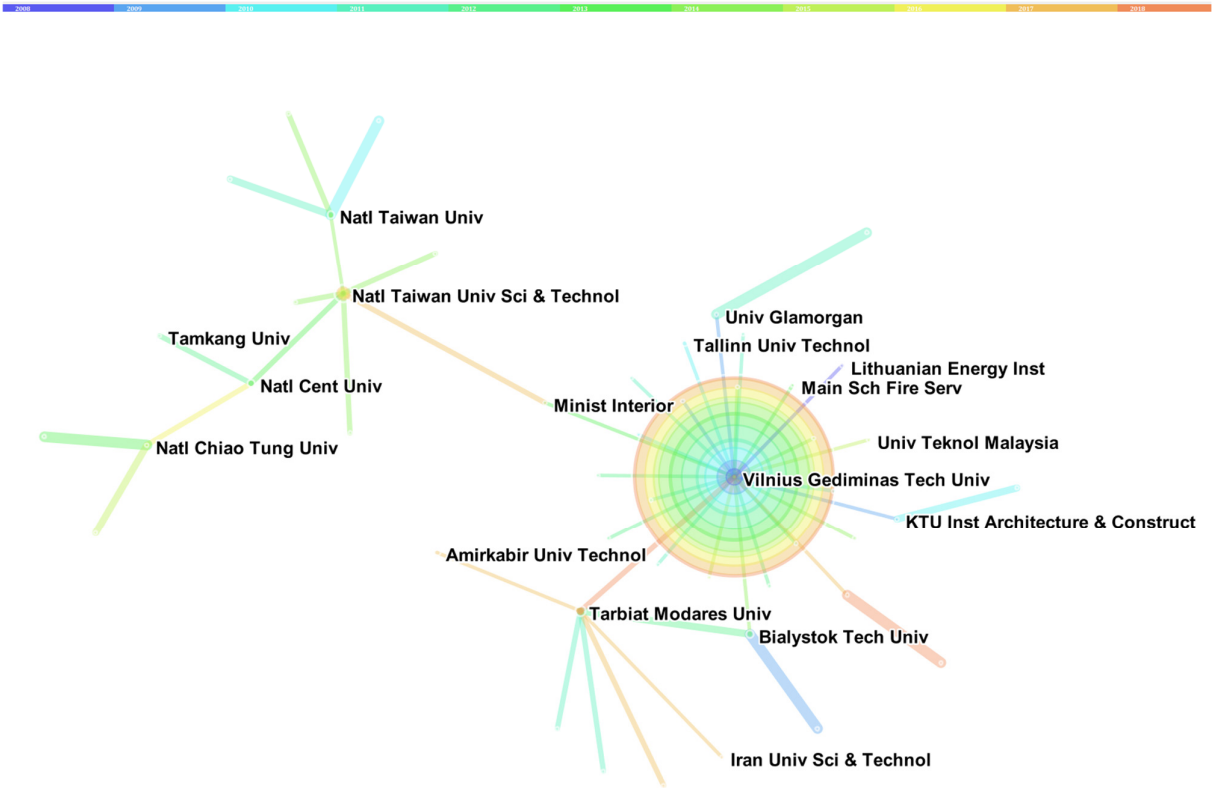


Figure 2. The biggest cooperation network at the institution level in JCEM publications [1]

'Concrete' is the most frequently used author keyword in the JCEM journal. Some other keywords are construction industry, construction management, reinforced concrete, compressive strength, MCDM, simulation and optimization (Fig. 3).

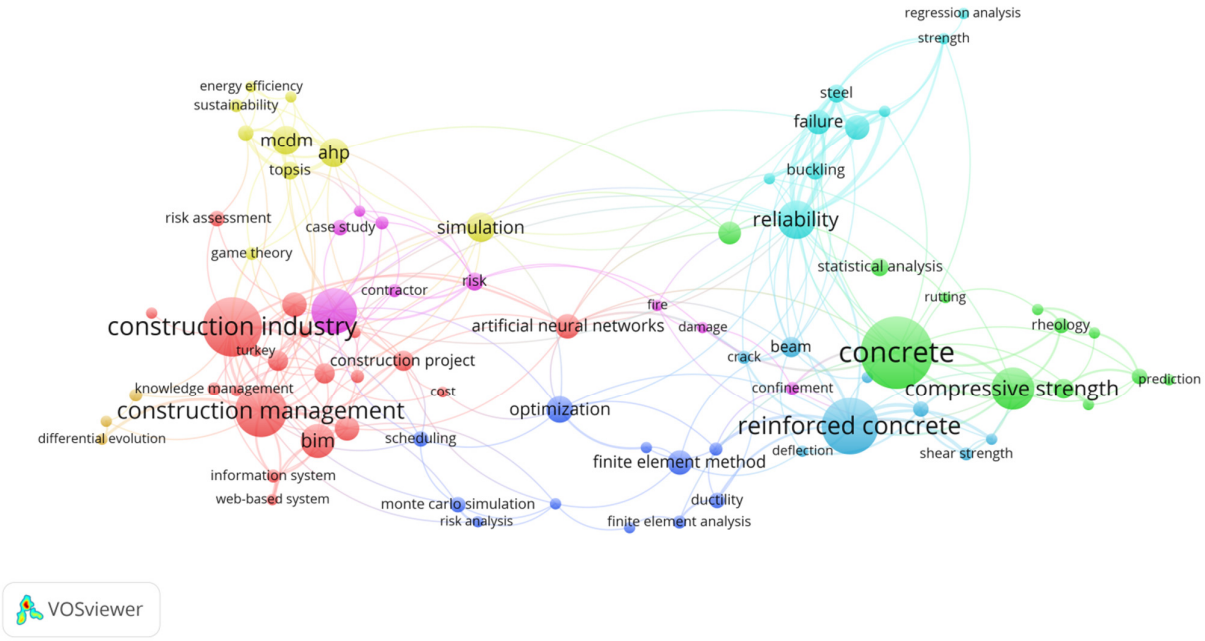


Figure 3. Co-occurrence of author keywords of the JCEM publications [1]

* * *

The Journal ***Technological and Economic Development of Economy (TEDE)*** publishes original research, review articles and book reviews on all areas of sustainable economic development including political, economic and technological economic strategies:

https://journals.vgtu.lt/index.php/TEDE/index

https://journals.vgtu.lt/index.php/TEDE/article/view/10193/8874

In 2008, TEDE was indexed by Science Citation Index Expanded, Web of Science and the Impact Factor (IF) was provided in 2010. The latest currently available Journal ranking is as follows: Journal Impact Factor (Clarivate Analytics, 2019) JIF = 2.194; 5-years Journal Impact Factor = 2.786; SCOPUS CiteScore 2019 is 5.7; SCImago Journal Ranking (2019), SJR = 0.622; SCOPUS Source Normalized Impact per Paper (2019), SNIP = 1.196. TEDE enteres the second quartile (Q2) under the "Economics" category of the Clarivate Analytics Web of Science. The Journal is currently ranked in the 98th position worldwide among 371 journals in the category.

The study of Yu, Xu and Šaparauskas, 2019 [2] presented a bibliometric analysis on all the TEDE publications indexed in the SSCI database. The basic characteristics of the TEDE journal, including annual and geographical distributions, author and manuscript characteristics, as well as the influential contributors were studied in detail. The results indicated that the number of papers published each year by the TEDE journal was relatively small and stable. The 55 percent of publications were authored through inter-institutions cooperation, and most of the papers were published through cooperation among multiple authors. The TEDE publications with two or three authors accounted for the majority, but the proportion of one or two authors was gradually decreasing. The publications with authors from one country or institution accounted for the vast majority, but their shares continue to decline. Authors from European and Asia countries predominately contributed the publications in the TEDE journal. The results of this study showed

that the authors of the TEDE journal were mainly distributed in Lithuania, China, Taiwan, Turkey, Poland and other countries/territories. Publications with 11–20 pages have been dominated at three different stages. Meanwhile, the publications with 20 or more references accounted for most of the proportion. As explored by co-occurrence analysis of keywords, decision analysis has become an important research topic in the TEDE journal (Fig. 4) [2].

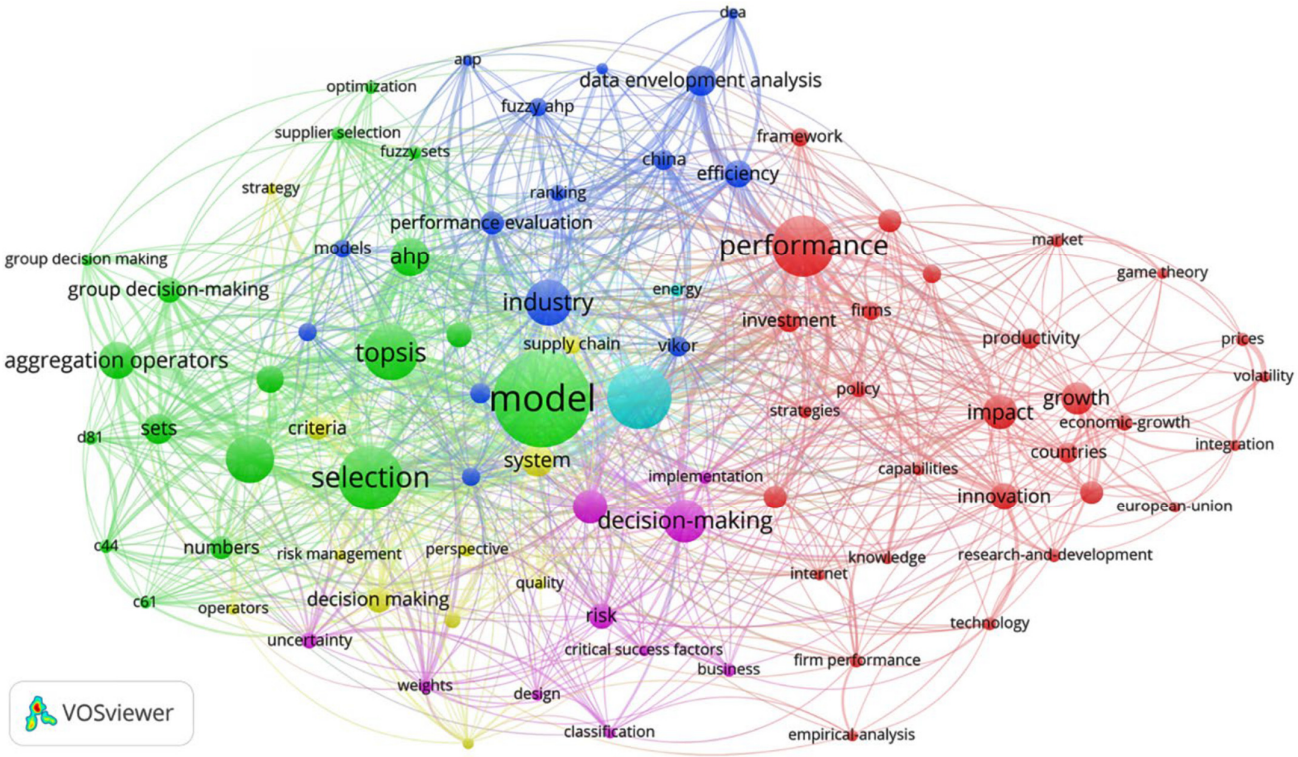


Figure 4. Co-occurrence network of keywords of the TEDE publications [2]

* * *

The bibliometric analysis was also made for several other VILNIUS TECH journals, whose topics are related to the research field of our Working Group.

The paper of Zhou, Xu and Zavadskas, 2019 [3] provided a bibliometric analysis of ***International Journal of Strategic Property Management (IJSPM)***:

https://journals.vgtu.lt/index.php/IJSPM/index

https://journals.vgtu.lt/index.php/IJSPM/article/view/10535/9324

Being established in 1997, the IJSPM is an interdisciplinary journal which provides a forum for a broad range of strategic property management research. The topics such as the asset and facilities management, the property policy, the risk management, the residential property value enhancement, and the housing finance are included in the scope of the IJSPM's investigation. This journal is referred in the Social Science Citation Index (SSCI) database, with an impact factor of 1.639 according to the Journal Citation Report (2019).

The research [3] founded that the articles published in 2017 have been cited most frequently, while there are more papers released in the IJSPM in 2018. China, Lithuania, England, Australia, and the USA are the most productive countries. In terms of the institutions that have contributed a lot in this area, Vilnius Gediminas Technical University is the most productive and influential organization. As for the cited journal with citation burst, they have been constantly attracted the attention from the articles published in the IJSPM between 2008 and 2019. The strongest citation bursts of The Review of Economics and Statistics and Regional Science and Urban Economics

continue until now. In consideration of the hot topics and the emerging trends in this research area, the keyword of "model" appeared most frequently. Hui has 21 publications in the IJSPM, he is the most productive author. Kaklauskas, as a cited author, has received the longest duration of citation burst which began in 2009 and ended in 2013 years.

* * *

The paper of Xu, Zhou and Baltrėnaitė, 2019 [4] provided a bibliometric analysis of ***Journal of Environmental Engineering and Landscape Management (JEELM)***:

https://journals.vgtu.lt/index.php/JEELM

https://journals.vgtu.lt/index.php/JEELM/article/view/11366/9502

JEELM makes some contributions to the research of environmental changes caused by human activities and the sustainability-related investigations. As a research journal, JEELM is acknowledged by The Lithuanian Academy of Sciences, The International Academy of Ecological and Life Protection Sciences (IAELPS) and is also the associate member of the Public Information Department of the United Nations. JEELM is indexed by Clarivate Analytics Web of Science and the latest Journal Impact factor IF = 2.733, its quartile in the category of environmental sciences is Q2 (data from the 2019 edition of Journal Citation Reports).

The findings are concluded as follows [4]: The number of publications reached the peak in 2010. Besides, the article entitled "Sustainable construction taking into account the building impact on the environment" (Medineckienė et al., 2010) is the most influential paper with 67 citations. Lithuania is the most influential country. As the publishing institution, Vilnius Gediminas Technical University is the most influential institution. As the former Editor-in-Chief, Baltrėnas is the most influential author. As for the analysis of keywords, the keywords "heavy metal", "soil", "plant", "nitrogen", "water", and "impact" occur in JEELM frequently. In the cluster network of keyword research of JEELM, the biggest cluster is "waste management scenario". Moreover, from the timeline view of keywords, it has been derived that people begin to care more about how to restore ecology instead of investigating and studying the detailed information of pollution sources before.

* * *

The paper of Zhou, Xu and Skačkauskas, 2019 [5] provided a bibliometric analysis of ***TRANSPORT***:

https://journals.vgtu.lt/index.php/Transport

https://journals.vgtu.lt/index.php/Transport/article/view/11774/9612

The journal focuses on many issues related to transport, such as transport policy, transport system, transport tools, transport economics and management, transport educology and history, etc. The first issue of this journal was published (under the new title) in 2002. This journal was indexed in Clarivate Analytics Web of Science in 2007. Now, TRANSPORT is indexed in many famous databases such as Science Citation Index Expanded (SCI-Expanded), Ei Compendex, and Scopus. In the SCI-Expanded database, this journal ranks 30/36 in the Transportation Science & Technology filed and belongs to a Q4 journal. In the Scopus database, this journal is classified as the Q2 journal.

According to the study [5] on the papers published in TRANSPORT and indexed in Clarivate Analytics Web of Science, it can be found that many papers were published in 2018 with a large number of citations. The paper "Multi-objective decision-making for road design" (Brauers et al. 2008) is the most influential paper. As for the top 20 keywords with the strongest citation bursts, the keywords "automobile", "network" and "efficiency" receive the longest burst durations. In 2007, the emerging trends of the research outputs in this journal can be related to automobile, which is a commonly used transport way in people's daily life. In recent years, the emerging trends of this journal tend to be "design" and "public transport", indicating that technological innovations and public awareness have also attracted researchers' attention. In terms of the keyword's analysis, "model" and "system" have occurred the most. In the keyword cluster network, the

authors have found that "operational parameter" is the biggest cluster. Finally, from the timeline view analysis it can be seen that the hot topics of this journal continually change over time and the authors pay more attention to transport service recently.

* * *

The Baltic Journal of Road and Bridge Engineering (BJRBE) was transferred from Vilnius Gediminas Technical University (Lithuania) to Riga Technical University (Latvia) since June 2018: https://bjrbe-journals.rtu.lv/index

The study of Zhou, Xu, Zavadskas and Laurinavičius, 2020 [6] presented a bibliometric analysis on the BJRBE publications 2006-2019:

https://bjrbe-journals.rtu.lv/article/view/bjrbe.2020-15.470/pdf

Being established in 2006, The Baltic Journal of Road and Bridge Engineering (BJRBE) provides a platform for researchers who are interested in the areas such as the road and bridge research and design, the construction materials and technologies of roads and bridges, the construction financing and environmental issues, and the assessment management. This journal is collected in the Social Science Index Expanded and ranked 123rd among 134 journals in the research area of civil engineering with an impact factor of 0.62 in 2019 based on the Journal Citation Report.

The analysis [6] showed that the articles published in 2010 have been cited most frequently. "Multi-attribute assessment of road design solutions by using the COPRAS method" published in 2007 by Zavadskas, Kaklauskas, Peldschus, & Turskis is the most cited paper in BJRBE. Lithuania, Poland, and Italy are the countries published most articles, and among the top 10 influential countries, most countries are from Northern Europe. Lithuania has more connections with other countries. As the agency for publishing the Baltic Journal of Road and Bridge Engineering, the Vilnius Gediminas Technical University is the most influential organization that published most papers. Čygas has most collaborations with other authors. The top 18 cited journals of the Baltic Journal of Road and Bridge Engineering have listed with the strongest citation bursts between 2006 and 2019, and Journal of Civil Engineering and Management and Transport and Procedia Engineering have the most extended duration. The strongest citation bursts of Procedia Engineering, Structure and Infrastructure Engineering, Journal of Performance of Constructed Facilities, Transportation Research Procedia, and Thesis continue until 2019. Besides, Laurinavičius is the most productive author who has 28 publications in the Baltic Journal of Road and Bridge Engineering. Petkevičius, Radziszewski, Zavadskas, & O'Brien have the most extended duration of citation burst.

The keywords are analysed to learn hot topics and the emerging trends of the research field of BJRBE [6]. The most significant cluster of the main keyword is "stray current corrosion" and the keyword of "model" appears most frequently, it shows the hot topics and emerging trends of this journal recently. In addition, based on the timeline of keywords, it is found that the hot keywords "accident criteria", "traffic accident", "tire and road noise", and "creep risk" have been changed into "cost", "sustainability", and "reliability". They have gained increasing attention from the scholars in the journal and this research field.

* * *

Also, we would like to take an opportunity and to mention the Journal ***Computer-Aided Civil and Infrastructure Engineering (CACAIE)*** on the occasion of its 35th anniversary.

https://onlinelibrary.wiley.com/journal/14678667

Professor Edmundas Kazimieras Zavadskas was one of the scientists who received a letter from Professor Hojjat Adeli, Editor-in-Chief of CACAIE, to write an editorial for the 35th anniversary of the journal [7]:

https://onlinelibrary.wiley.com/doi/epdf/10.1111/mice.12597

CACAIE has been a leader in Journal Citation Reports (JCR) category rankings in the areas of Civil Engineering, Construction & Building Technology, Transportation Science & Technology, Computer Science, and Interdisciplinary Applications for many years. In Clarivate Analytics Web of Science this journal is classified as the Q1 journal with the Impact Factor of 8.552.

CACAIE has elevated the profile of the entire civil engineering field in bibliometrics. Over a long period of 35 years, Editor-in-Chief Hojjat Adeli has been instrumental in transforming the image of Civil Engineering from a low-tech field to an exciting field where high technology and advanced computing ideas are embraced. The process of reviewing and publishing papers in CACAIE and the experience gained has contributed to improving the quality of VILNIUS TECH journals, such as the Journal of Civil Engineering and Management, Technological and Economic Development of Economy, and International Journal of Strategic Property Management [7].

* * *

Researchers from VILNIUS TECH serve as Guest Editors in many other scientific journals and publish Special Issues on the topics related to our Working Group activities.

Symmetry is one of the journals that has published the most numerous collections of Special Issues edited by our Working Group members:

https://www.mdpi.com/journal/symmetry/special_issues/Civil_Engineering_Symmetry

https://www.mdpi.com/journal/symmetry/special_issues/Solution_models_based_symmetric_asymmetric_information

https://www.mdpi.com/journal/symmetry/special_issues/Sustainability_Engineering_Processes

https://www.mdpi.com/journal/symmetry/special_issues/Symmetric_Asymmetric_Data_Solution_Models

https://www.mdpi.com/journal/symmetry/special_issues/Sustainability_assessment_globalization

Therefore, in 2020 Li, Xu, Zavadskas, Antucheviciene and Turskis [8] published a bibliometric analysis of Symmetry:

https://www.mdpi.com/2073-8994/12/8/1304

Symmetry is an international journal in the research fields of physics, chemistry, biology, mathematics, computer science, theory and methods, and other scientific disciplines and engineering with an impact factor of 2.645 by Journal Citation Reports (2019). The first paper was published in 2009, therefore a bibliometric analysis of publications in Symmetry from 2009 to 2019 has been made that included 3215 papers. The analysis was conducted from the following aspects: basic characteristics, including the publications, citation number and citation structure; the influential objects; co-citation contributors and the burst detection analyses; the author-keywords co-occurrence analyses and timeline view analysis. The analysis [8] showed that the number of publications has almost increased every year since 2014. The year 2019 was the year with the largest volume of publications and 2018 was the year with the most citations. The prominent author is Smarandache F. According to the results, cooperation among contributors also plays a key role in the publications. In the view of author-keyword analyses, the scopes of Symmetry are constantly enriching and no longer limited to the symmetry phenomena in the fields of physics and chemistry. At present, these include decision making, fuzzy mathematics, deep learning, machine learning and classification.

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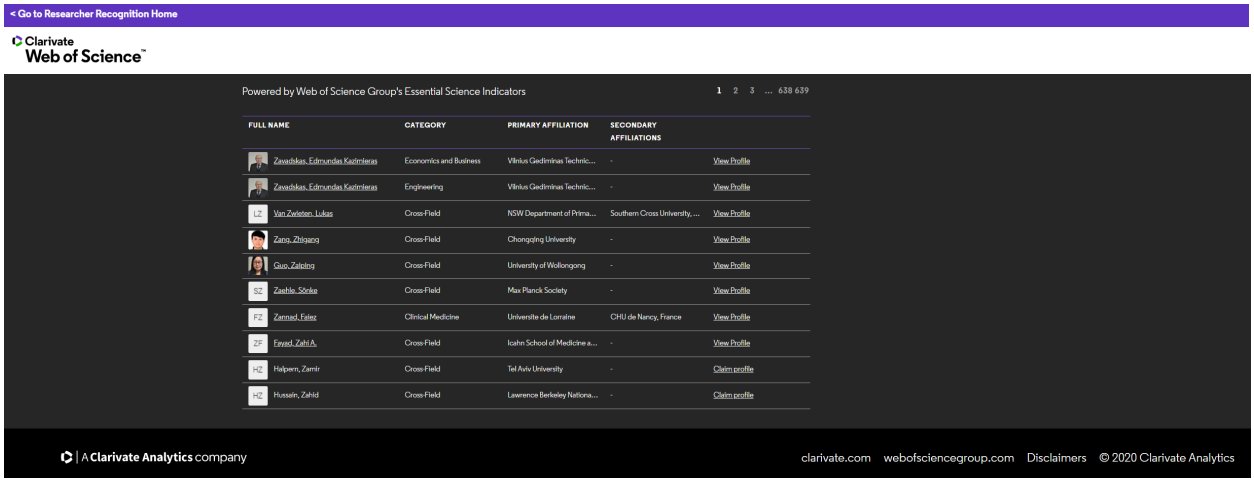
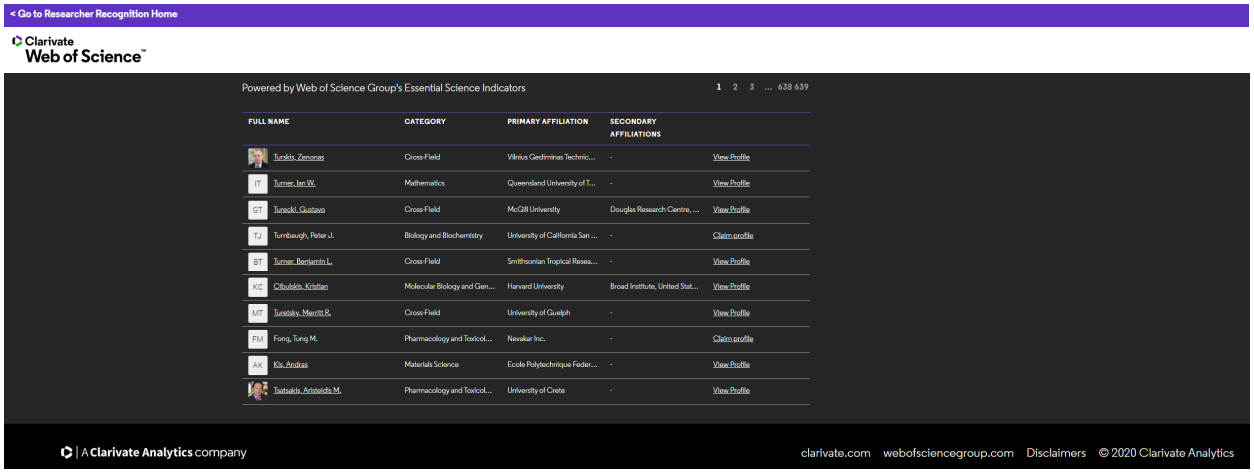
International recognition

Congratulations to the members of EWG-ORSDCE prof. Edmundas Kazimieras Zavadskas and prof. Zenonas Turskis recognized being among the world's most influential researchers of the past decade, demonstrated by the production of multiple highly-cited papers that rank in the top 1% by citations for field and year in Web of Science. Experts from the Institute for Scientific Information provide exclusive insight into the list of Highly Cited Researchers 2020, including the methodology, country, and institutional breakdowns, and much more.





Find more here: https://recognition.webofscience.com/awards/highly-cited/2020/

Vilnius Gediminas Technical University (VILNIUS TECH) scientists are among the 2 percent best in the world

The Stanford University in the United States currently ranks second among the best educational institutions in the world. Group of professors, led by John P. A. loannidis and working at the university, published an article outlining a new methodology for evaluating scientists (Ioannidis

et al., 2019). Professor John P. A. loannidis, according to the Scopus database, is the author and co-author of 1189 articles with *h*-160 and citations 127,048 times. It publishes up to 86 articles each year and has 6,240 co-authors.

The database published in the article is updated annually. According to the article among 2 percent of the best scientists in the world last year were two VILNIUS TECH researchers – chief researcher prof. habil. dr. E.K. Zavadskas and prof. dr. Z. Turskis.

An article with a selection of 2 percent of the world's most cited scientists based on the authors' complex C index can be found here.

The following is an excerpt from the article summary (Ioannidis et al., 2019): "Citation metrics are widely used and misused. We have created a publicly available database of 100,000 top scientists that provides standardized information on citations, h-index, coauthorship-adjusted hm-index, citations to papers in different authorship positions, and a composite indicator. Separate data are shown for career-long and single-year impact. Metrics with and without self-citations and ratio of citations to citing papers are given. Scientists are classified into 22 scientific fields and 176 subfields. Field- and subfield-specific percentiles are also provided for all scientists who have published at least five papers. Career-long data are updated to end of 2017 and to end of 2018 for comparison".

An opinion on the methodology used can also be obtained from the information provided in article (Ioannidis et al., 2016): "We have tried to offer a solution to overcome many of the technical problems and provide a comprehensive database of a sufficiently large number of most-cited scientists across science. Here, we used Scopus data to compile a database of the 100,000 most-cited authors across all scientific fields based on their ranking of a composite indicator that considers six citation metrics (total citations; Hirsch h-index; coauthorship-adjusted Schreiber hm-index; number of citations to papers as single author; number of citations to papers as single or first author; and number of citations to papers as single, first, or last author".

The list also included 27 scientists from Lithuania, 6 of them from VILNIUS TECH, working in the field of civil engineering, engaged in decision-making and application.

The full list of scientists can be found here.

The field of civil engineering includes construction mechanics, construction structures, building materials, geotechnics, construction technology, organization, management, construction contracts, supply chains, decision support systems, construction design and execution information provision.

VILNIUS TECH scientists have been working in this field for more than 40 years. The methods developed are widely used in other fields of science. That is why they are on the list of the most cited scientists.

The professors on the list are members of the editorial boards of several dozen foreign journals, and guest editors of about 30 thematic issues of foreign journals. They regularly publish articles in Q1 journals, collaborating with at least 10 top-ranked professors (included in The Highly Cited Researchers™ list from Clarivate™) from the U.S., Europe and Asia.

The selection was carried out from 42,054 scientists working in the field. 1,074 scientists were among the top 2 percent.

According to the rating data VILNIUS TECH honorary doctor from the USA prof. Hojjat Adeli occupies the second place in the list.

Editorial board members of the Journal of Civil Engineering and Management published by VILNIUS TECH professors H. Adeli, V. Babrauskas, A. Nowak from the USA, Z. Kala from the Czech

Republic, and D. Camotim from Portugal were among the 2 percent of the best scientists in the world.

From the VILNIUS TECH community, E.K. Zavadskas, Z. Turskis, A. Kaklauskas, J. Antuchevičienė, H. Sivilevičius, L. Ustinovičius were included in the list.

Five of these researchers work in the development of decision-making methods. These methods are widely used not only in the listed fields of civil engineering, but also in other fields of science. That is why they are on the lists of the most cited scientists. It is also important that VILNIUS TECH has been working in this field for a more than 40 years.

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Newly developed or extended methods

Wen, Z., Liao, H., & Zavadskas, E. K. (2020). MACONT: Mixed Aggregation by Comprehensive Normalization Technique for Multi-Criteria Analysis. *Informatica*, *31*(4), 857-880. https://doi.org/10.15388/20-INFOR417

Abstract
Normalization and aggregation are two most important issues in multi-criteria analysis. Although various multi-criteria decision-making (MCDM) methods have been developed over the past several decades, few of them integrate multiple normalization techniques and mixed aggregation approaches at the same time to reduce the deviations of evaluation values and enhance the reliability of the final decision result. This study is dedicated to introducing a new MCDM method called Mixed Aggregation by COmprehensive Normalization Technique (MACONT) to tackle complicate MCDM problems. This method introduces a comprehensive normalization technique based on criterion types, and then uses two mixed aggregation operators to aggregate the distance values between each alternative and the reference alternative on different criteria from the perspectives of compensation and non-compensation. An illustrative example is given to show the applicability of the proposed method, and the advantages of the proposed method are highlighted through sensitivity analyses and comparative analyses.

Keshavarz-Ghorabaee, M., Amiri, M., Hashemi-Tabatabaei, M., Zavadskas, E. K., Kaklauskas, A. (2020). A New Decision-Making Approach Based on Fermatean Fuzzy Sets and WASPAS for Green Construction Supplier Evaluation. *Mathematics*, *8*(12), 2202. https://doi.org/10.3390/math8122202

Abstract
The construction industry is an important industry because of its effects on different aspects of human life experiences and circumstances. Environmental concerns have been considered in designing and planning processes of construction supply chains in the recent past. One of the most crucial problems in managing supply chains is the process of evaluation and selection of green suppliers. This process can be categorized as a multi-criteria decision-making (MCDM) problem. The aim of this study is to propose a novel and efficient methodology for evaluation of green construction suppliers with uncertain information. The framework of the proposed methodology is based on weighted aggregated sum product assessment (WASPAS) and the simple multi-attribute rating technique (SMART), and Fermatean fuzzy sets (FFSs) are used to deal with uncertainty of information. The methodology was applied to a green supplier evaluation and selection in the construction industry. Fifteen suppliers were chosen to be evaluated with respect to seven criteria including “estimated cost”, “delivery efficiency”, “product flexibility”, “reputation and management level”, “eco-design”, and “green image pollution”. Sensitivity and comparative analyses were also conducted to assess the efficiency and validity of the proposed methodology. The analyses showed that the results of the proposed methodology were stable and also congruent with those of some existing methods.

Zavadskas, E. K., Bausys, R., Lescauskiene, I., & Omran, J. (2020). M-generalised q-neutrosophic MULTIMOORA for Decision Making. *Studies in Informatics and Control*, *29*(4), 389-398. https://doi.org/10.24846/v29i4y202001

Abstract
Different frameworks can be chosen to solve multicriteria decision making (MCDM) problems emerging in business, economy, health care, engineering and other areas. Uncertainty, vagueness and non-rigid boundaries of the initial information are frequently noticed when dealing with the practicalities of the MCDM tasks. Single-valued neutrosophic sets are considered as the effective tool to express uncertainty of the information, however in some cases it lacks the desirable generality and flexibility. The m-generalized q-neutrosophic sets (mGqNNs) were recently proposed to deal with this situation. The novel MCDM methodology MULTIMOORA-mGqNN is presented in this paper. An illustrative example that analyses the effectiveness of different cable root management decisions for the application in chemical industry is also provided to demonstrate the practicalities of the MULTIMOORA-mGqNN.

Mitrović Simić, J., Stević, Ž., Zavadskas, E. K., Bogdanović, V., Subotić, M., & Mardani, A. (2020). A Novel CRITIC-Fuzzy FUCOM-DEA-Fuzzy MARCOS Model for Safety Evaluation of Road Sections Based on Geometric Parameters of Road. *Symmetry*, *12*(12), 2006. https://doi.org/10.3390/sym12122006

Abstract
Trends of globalization very often cause the emergence of phenomena that asymmetrically affect the overall sustainability of the transport system. In order to predict certain situations and potentially be able to manage the transport system, it is necessary to manage risk situations and traffic safety in a timely manner. This study has conducted an investigation which implies defining the level of safety of a total of nine sections of two-lane roads. The main aim of the paper is to create a new multiphase model consisting of CRITIC (The CRiteria Importance Through Intercriteria Correlation), Fuzzy FUCOM (Full Consistency Method), DEA (Data Envelopment Analysis), and Fuzzy MARCOS (Measurement Alternatives and Ranking according to the COmpromise Solution) methods for determining the level of traffic safety on road sections under the conditions of uncertainty. In order for the created model to be adequately applied, eight parameters were created, and they were classified through four inputs and four outputs. To calculate the significance of the inputs, the CRITIC method based on the symmetric correlation matrix was used, and taking into account the nature of the outputs, the Fuzzy FUCOM method based on averaged values using the fuzzy Bonferroni Mean (BM) operator was applied to determine their weights. To determine the degree of safety, the DEA model was created. After that, the Fuzzy MARCOS method was used in order to determine the final ranking of the remaining five sections of the road network. Finally, the verification of results was performed through three phases of Sensitivity Analysis (SA).

Zhang, H., Liao, H., Wu, X., Zavadskas, E. K., & Al-Barakati, A. (2020). Internet Financial Investment Product Selection with Pythagorean Fuzzy DNMA Method. *Inzinerine Ekonomika-Engineering Economics*, *31*(1), 61-71. https://doi.org/10.5755/j01.ee.31.1.23255

Abstract
The number of products based on internet financial platform has increased dramatically, but due to the lack of effective regulatory system and the information barrier of investors, product returns have been greatly discounted and investment risks have been greatly increased. How to select high-quality products in internet finance based on several indicators is an important multiple criteria decision making problem. In this regard, this study develops a Pythagorean fuzzy double normalization-based multiple aggregation (PF-DNMA) method to solve the problem of selecting internet financial products. Firstly, the key factors for evaluating internet financial products are identified. Observing that the Pythagorean fuzzy set is an effective tool to express evaluation information, we then extend the original multiple criteria decision making method named the double normalization-based multiple aggregation method to Pythagorean fuzzy environment. The PF-DNMA method is characterized by two normalization techniques and three aggregation tools, and thus is effective and robust in solving multiple criteria decision making problems. We deal with an internet financial investment problem by the PL-DNMA method and provide some comparative analyses with the Pythagorean fuzzy TOPSIS and VIKOR methods to illustrate the effectiveness of the proposed method.

Mahdiraji, H. A., Zavadskas, E. K., Skare, M., Kafshgar, F. Z. R., & Arab, A. (2020). Evaluating strategies for implementing industry 4.0: A hybrid expert oriented approach of BWM and interval valued intuitionistic fuzzy TODIM. *Economic Research-Ekonomska Istraživanja*, *33*(1), 1600–1620. https://doi.org/10.1080/1331677X.2020.1753090

Abstract
Developing and accepting industry 4.0 influences the industry structure and customer willingness. To a successful transition to industry 4.0, implementation strategies should be selected with a systematic and comprehensive view to responding to the changes flexibly. This research aims to identify and prioritise the strategies for implementing industry 4.0. For this purpose, at first, evaluation attributes of strategies and also strategies to put industry 4.0 in practice are recognised. Then, the attributes are weighted to the experts' opinion by using the Best Worst Method (BWM). Subsequently, the strategies for implementing industry 4.0 in Fara-Sanat Company, as a case study, have been ranked based on the Interval Valued Intuitionistic Fuzzy (IVIF) of the TODIM method. The results indicated that the attributes of 'Technology', 'Quality', and 'Operation' have respectively the highest importance. Furthermore, the strategies for "new business models development', 'Improving information systems' and 'Human resource management' received a higher rank. Eventually, some research and executive recommendations are provided. Having strategies for implementing industry 4.0 is a very important solution. Accordingly, multi-criteria decision-making (MCDM) methods are a useful tool for adopting and selecting appropriate strategies. In this research, a novel and hybrid combination of BWM-TODIM is presented under IVIF information.

Huang, M., Zhang, X., Ren, R., Liao, H., Zavadskas, E. K., & Antuchevičienė , J. (2020). Energy-saving building program evaluation with an integrated method under linguistic environment. *Journal of Civil Engineering and Management*, *26*(5), 447-458. https://doi.org/10.3846/jcem.2020.12647

Abstract
In the context of sustainable development, building energy conservation has become the development trend of the construction industry. The selection of energy-saving building program, as a multi-criteria decision-making (MCDM) problem, has a direct influence on the actual energy-saving effect. In this paper, an integrated MCDM method combining the extended best worst method (BWM) and Weighted Aggregated Sum Product Assessment (WASPAS) method is proposed to solve the energy-saving building program selection problem under the linguistic Pythagorean fuzzy environment. The Linguistic Pythagorean fuzzy sets (LPFSs) are used to model the uncertain evaluation information of experts. The extended BWM is developed to determine the weights of criteria, while the extended WASPAS method is proposed to determine the ranking of alternatives. To validate the applicability and reliability of the proposed method, this paper presents a numerical example of the selection problem for energy-saving building programs. Some managerial insights are also given for practitioners to use the proposed method.

Podvezko, V., Zavadskas E. K., & Podviezko, A. (2020). An extension of the new objective weight assessment methods CILOS and IDOCRIW to fuzzy MCDM. *Economic Computation and Economic Cybernetics Studies and Research*, *54*(2), 59-76. https://doi.org/10.24818/18423264/54.2.20.04

Abstract
Weights of criteria are playing a significant role in the wide range of MCDM (multiple criteria decision making) evaluation models. Results of evaluation significantly depend on magnitudes of weights as they proportionally transmit importance of each criterion to the final result of evaluation along with values of criteria placed in the decision matrix. There are two broad categories of methods for eliciting weights of criteria, subjective and objective. The former methods are based on opinions of experts, while the latter group of methods reflects the structure of data. The entropy method can be found within the most popular group of objective methods; it reflects the degree of diversification among values of criteria. Shortcomings of the entropy method are explained in the paper, especially the ones that are arising in the way of its extension to fuzzy MCDM. The authors propose extension of the earlier introduced criterion impact loss (CILOS) method to fuzzy MCDM that mitigate some shortcomings of the entropy. The latter method is based on the losses of values of criteria comparing to the ones that belong to the alternative with the best values. In the paper extension FIDOCRIW (Fuzzy Integrated Determination of Objective CRIteria Weights) of the combination of both above-mentioned methods, entropy and CILOS, to fuzzy MCDM is proposed. Obstacles related to such extension are outlined and described. The paper provides a detailed explanation of the obstacles of extending the methods to fuzzy MCDM. Proposed in the paper FIDOCRIW method retains idea of the IDOCRIW method of combining the entropy with CILOS method. In contrast, the FIDOCRIW processes fuzzy numbers instead of real ones. This comprises uncertainty of data. The method allows to fully retain the fuzzy structure of the decision matrix along the full framework of the method. Resulting fuzzy weights allow to use the full scope of fuzzy MCDM methods, e.g. to comprise FIDOCRIW fuzzy weights with the fuzzy data that describe alternatives. Thus evaluation of alternatives in the environment with a degree of uncertainty can be performed.

Hashemkhani Zolfani, S., Yazdani, M., Zavadskas, E. K., & Hasheminasab, H. (2020). Prospective MADM and Sensitivity Analysis of the Experts Based on Causal Layered Analysis (CLA). *E&M Economics and Management*, *23*(3), 208-223. https://doi.org/10.15240/tul/001/2020-3-013

Abstract
"Multiple Attribute Decision Making (MADM)" is an expert based field which is working based on real data and experts' opinions. So many studies have been doing based on MADM methods which they usually use qualitative data based on experts' ideas. Decisions based on the experts' opinion shall be carefully designed to cope the real problems uncertainty. This uncertainty will be even more intricate if combining the problem with the ambiguity of the future study. Prospective MADM is a future based type of MADM field which is concentrating on decision making and policy making about the future. Prospective MADM (PMADM) can have both explorative and descriptive paradigms in the studies but it will more useful to be applied for strategic planning. In this regard, experts' role would be even more challenging because one/some possible future/futures will be partially designed based on their opinions. Future and prediction always complicates the decision environment, especially methodologies founded on experts' judgement. Considering experts' preferences, attitude, and background, they may be a major source of inaccurate results. Causal Layered Analysis (CLA) is well-known "Futures Studies" method which is qualitative and usually is supporting other methods such as "Backcasting" and "Scenario Planning". CLA has a deep point of view to the subjects to support a future with all those changes which are necessary for the main goal/goals. In this study, this idea will be proposed that CLA can be added to PMADM outline to decrease the risk of unsuitable decisions for the future and for this aim a case study about energy and CO2 consumption in policy making level proposed and a hybrid MADM method based on BWM-CoCoSo applied in the PMADM outline for the procedure.

Lai, H., Liao, H., Wen, Z., Zavadskas, E. K., & Al-Barakati, A. (2020). An Improved CoCoSo Method with a Maximum Variance Optimization Model for Cloud Service Provider Selection. *Inzinerine Ekonomika-Engineering Economics*, *31*(4), 411-424. https://doi.org/10.5755/j01.ee.31.4.24990

Abstract
With the rapid growth of available online cloud services and providers for customers, the selection of cloud service providers plays a crucial role in on-demand service selection on a subscription basis. Selecting a suitable cloud service provider requires a careful analysis and a reasonable ranking method. In this study, an improved combined compromise solution (CoCoSo) method is proposed to identify the ranking of cloud service providers. Based on the original CoCoSo method, we analyze the defects of the final aggregation operator in the original CoCoSo method which ignores the equal importance of the three subordinate compromise scores, and employ the operator of "Linear Sum Normalization" to normalize the three subordinate compromise scores so as to make the results reasonable. In addition, we introduce a maximum variance optimization model which can increase the discrimination degree of evaluation results and avoid inconsistent ordering. A numerical example of the trust evaluation of cloud service providers is given to demonstrate the applicability of the proposed method. Furthermore, we perform sensitivity analysis and comparative analysis to justify the accuracy of the decision outcomes derived by the proposed method. Besides, the results of discrimination test also indicate that the proposed method is more effective than the original CoCoSo method in identifying the subtle differences among alternatives.

Mousavi, S. M., Foroozesh, N., Zavadskas, E. K., & Antucheviciene, J. (2020). A new soft computing approach for green supplier selection problem with interval type-2 trapezoidal fuzzy statistical group decision and avoidance of information loss. *Soft Computing*, *24*(16), 12313–12327. https://doi.org/10.1007/s00500-020-04675-4

Abstract
Green supplier selection problem (GSSP) is viewed as multiple attributes group decision-making (MAGDM) issue that includes the green growth and influential factors within subjective and objective natures. Because of the expanding uncertain conditions of social and economic environments, some assessment factors are not sufficiently described by numerical appraisals and classic fuzzy sets. Moreover, supply chain decision makers (DMs) may not provide complete rationality under numerous viable choice circumstances. In this research, a new MAGDM model is proposed by interval type-2 trapezoidal fuzzy numbers (IT2TrFNs) via some matrices of possibilistic mean and standard deviation statistical concepts. A new weighting method of experts within the group decision-making process is developed based on possibilistic statistical information. Also, a new ranking process based on relative-closeness coefficients is presented to rank all green supplier candidates under IT2TrF uncertainty. Finally, this research offers an illustrative example in supply chain networks to appraise green supplier candidates in terms of some factors by the proposed model along with the comparison to a recent decision method.

Kaklauskas, A., Zavadskas, E. K., Schuller, B., Lepkova, N., Dzemyda, G., Sliogeriene, J., & Kurasova, O. (2020). Customized ViNeRS Method for Video Neuro-Advertising of Green Housing. International Journal of Environmental Research and Public Health, 17(7), 2244. https://doi.org/10.3390/ijerph17072244

Abstract
The implementation of advertising for green housing usually involves consideration of individual differences among potential buyers, their desires for residential unit features as well as location impacts on a selected property. Much more rarely, there is consideration of the arousal and valence, affective behavior, emotional, and physiological states of possible buyers of green housing (AVABEPS) while they review the advertising. Yet, no integrated consideration of all these factors has been undertaken to date. The objective of this study was to consider, in an integrated manner, the AVABEPS, individual differences, and location impacts on property and desired residential unit features. During this research, the applications for the above data involved neuromarketing and multicriteria examination of video advertisements for diverse client segments by applying neuro decision tables. All of this can be performed by employing the method for planning and analyzing and by multiple criteria and customized video neuro-advertising green-housing variants (hereafter abbreviated as the ViNeRS Method), which the authors of this article have developed and present herein. The developed ViNeRS Method permits a compilation of as many as millions of alternative advertising variants. During the time of the ViNeRS project, we accumulated more than 350 million depersonalized AVABEPS data. The strong and average correlations determined in this research (over 35,000) and data examination by IBM SPSS tool support demonstrate the need to use AVABEPS in neuromarketing and neuro decision tables. The obtained dependencies constituted the basis for calculating and graphically submitting the ViNeRS circumplex model of affect, which the authors of this article developed. This model is similar to Russell's well-known earlier circumplex model of affect. Real case studies with their related contextual conditions presented in this manuscript show a practical application of the ViNeRS Method.

New scientific papers

The list presents papers co-authored by the members of EWG-ORSDCE and published in 2020 only in journals with IF.

Ali Mirnezami Seyed; Meysam Mousavi Seyed; Antuchevičienė Jurgita; Mohagheghi Vahid. A new approach for multi-scenario project cash flow analysis based on todim and critical chain methods under grey uncertainty. Economic computation and economic cybernetics studies and research. vol. 54, iss. 2 (2020), p. 263-279.

Al-Refaie Abbas; Al-Shalaldeh Heba; Lepkova Natalija. Proposed procedure for optimal maintenance scheduling under emergent failures. Journal of civil engineering and management. vol. 26, iss. 4 (2020), p. 396-409.

Al-Refaie Abbas; Al-Tahat Mohammad; Lepkova Natalija. Modelling relationships between agility, lean, resilient, green practices in cold supply chains using ISM approach. Technological and economic development of economy. vol. 26, iss. 4 (2020), p. 675-694.

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New journal established

Journal of Smart Environments and Green Computing (JSEGC) is an international, peer-reviewed, open access journal (https://segcjournal.com/)

Editor-in-Chief

Witold Pedrycz

Professor, Department of Electrical and Computer Engineering, University of Alberta, Edmonton, Canada

Pedrycz W. Welcome to the exciting world of "Green Computing and Smart Environments". *J Smart Environ Green Comput* 2021;1:1-2. http://dx.doi.org/10.20517/jsegc.2020.01

Aims and Scope

Green Computing refers to a multi-faceted and environmentally sustainable computing environment. In a broad sense, Green Computing focuses on the environmentally responsible and eco-friendly usage of computers being central to the formation of smart environments, exploration of their resources and efficient applications. As such, within this framework, one concentrates on the studies of designing, manufacturing/engineering, using and disposing of computing devices to reduce their environmental impact thus making them environmentally sustainable. Green computing is important for all classes of systems, ranging from handheld devices to large-scale data centers. Green initiatives including renewable energy, smart grids, energy efficiency are essential to the holistic, well thought out buildup of the smart environments. They are of fundamental relevance given the omnipresence of computers when offering solutions to a plethora of problems encountered in smart cities, Internet of Things (IofT), sensor networks, diverse communication channels, user-centricity and centrality of systems, AI-oriented tasks, high complex systems, supporting strategic decisions, high scale logistic problems, rapid crises response strategies, decision-making processes and risk assessment in complex and varying and unpredictable environments.

There has been a great deal of interest in the research discipline of Green Computing as well as its practical implications and a number of journals have expressed vital interest there, however from different albeit somewhat limited viewpoints thus lacking a badly needed broader perspective.

So far there has not been a unified platform that could fill this acute gap by bringing a publishing venue with an ultimate focus on green computing studied in a holistic and unified manner. The ultimate objective of this journal is to bring to the research community and practitioners a stable and recognized platform to disseminate crucial, timely, and far-reaching research results as well as establish a broad forum for fostering vital discussions and accelerate further progress. The main areas of interest include the following:

- Power Supply
- Power Management
- Algorithmic Developments and Deployment Strategies for Green Computing
- Energy Management in Data Centres
- Green Cloud Computing in Energy Efficiency
- Green Wireless Networks
- Green Cloud Computing
- Green Parallel Computing with Big Data and Data Analytics
- Smart Cities
- Smart Grid, Smart Agriculture, Smart Ocean

- E-learning, Smart education, E-health
- Ambient Intelligence
- Product Recycling and Recycling Strategies
- Advantages and Challenges of Green Computing
- Green Computing and Smart Cities
- Ambient Intelligence-Based Green Computing
- Applications to Manufacturing, Health, Energy Sector, and Education
- Green Virtual Technologies
- Green Monitoring Systems
- Green Energy
- Societal Issues

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All articles in this journal have undergone editorial screening and a single-blind peer review by at least two reviewers. For more details, please refer to Editorial Process and Peer Review Guidelines.

Journal Information and Statistics
Publication model: Open access
Digital archive: Portico
Frequency: Quarterly

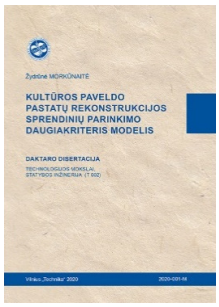
Recently finished and ongoing research projects

No.	Programme	Project	Short name	Date from - to	Responsible person (project manager)
1	HORIZON2020	Regeneration and Optimisation of Cultural heritage in creative and Knowledge cities https://rockproject.eu/	ROCK	2017-2020	Prof. Habil. Dr. Artūras Kaklauskas
2	HORIZON2020	BIM based tools for fast & efficient renovation https://bim4ren.eu/	BIM4REN	2018-2022	Prof. Habil. Dr. Artūras Kaklauskas
3	HORIZON2020	Students Achieving Valuable Energy Savings https://saves.unioncloud.org/articles/welcome-to-saves2	SAVES2	2017-2020	Prof. Dr. Audrius Banaitis
4	HORIZON2020	Network for Using BIM to Increase the Energy Performance http://www.net-ubiep.eu/lt/home-lt/	Net-UBIEP	2017-2019	Assoc. Prof. Dr. Tatjana Vilutienė

PhD Dissertations defended during 2020

Žydrūnė MORKŪNAITĖ

MULTIPLE CRITERIA MODEL FOR RECONSTRUCTION DECISIONS SELECTION OF CULTURAL HERITAGE BUILDINGS



Supervisor

Prof. Dr Habil. Edmundas Kazimieras ZAVADSKAS

Object of the thesis

The research object of this thesis is reconstruction decisions of cultural heritage buildings.

Aim of the thesis

The main aim of this thesis is to propose a multiple criteria model for reconstruction decisions selection of cultural heritage buildings based on issues of cultural heritage buildings preservation and restoration.

Research methodology

This dissertation is based on analysis of publications, researched and reports of foreign and Lithuanian scientists. The data of legislation of UNESCO and Lithuanian heritage preservation, and scientific research served as a basis for developing the framework of criteria for the evaluation of cultural heritage buildings reconstruction. Expert analysis and multiple criteria methods (EDAS, PROMETHEE and WASPAS-SVNS) were applied in the research. The criteria weights were established with the help of expert judgment, AHP and SWARA methods.

Practical value of the research findings

Research findings may be useful for the Department of Cultural Heritage under the Ministry of Culture, owners of cultural heritage buildings, clients and customers, seeking properly to decide cultural heritage projects for their implementation, and to select conscientious, careful and qualified contractor for cultural heritage buildings. A multiple criteria model for reconstruction decisions selection of cultural heritage buildings was proposed, evaluating the heritage buildings preservation. In case of the practical application of the multiple criteria model of reconstruction, the funding for public procurement could be reduce and increase the funding for heritage building performances. This allocation of annual funding could ensure cultural heritage buildings preservation, restoration and reconstruction in time. Whereas, the appropiate cultural heritage buildings projects realization and innovation depend on qualified contractor selection.

Defended statements

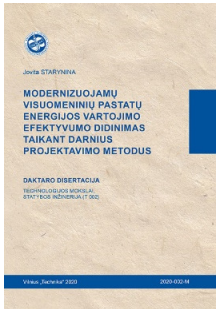
1. A multiple criteria model for reconstruction decisions selection of cultural heritage buildings provides opportunities to identify the necessity of preservation, restoration and reconstruction of cultural heritage buildings, according to heritage problems, and goals and reguirements of users, owners and regulatory authorities of cultural heritage buildings.
2. Application of multi–criteria decision making methods allows to evaluate the optional solution of complicated cultural heritage projects and their implementation, difficult contractor selection and to select the most rational alternatives.
3. Application of multi-criteria decision making methods allows the comparison of the optional solutions to tasks (such as determine the priority of implementation of cultural heritage projects, to select proper and qualified contractor and to determine indicators for adaptive reuse of cultural heritage buildings) and the selection of the most rational alternative.

Approval of the research findings

The key research findings were announced in eight research papers.

Jovita STARYNINA

ENERGY EFFICIENCY IMPROVEMENT IN MODERNIZATION OF PUBLIC BUILDINGS USING SUSTAINABLE DESIGN METHODS



Supervisor

Prof. Dr Habil. Leonas USTINOVIČIUS

The object of the research

Evaluation of the efficiency of modernization options and solutions for public buildings, and the development of an algorithm based on digital technologies (BIM).

Research methodology

Preparation of the thesis is based on publications of foreign and Lithuanian scientists, researches, data of construction companies, construction and design regulating laws, construction technical regulations, construction law, BIM standards. Experimental evaluation, systematization of data, graphical representation of data are performed. The decision-making method, method of synthesis of modernization options, multicriteria analysis are used to evaluate the efficiency of modernization. Publications of various construction industry institutions, reports, statistics of Lithuanian and foreign institutions are used. Technical information of BIM software manufacturers, various reports, methodology of calculating payback are analyzed.

Practical value of the research findings

The developed modernization algorithm model can be applied to BIM environment for planning or development of housing projects and for building modernization. These research results are useful for investment project developers, designers and constructors, building owners, as the system generates thousands of alternative recommendations and selects the most rational options for a specific case for safe and healthy housing. The obtained results can also be applied to the planning of static energy losses of state institutions in the framework of modernization strategies.

Defended statements

1. The optimization algorithm model is developed, which can be applied to information modeling (BIM) environment, modernization and reconstruction of public buildings.
2. The solution model for modernization screening measures has been developed, which allows to determine the most effective combination of structural and engineering equipment solutions when renovating buildings.
3. By analyzing the application of building modernization and the benefits of BIM, it is possible to develop an automated building modernization decision making algorithm

Approval of the research findings

7 scientific articles have been published on the topic of the dissertation.

Editor's comments

Dear EWG-ORSDCE members, dear friends,

In year 2021 all members of EWG-ORSDCE are welcome to participate in the forthcoming 18th Colloquium „New Trends in Construction Management ", and 8th meeting of EURO working group OR in Sustainable Development and Civil Engineering that will be held on 20th of May, 2021 in Cracow University of Technology, Poland. In addition, you are invited to the 31st European Conference On Operational Research (EURO 2021) to be held on 11-14 July, 2021 Athens, Greece and the 22nd Conference of the International Federation of Operational Research Societies (IFORS 2021) to be held August 22 (Sun) - 27 (Fri), 2021 at Hanyang University in Seoul, South Korea. EURO Working Group "OR in Sustainable Development and Civil Engineering (ORSDCE)" will organize the invited sessions in the field "OR for Sustainable Development". The papers presented in this session are welcome for publishing in scientific journals: *Technological and Economic Development of Economy, Journal of Civil Engineering and Management, Journal of Business Economics and Management, International Journal of Strategic Property Management,* and *Engineering Structures and Technologies*.

On behalf of the Editorial Board of EWG-ORSDCE Newsletter
Audrius Banaitis

EWG-ORSDCE Newsletter Editorial Board: Edmundas Kazimieras Zavadskas, Tatjana Vilutienė, Audrius Banaitis