

## The 39th Multivariate Statistical Analysis MSA 2021. Conference Report

Marta Małecka,<sup>a</sup> Artur Mikulec<sup>b</sup>

The 39th Multivariate Statistical Analysis MSA 2021 international scientific conference was held on November 8–10, 2021 in Łódź, at the Faculty of Economics and Sociology of the University of Łódź. The conference was organised by the Department of Statistical Methods of the University of Łódź in collaboration with the Institute of Statistics and Demography of the University of Łódź, the Committee of Statistics and Econometrics of the Polish Academy of Sciences and the Łódź branch of the Polish Statistical Association. The honorary patronage over the conference was taken by Elżbieta Żądzińska, Rector of the University of Łódź, and Dominik Rozkrut, President of Statistics Poland.

The conference was organised in co-operation with the MASEP (Measurement and Assessment of Social and Economic Phenomena) conference, arranged by the Department of Economic and Social Statistics of the University of Łódź. The conference received financial support from the Ministry of Education and Science (MEiN) as part of the ‘Excellent Science’ programme (DNK/SP/515427/2021). Educational activities related to the conference were supported by the National Bank of Poland (NBP) as part of its educational project (NBP-DEW-WPE-AB-0662-0226-2021) which corresponds to NBP’s priority areas of economic education – ‘New horizons of economic thought’. StatSoft Polska Sp. z o.o. was also the content partner of the conference. Prof. Czesław Domański was the chairman of the Scientific Committee, while the Organising Committee was chaired by Alina Jędrzejczak, Assoc. Prof. of the University of Łódź.

The main goal of the MSA 2021 conference was to provide an international forum for the discussion and exchange of ideas and views on the development of statistics as a science. The specific objectives included:

- the presentation of the latest achievements in the field of multidimensional statistical analysis;
- disseminating knowledge in the field of data analysis and the application of statistical methods in other scientific disciplines, especially in economics, sociology and finance, as well as the exchange of experiences;
- creating a bridge between science (statistics) and research practice (individual users, business and administration).

<sup>a</sup> University of Łódź, Department of Statistical Methods, ul. Rewolucji 1905 r. nr 41, 90-214 Łódź, e-mail: marta.malecka@uni.lodz.pl, ORCID: <https://orcid.org/0000-0003-4465-9811>.

<sup>b</sup> University of Łódź, Department of Statistical Methods, ul. Rewolucji 1905 r. nr 41, 90-214 Łódź, e-mail: artur.mikulec@uni.lodz.pl, ORCID: <https://orcid.org/0000-0001-8249-2296>.

The MSA 2021 conference was held in hybrid form: in-person and online. 84 participants from various academic centres in Poland attended the event, including representatives from Gdańsk, Katowice, Kraków, Lublin, Łódź, Poznań, Radom, Szczecin, Warsaw and Wrocław, as well as representatives of Statistics Poland and the Statistical Office in Łódź. The conference also hosted members of the academic society from abroad: the Czech Republic, India, Iran and Italy. The conference consisted of 15 sessions (plenary and parallel), with 63 papers presented.

The conference was opened by the Chairwoman of the Organising Committee, Alina Jędrzejczak. On behalf of Elżbieta Żądzińska, Rector of the University of Łódź, the conference participants were welcomed by Agnieszka Kurczewska, Vice-Rector for External Relations. Subsequently, short welcome speeches were given by Ewa Kusideł, Vice-Dean for Science (Faculty of Economics and Sociology, University of Łódź) and the Chairman of the Scientific Committee, Czesław Domański (University of Łódź).

According to the tradition of the MSA conference, the first plenary session was devoted to prominent representatives of the historical statistical thought and to the memory of statisticians who have recently passed away. This session was chaired by Bronisław Ceranka (Poznań University of Life Sciences). The first lecture, devoted to the life and scientific work of Antoni Łomnicki (1881–1941), a probabilist and statistician, was given by Mirosław Krzyśko (Adam Mickiewicz University in Poznań). The next speaker was Czesław Domański (University of Łódź), who presented the images of Józef Kleczyński (1841–1900), the precursor of population estimation between censuses, and Kazimierz Władysław Kumaniecki (1880–1941), the initiator of the Polish Statistical Society and the first Statistical Yearbook – Polish Statistics. In this session, the profiles of three famous Polish statisticians who passed away last year were recalled:

- ‘Dominik Szynal – creator of the probabilistic environment in Lublin’ – by Mariusz Bieniek (Maria Curie-Skłodowska University);
- ‘Daniel Kosiorowski – an outstanding Krakow statistician’ – by Józef Pociecha (University of Economics in Krakow);
- ‘Ryszard Walkowiak – statistician and naturalist’ – by Małgorzata Graczyk (University of Life Sciences in Poznań).

During the conference, there were four open lectures delivered by the invited speakers:

- ‘Harnessing the power of Earth observation for official statistics’ – Dominik Rozkrut (Statistics Poland);
- ‘About the sampling plans depending on the position statistics of the auxiliary variable’ – Janusz Wywiół (University of Economics in Katowice);
- ‘The appearance of the Rawlsian Paradox when neglecting income dependence of the random equivalence scales’ – Stanisław Maciej Kot (Gdańsk University of Technology);

- ‘Graphical and computational tools to guide parameter choice for robust clusterwise regression’ – Francesca Greselin (University of Milan).

A broad range of topics related to the theory and application of mathematical statistics was covered during parallel sessions which focused in particular on the following groups of issues:

1. The theory of statistical methods. The papers presented at the conference related to both estimation and statistical inference. Studies from the area of taxonomic issues were also presented. Outliers, fuzzy numbers, Big Data, bootstrapping techniques and text recognition were among the variety of the discussed topics.
2. Macroeconomic applications. This thematic group included issues related to macroeconomic interventions, inflation and the use of modern data collection methods such as scanner data on web-scraped data.
3. Demographic and social issues. A large group of papers concerned the labour market. There were debates on many social issues relating to disabled or older people, retirement benefits and the quantification of poverty. In the area of demography, topics such as birth dynamics and cities demography were discussed. A number of papers dealt with social issues related to the COVID-19 pandemic.
4. Sustainable development. Among social topics, a special place was taken by discussions on sustainable development, relating in particular to the impact of economic activity on the environment, air quality, water demand depending on the weather conditions or the transformation of cities.
5. Business applications. The conference discussions covered the following areas within business applications: energy consumption forecasts, logistics, duration of business entities, micro-enterprise statistics, investment potential of voivodships, industrial transformation, identification of bid rigging, organisational security culture.
6. Financial market. A separate group of topics within statistical applications was the use of statistical methods in financial market analysis. The presented papers dealt with issues such as: the relationship between the COVID-19 pandemic and exchange rates, the cryptocurrency market, banking scoring models, financial efficiency of insurance companies and the modelling of systemic risk in the insurance sector.

A detailed list of topics is available at <https://sites.google.com/view/msa2021pl/archiwum/msa-2021>.

The next Multivariate Statistical Analysis MSA conference will be held at the University of Łódź on November 7–9, 2022.