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STATISTICAL SCIENCE IS INTERNATIONAL – AND SURVEY STATISTICS IS COOL AND HOT

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Abstract. The paper presents a short history of international cooperation in statistics, formation of statistical associations and their activities in the world and in the Nordic countries. The cooperation background for Baltic and Nordic statisticians before 1992 is presented. The contents of the activities of the Baltic–Nordic–Ukrainian Network on Survey Statistics is highlighted.

Keywords: International Statistical Institute, statistical associations, survey statistics, cooperation network.

1. Introduction

Great achievements are usually reached by groups of people. The exchange of scientific knowledge is as old as science itself. As far as statistical sciences are concerned, we are aware of a great deal of correspondence that took place in the era of Hyugens and Pascal. The history of statistics shows statisticians' pursuit of professional communication, exchange of scientific knowledge and discussion thereof, cooperation and consolidation to professional associations. Nowadays, professional communication takes place in a large number of societies and associations uniting representatives of various fields of statistics, conferences, meetings, workshops and seminars, both national and international, providing a forum for the discussion of statistics. The Baltic–Nordic–Ukrainian Network on Survey Statistics has arisen in the context of the tendency for cooperation of researchers in general and statisticians in particular.

2. Formation of international professional associations

The first national statistical associations started to be organized in the first half of the nineteenth century. At that time, researchers in many fields were striving to found national professional unions: the Royal Agricultural Society was established in western Australia in 1831, the Chemical Society of London was established in 1841, the American Medical Association – in 1847. The aspiration for consolidation also affected statisticians: the Royal Statistical Society (RSS) was founded in the UK in 1834, and the American Statistical Association (ASA) was established in the USA in 1839. It occurred soon that professional communication for statisticians inside the country was too tight. In the middle of the nineteenth century, statisticians from various countries felt the need to meet and present their research results. On the initiative of the Belgian statistician Adolphe Quetelet, the first International Statistical Congress was organized in 1853 in Brussels. It was followed by a sequence of other international statistical congresses, presented in Table 1.

Table 1. List of international statistical congresses

Year	Location
1855	Paris
1857	Vienna
1860	London
1863	Berlin
1867	Florence
1869	The Hague
1872	St. Petersburg
1876	Budapest

When celebrating the anniversary of the RSS in London in 1885, the International Statistical Institute (ISI) was founded. This meeting is called the ISI Congress No 0. 81 people – the elite of that era's statisticians in government and academia – joined the ISI. They developed the structure and statute of the organization. The International Statistical Institute is one of the oldest scientific societies in the world. The period can be characterized as making pushes of science through the borders. The Astronomical Society of the Pacific (ASP) – the first national astronomical organization to be established in the United States – was founded in 1889. Although its name was a reminder of its origins on the Pacific Coast, it soon drew members from around the country and the world. The International Association of Chemical Societies was founded in 1911. The International Union of Pure and Applied Physics was founded in 1922.

Some other international associations for the development of various branches of statistics were founded later:

1895 International Actuarial Association (IAA),
1928 International Union for the Scientific Study of Population (IUSSP),
1930 Econometric Society (ES),
1935 Institute of Mathematical Statistics (IMS),
1935 Psychometric Society (PS),
1947 International Biometric Society (IBS),
1978 International Society for Clinical Biostatistics (ISCB),
1989 The International Environmetrics Society (TIES).

The ISI objectives are defined as the development and improvement of statistical methods and their application throughout the world, all this in the broadest sense of the words. The ISI has meetings, called ISI sessions/congresses, starting from the first one in Rome in 1887, which are regular biennial events. Some of the meetings, which took place in the Nordic region, are: the 7th Congress in Christiania (Oslo), 1899, and the 11th Congress in Copenhagen, 1907. The congresses were held regularly until the 24th conference in Prague, 1938, with a break related to World War II. The next congress was held in New York in 1947. The mission of the ISI was modified in 1947 – to emphasize international communication among statisticians rather than with governments and to support the international promotion and dissemination of research as well as practice of statistics. Up to now, this largely remains the mission of the ISI [6]. Some of the subsequent ISI congresses are presented in Table 2.

Table 2. List of some ISI congresses

Sequence No	Location	Year
30	Stockholm	1957
52	Helsinki	1999
56	Lisbon	2007
57	Durban	2009
58	Dublin	2011
59	Hong Kong	2013
60	Rio de Janeiro	2015

ISI sections, later called associations, started to be organized in 1957; at the moment, there are 7 sections:

1975 Bernoulli Society (BS) for Mathematical Statistics and Probability,
1973 International Association of Survey Statisticians (IASS),
1977 International Association for Statistical Computing (IASC),
1985 International Association for Official Statistics (IAOS),
1991 International Association for Statistical Education (IASE),
2005 International Association for Business and Industrial Statistics (ISBIS),
2008 2008 The International Environmetrics Society (TIES).

Nowadays, the ISI officially includes over 5000 members. About 2000 of them are elected from 100 countries, 95 members are institutional/*ex officio* (representatives of national statistical offices, United Nations agencies, World Health Organization, World Bank Group, etc.), 56 corporate members (universities, central statistical offices, banks and other commercial organizations), and 30 affiliate members (national and regional statistical societies/associations). The

ISI network includes most of the national statistical offices around the world; it also has links with international statistical organizations and selected professional societies. The current system of governance has an elected Council and an Executive Committee, consisting of the President, President-Elect and Vice-Presidents. The President for 2013–2015 is Mr Vijay Nair, Malaysia, and the permanent Office is in the Hague. The ISI General Assembly is made up of the ISI members and meets during the ISI World Statistics Congresses. The Executive Committee and Council, in turn, report to the ISI members during the ISI General Assembly. ISI members can present questions during the meeting.

The ISI associations have their own governance structure, conferences, journals, and other activities. The ISI and its associations work together to serve the needs of the international statistical community. The main journals of the ISI and ISI associations are as follows:

- International Statistical Review & Book Reviews,
- Bulletin of the ISI,
- ISI Newsletter,
- Stochastic Processes and Their Applications,
- Applied Stochastic Models in Business and Industry,
- Bernoulli Journal,
- The Survey Statistician,
- Computational Statistics & Data Analysis,
- Statistical Journal of the IAOS,
- Statistics Education Research Journal,
- Environmetrics,
- Stat.

After the ISI was founded, the process of creation of national statistical associations started. Some examples are as follows:

1901 Statistiska föreningen (SF), Sverige,
1920 Statistiska samfundet i Finland, Finland,
1922 Dansk statistisk forening, Denmark,
1936 Norsk statistisk forening, Norway,
1962 Svenska statistikersamfundet (SSS), Sweden,
1971 Dansk selskab for teoretisk statistik, Denmark,
1992 Lietuvos Statistikų Sajunga, Lithuania,
1992 Eesti Statistikaselts, Estonia,
1998 Belarusian Statistical Association, Belarus,
1999 Latvijas Statistikas Asociācija, Latvia,
2008 Svenska statistikfrämjandet (SSF), Sweden.

The last one – Swedish – statistical organization consolidates people with interest lying in official statistics, and has a section for survey statisticians.

When founded, the ISI had to influence national statistical agencies, with the first and foremost role – to encourage uniformity in statistical definitions and data collection. Some of the national statistical agencies were founded even before the ISI:

1749 Tabellverket, Sweden, the name changed to Statistiska centralbyrån (SCB) in 1858,
1833 Bureau de la Statistique, France, evolved to Institut National de la Statistique et des Etudes Economiques (INSEE) in 1946,
1850 Danmarks statistik, Denmark,
1865 Statistikcentralen, Finland,
1876 Statistisk sentralbyrå, Norway,
1902 US Census Bureau (USCB), USA,
1905 Australian Bureau of Statistics (ABS), Australia,
1914 Hagstofa Islands, Island,
1919 Department of General Statistics, Lithuania, currently – Statistics Lithuania,
1941 Central Statistical Office, UK, evolved to the Office for National Statistics (ONS) in 1996.

Eurostat is the statistical office of the European Union, situated in Luxembourg. Its task is to provide the European Union with statistics at the European level that enable comparisons between countries and regions [3]. Eurostat was established in 1953 to meet the requirements of the Coal and Steel Community. Over the years, its task has broadened, and when the European Community was founded in 1958, it became a Directorate-General (DG) of the European Commission. Eurostat's fields of activity are as follows:

- Statistical information; research and data analysis; technical cooperation;
- Economic statistics;
- Transport; trade statistics;
- Business statistics;
- Social statistics;
- Agricultural, environmental, food and regional statistics;
- Information and dissemination.

Jason T. Girouard shows the importance of statistics in a playful way on a video [2].

The **United Nations (UN)** is an international organization founded in 1945 after World War II by 51 countries committed to maintaining international peace and security, developing friendly relations among nations and promoting social progress, better living standards and human rights. There are now 193 countries in this organization. The United Nations Statistical Commission, established in 1947, is the apex entity of the global statistical system. It brings together the Chief Statisticians from member states from around the world. It is the highest decision-making body for international statistical activities, especially the setting of statistical standards, the development of concepts and methods and their implementation at the national and international level [8].

The Statistical Commission oversees the work of the **United Nations Statistics Division** and is a Functional Commission of the UN Economic and Social Council. The UN Statistics Division, under the United Nations Department of Economic and Social Affairs (DESA), serves as the central mechanism within the Secretariat of the United Nations to meet the statistical needs and coordinate the activities of the global statistical system. The Division compiles and disseminates global statistical information, develops standards and norms for statistical activities, and supports countries' efforts to strengthen their national statistical systems. The UN Statistics Division includes:

- Economic Commission for Europe,
- Economic Commission for Africa,
- Food and Agriculture Organization (FAO),
- Industrial Development Organization (UNIDO),
- UN Population Fund (UNFPA),
- UN Children's Fund (UNICEF),
- UN Educational, Scientific and Cultural Organization (UNESCO).

The ISI is a non-profit, non-governmental organization and has a consultative status at the Economic and Social Council of the United Nations since 1949.

Quick and user-friendly access to economic and social data from the main international organizations is presented in [9].

3. Statistical activities in the Nordic countries

The statisticians of the Nordic countries have deep cooperation traditions. The Nordic Statistical Conference, which convenes once every three years, is a traditional meeting. The Nordic countries alternate in hosting it, and local statistical societies participate in the arrangements. Different topics important for official statistics are chosen for these meetings.

During the past few years, the practice has been to arrange a course on statistical methodology before the conference, targeting, in particular, the younger professionals in the field. Nordic experts have acted as lecturers and have often been joined by other internationally known experts. The list of the Nordic Meetings of Statisticians in Table 3 reflects the tradition.

Table 3. List of some Nordic meetings of statisticians

Sequence No	Location	Year
1	Stockholm	1927
2	København	1936
3	Oslo	1939
4	Stockholm	1946
5	Helsingfors	1949
…	…	…
21	Lillehammer	1998
22	Kalmar	2001
23	Åbo	2004
24	Reykjavik	2007
25	København	2010
26	Bergen	2013

The *Journal of Official Statistics* started to be published in 1985. It is a peer-reviewed scientific journal that publishes papers related to official statistics on statistical methodology and theory, with emphasis on applications. It is published by Statistics Sweden.

Nordstat is a biennial international meeting for statisticians and probabilists, organized by the Nordic countries, which started in 1965. Baltic countries have joined this tradition. The conferences bring together probabilists and statisticians from Northern European countries and the Baltic States to discuss the recent developments on diverse topics in statistics and probability. The list of some Nordstat conferences is presented in Table 4.

Table 4. List of some Nordic conferences on mathematical statistics

Sequence No	Location	Year
1	Aarhus	1965
2	Lofthus	1966
3	Umeå	1969
4	Jyväskylä	1971
…	…	…
17	Helsingør	1998
18	Grimstad	2000
19	Stockholm	2002
20	Jyväskylä	2004
21	Rebild	2006
22	Vilnius	2008
23	Voss	2010
24	Umeå	2012
25	Turku	2014

The *Scandinavian Journal of Statistics* has been published since 1974 by the Danish Society for Theoretical Statistics, the Finnish Statistical Society, the Norwegian Statistical Society, and the Swedish Statistical Association. It is devoted to the problems of mathematical statistics.

The year 2013 has been announced as the International Year of Statistics [7]. It was a worldwide celebration and recognition of the contributions of statistical science. It shows how important statistics has become to people's lives, and the SAS Institute shows it in a nice way in a video [5].

4. Formation of the Baltic–Nordic–Ukrainian Network on Survey Statistics

The Nordic countries have had 18 meetings of statisticians and 13 conferences on mathematical statistics before 1992. The statisticians of the Baltic countries have had research in mathematical statistics and 5 international Vilnius conferences on probability theory and mathematical statistics before 1992. However, survey statistics was not a subject of interest in the Baltic countries: no teaching at universities, no research, no practice.

With the restoration of independence, interest in the previously unknown fields of research in the Baltic countries in general, and in survey sampling in particular, has grown. The need for official statistics to carry out sample surveys stimulated interest. Getting experience from the Nordic countries was one of the ways to try to get knowledge in statistics. Cooperation between the statisticians of Baltic and Nordic countries in the field of survey statistics started in 1993. A Baltic-Nordic Network on Survey Statistics was founded in 1996 and later extended to Ukraine and Belarus. The aim of the Network is long-term cooperation on education and research in survey statistics by means of exchange of knowledge, experiences and ideas. Efforts are made to strengthen contacts between university teachers, students, researchers and practitioners, academic institutions and national statistical agencies. The Network also tries to promote interest among students and to motivate them to choose survey statistician as their professional career [1].

Many university teachers, researchers, research students and official statisticians in Estonia, Latvia, Lithuania, Ukraine and Belarus have visited Nordic universities for studies and research in survey statistics. They found there rich libraries and competent colleagues.

The activities of the Network, which include summer schools, workshops and conferences on survey statistics, have been arranged annually since 1997. Individual exchange visits within the Network region for teaching, consulting and other academic tasks have been arranged. Preparation of theses for academic degrees in survey statistics has been one of the important objects of the visits.

18 Network events were organized during 1997–2014. Their aim can be shortly formulated as exchange of knowledge between generations, because knowledge of participants varies from beginners to experts without any age limits.

3 summer schools on survey sampling theory, methodology and practice were organised: in 1997 in Tartu (49 participants), in 2009 in Kyiv (48 participants), and in 2013 in Minsk (32 participants) – in total, 129 participants.

12 workshops on survey sampling theory and methodology, with the total of 479 participants, were organised: among them, in 1998 in Jūrmala (27 participants), in 1999 and 2003 in Palanga, in 2005 and 2010 (51 participants) in Vilnius, in 2012 in Valmiera (63 participants), in 2014 in Tallinn (50 participants). Fig. 4 shows listeners of the lecture in Valmiera. Three Baltic-Nordic conferences on survey statistics (BaNoCoSS) were organised: in 2002 in Ammarnäs (74 participants, 14 countries), in 2007 in Kuusamo (74 participants), and in 2011 in Norrfällsviken (55 participants, 17 countries). Fig. 3 shows the participants of the 3rd BaNoCoSS.

Many famous statisticians all over the world took part in the events and gave lectures: Carl-Eric Särndal (Sweden), B. Swensson (Sweden), J. Wretman (Sweden), L. Bondesson (Sweden), R. Chambers (United Kingdom), J. C. Deville (France), S. Thopmson (USA), G. Ranalli (University of Perugia, Italy), M. Pratesi (University of Pisa, Italy) Fig. 2; J. N. K. Rao (Carleton University, Canada), Fig. 1, and many others. Young participants had a possibility to learn much from the world-known experts.

Materials from the workshops and conferences arranged by the BNU Network have been published in Proceedings with a programme, abstracts, papers and lists of participants.

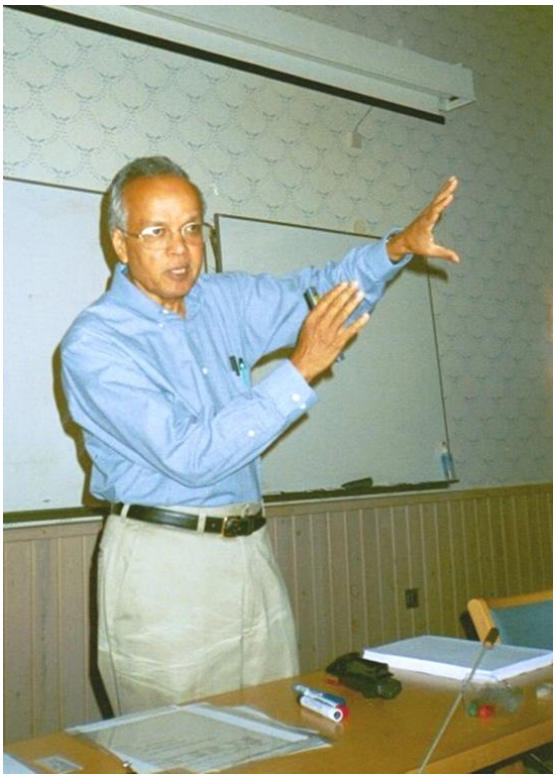

Fig. 1. Professor J. N. K Rao is giving a lecture at the first Baltic-Nordic Conference on Survey Statistics in Ammarnäs, Sweden, 2002

Fig. 2. Professor M. Pratesi is giving a lecture at the Workshop of the Baltic–Nordic–Ukrainian Network on Survey Statistics in Valmiera, Latvia, 2012

Visitors. Table 5 shows the number of Baltic, Ukrainian and Belarusian statisticians visiting the University of Umeå, Sweden, in 1992–2012 for studies and research in survey statistics. The distribution of the number of visitors, visits and visit days is presented by country. Table 6 presents the number of visits made by statisticians from the networking countries to the Umeå University by duration in 1992–2012.

Table 5. Visitors, visits and visit days at the Umeå University by country

Country	Timing	Visitors	Visits	Days
Estonia	1992–2010	10	41	1431
Latvia	1994–2011	19	31	838
Lithuania	1998–2011	14	30	847
Ukraine	1994–2012	15	28	883
Belarus	2010–2012	5	6	160
Total	1992–2012	63	136	4159

Fig. 3. Participants of the third Baltic-Nordic Conference on Survey Statistics in Norrfällsviken, Sweden, 2011

Fig. 4. Listening to the lecture at the Workshop of the Baltic–Nordic–Ukrainian Network on Survey Statistics in Valmiera, Latvia, 2012

Table 6. Number of visits of statisticians of Baltic countries, Belarus and Ukraine to the Umeå University, times

Timing	Estonia	Latvia	Lithuania	Ukraine	Belarus
1992–1994	5	1	–	1	–
1995–1997	13	3	–	1	–
1998–2000	8	7	5	5	–
2001–2003	7	10	10	–	–
2004–2006	5	5	12	–	–
2007–2009	2	4	2	10	–
2010–2012	1	1	1	11	6
1992–2012	41	31	30	28	6

In 1995–2013, 140 Bachelor's and 69 Master's theses on survey statistics were written at Baltic universities, 23 theses at the universities of Belarus and Ukraine. Their distribution is presented in tables 7 and 8.

Table 7. Number of Bachelor's and Master's theses at Baltic universities, 1995–2013

Country	Bachelor's	Master's	Total
Estonia	31	15	46
Latvia	34	9	43
Lithuania	75	45	120
Total	140	69	209

Table 8. Number of graduation theses on survey statistics at the universities of Belarus and Ukraine, 2003–2013

Country	Bachelor's	Specialist	Master's	Diploma	Total
Belarus	–	–	–	5	5
Ukraine	8	3	7	–	18
Total	8	3	7	5	23

Four textbooks on survey statistics have been written by the members of the Steering Committee.

29 doctoral dissertations on survey statistics have been written by the participants of Network summer schools, workshops and conferences.

Network cooperation partners are:

Belarus State Economic University,
Institute for Demography and Social Research (Kyiv),
National Academy of Statistics, Accounting and Audit (Kyiv),
Scientific and Technical Complex of Statistical Research (Kyiv),
National Taras Shevchenko University of Kyiv,
University of Helsinki,
University of Latvia,
University of Stockholm,
University of Tartu,
University of Umeå,
Vilnius Gediminas Technical University,
Vilnius University.

The activities involve national statistical agencies, in particular:

Statistics Estonia,
Central Statistical Bureau of Latvia,
Statistics Lithuania,
Statistics Finland,
Statistics Sweden,
State Statistics Committee of Ukraine.

Information on the Network and its activities may be found on the web [1].

5. Conclusions

The results of the activities of the Baltic–Nordic–Ukrainian Network on Survey Statistics justify its creation.

Interest in survey statistics is growing rapidly in the networking countries. The subject is taught at universities, research is conducted, surveys are carried out at the institutions of official statistics, market and public opinion research companies. Survey statistics is cool intellectually, educationally and professionally. It is interesting because of challenging theory, concepts and mathematics, smart expertise for planning and implementation of surveys, accurate and honest analysis of survey results. You may see on a video [4] how cool statistics can be.

Survey statistics is hot because of the urgent need for survey results. Business and stock markets are influenced by economic surveys. Governments are influenced by economic and social surveys. Elections are influenced by surveys describing progress and problems in the country.

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STATISTIKOS MOKSLAS YRA TARPTAUTINIS, O TYRIMŲ STATISTIKA – PATRAUKLI IR AKTUALI

Gunnar Kulldorff

Santrauka. Straipsnyje pateikiama trumpa tarptautinio statistikų bendradarbiavimo, statistikų sąjungų formavimosi istorija bei jų tarptautinė veikla pasaulyje ir Šiaurės šalyse. Pateiktas Baltijos ir Šiaurės šalių tyrimų statistikos lygis, buvęs iki 1992 m., kaip šių šalių statistikų bendradarbiavimo pagrindas, apžvelgta Baltijos–Šiaurės–Ukrainos tyrimų statistikos tinklo veikla.

Reikšminiai žodžiai: Tarptautinis statistikos institutas, statistikų sąjungos, tyrimų statistika, bendradarbiavimo tinklas.