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CONFERENCE OF EUROPEAN STATISTICIANS

For discussion and recommendations

Meeting of the 2016/2017 Bureau
Geneva, (Switzerland), 14-15 February 2017

Item IV (b) of the Provisional Agenda

DRAFT OUTLINE FOR THE 2017 CES SEMINAR ON THE NEXT GENERATION OF STATISTICIANS AND DATA SCIENTISTS

Prepared by Statistics Finland and Eurostat

The paper presents the updated outline for the seminar on "The next generation of statisticians and data scientists" to be organized on 20 June 2017, during the CES plenary session. ***The Bureau discussed and provided recommendations on the seminar organization.***

I. BACKGROUND

1. At its April 2016 plenary session, the Conference of European Statisticians (CES) selected the topic "The next generation of statisticians and data scientists" for one of the seminars to take place during the 65th CES Plenary Session on 19-21 June 2017 in Geneva. The organization of the event will be coordinated by Eurostat and Statistics Finland and the paper contributions will be ensured by Sweden and Israel while Australia, Germany, Norway, and United States offered to act as panellists.

II. THE SEMINAR: STRUCTURE AND CONTENT

2. The seminar will discuss the skills and capabilities needed to address the challenges arising from the new data-driven world where statistics will need to be increasingly integrated to support policy and decision making. The seminar will consider how our skill sets are challenged by the increasing demands for statistics, fast technological changes, up-springing new data sources, such as Big Data and other current developments.

3. The seminar is carried out according to the following format (see Annex 1 for details):

- Introduction by Statistics Finland
- Opening by keynote speaker and the overview presentation by Eurostat setting the scene
- Short presentation of papers for sessions 1 and 2 and an interactive panel discussion with presenters and panellists facilitated by Statistics Finland and Eurostat
- Drafting of a CES2017 two-pager, including the way forward and recommendations

4. The opening and introduction of the seminar will be conducted by Ms. Marjo Bruun from Statistics Finland. This will be followed by a keynote speech by Professor Marcellino from Bocconi University in Milan under the tentative title "Big Data skills: challenges for the university world".

5. The seminar will consist of four sessions:

- **Session 1: Skills for the next generation of statisticians.** The session will be organized by Eurostat. The session will rely on a joint overview paper presentation by Eurostat/Finland and focus on the challenges and solutions for developing and building the necessary data science skills and competencies that allow statistical offices to stay competitive in the information industry. The session also reflects on the skill set required from a statistician when dealing with uncertainty about available data sources, increasing complexity and the need to integrate even unstructured data from multiple sources to provide data analytics as part of statistical services. The session will touch upon the idea of Smart Statistics and what it requires from future statisticians.

- **Session 2: Statistics Production System 4.0 – the role of the next generation of statisticians and data scientists.** The session will be organized by Statistics Finland. The session will rely on a contribution from Sweden and focus on future requirements on the competencies and skills at national statistical offices (NSOs) to meet the ever changing demand from users of statistics and necessary transformations of the statistics production. NSOs can adapt to future challenges by considering a mixture of developments: i) organization of the NSO, ii) the NSO's ability to utilize new data sources and new data collection techniques, iii) NSO's understanding of the specific decision problems, and iv) the NSO's ability to foster users' understanding of statistics. These aspects also define the competence needs of future statisticians.

- **Session 3: New emerging challenges in the production of official statistics: Are universities training students to work in National Statistical Offices?**

  The session will be organized by Eurostat and will rely on a contribution from Israel. The discussion will focus on how universities are taking into account the big advancement in technology and preparing students to work at modern NSOs. The availability of what is known as big data pose new demands for more detailed, more accurate and timelier official statistics. Issues like collection and management of big data for official statistics, big data privacy and protection, increasing data accessibility but maintaining privacy and confidentiality, possible use of web-panels, mode effects, possible use of social network data, integration of administrative (big) data with surveys for running censuses will have to be studied and addressed.

- **Session 4: Summary and conclusions.** This part of the seminar will collate proposals for future work and actions to develop the skill profile of statisticians and support statistical offices in the transformation. The session aims at drafting a two-pager with a joint vision on *the next generation of statisticians and data scientists*. Statistics Finland will act as a pen-holder.

6. Session 1 will kick-off of the discussion with the presentation by the keynote speaker focusing on the challenges in the university world and the overview presentation by Eurostat setting scene.

7. Sessions 2 and 3 will both begin with a short paper presentation by the authors. After the presentation, the moderator raises a few key questions for presenters and panellists to provide views on. During the discussion the floor is open also for the audience through Twitter (#CES2017Skills). Tweets are displayed on a screen during the discussion and they are collected by the chair and used to ask questions to the panellists live.

8. Session 4 will discuss proposals for future work based on the material presented at the seminar. The draft two-pager summary shall be approved by acclamation before the end of the seminar and will be then submitted to the CES Bureau to decide on the next steps at their meeting taking place on 17-18 October 2017.

III. PROGRESS IN ORGANIZING THE SEMINAR

9. The contributors are expected to meet these deadlines:

- Friday, 13 January 2017 - submission of abstracts
- Monday, 20 March 2017 - submission of papers for translation
- Monday, 24 April 2017 - submission of other CES papers
- Monday, 29 May 2017 - panellists will provide questions
- Monday, 12 June 2017 - all PowerPoint Presentations
- Tuesday, 20 June 2017 - CES 2017 Seminar

Annex 1: PRELIMINARY TIMETABLE

CES 2017 Seminar on the next generation of statisticians and data scientists

20 June 2017 in Geneva

Time	Topic	Presenter
09:30 – 09:45	Introduction to the seminar	Finland
09:45 – 10:30	Opening key note **Big Data skills: challenges for the university world**	Professor Marcellino from Bocconi University in Milan
10:30 – 11:00	Overview of topic **Skills for the next generation of statisticians**	Eurostat
11:00 – 11:30	Coffee and tea break	
11:30 – 12:30	Paper presentation on national experience **Statistics Production System 4.0 – the role of next generation of statisticians and data scientists.** Interactive panel discussion • Panellists' point of views • Questions from the audience	Sweden Discussion facilitated by Statistics Finland
12:30 – 14:30	Lunch break	
14:30 – 15:15	Paper presentation on national experience **New emerging challenges in the production of official statistics: Are universities training students to work in National Statistical Offices?** Interactive panel discussion • Panellists' point of views • Questions from the audience	Israel Discussion facilitated by Eurostat
15:15 – 15:30	Coffee and tea break (two-pager drafting)	
15:30 – 16:00	Two-pager adoption	Finland

Annex 2: ABSTRACTS OF PAPERS

Skills for the next generation of statisticians (Eurostat and Statistics Finland)

1. With the increasing digitalisation of the world, statistical organizations are challenged to modernize their production chain in order to incorporate new data sources and to benefit from new technologies and methods. In particular:

- the potential of the increasing availability of new data sources has to be untapped by using as far as possible big data and administrative sources, in order to better meet users' needs while increasing efficiency.
- to stay relevant for the various users' groups, more and more tailor-made data analytics and visualisation products and services need to complement the traditional dissemination portfolio.

2. At the same time, investments to maintain the recognized robustness and quality of official statistics are continuously required for official statistics to remain competitive in the rapidly changing information ecosystem.

3. As for any project or organization, one key factor in meeting these challenges is the development and building of the necessary skills and competencies. This comprises extracting relevant knowledge from a combination of different kind of sources, such as the capacity to deal with unstructured data, massive datasets, or crossing multiple sources. It also comprises the capability of telling stories based upon complex sets of statistical data.

4. These capabilities are closely related to the concept of data science. Statistical organizations will have to build these capabilities, integrate those data science skills and to create favourable conditions for using them with success.

5. This paper contributes with a discussion on the methodological issues and challenges faced by official statistics in harnessing new data sources and delivering new data analytics services and on the necessary skills and condition of applicability of data science in official statistics

Statistics Production System 4.0 – the role of next generation of statisticians and data scientists (Sweden)

6. This paper contributes with a discussion on future requirements on the competencies and skills at NSOs to meet the ever changing demand from users of statistics. It also provides an analysis of necessary transformations of the statistics production organization to be able to meet requirements on efficiency and quality. The discussion builds on lessons from the past moving from a sample survey oriented production system towards a register based statistics production system, and our expectation of the future drawn upon the experience of the last decade's efforts to utilize new data sources and the rapid information technological change.

7. When considering the issue of the seminar, further questions on, perhaps, a higher level have to be raised and clarified. What will be the role of an NSI in the future, on the national and the international levels, respectively? How to adapt to the globalization of societies and economies? What kind of information is to be contained in statistics produced by an NSI? Will the present statistical system be apt for future decision making? To what extent is coherence and comparability necessary?

8. One sure thing about the future is things will change. This is, of course, also true for the contexts in which NSOs operate. Not only do they have to adapt to changing user demands, they also have to consider the supply utilizing different potential data sources with different pros and cons. Traditionally NSOs have exercised control over the data generating process. With decreasing response rates and lesser resources, NSOs have sought alternative data sources to replace the old ones. These new data sources are not in the control of the NSOs whereby risks for unstable production and less valid production outcome are introduced.

9. NSOs can adapt to future challenges by considering a mixture of developments. Decisive of what to do is the role and mandate given, and given its role, there are several aspects on an NSO to consider. Four of them are i) organization of the NSO, ii) the NSO's ability to utilize new data sources and new data collection techniques, iii) NSO's understanding of the specific decision problems and iv) the NSO's ability to foster user's understanding of statistics.

10. The treatment of the issues described above serves as a background for a discussion on the future competencies and skills of statisticians and data scientists, the topic of the seminar.

New emerging challenges in the production of official statistics: Are universities training students to work in National Statistical Offices? (Israel)

11. The big advancement in technology and the availability of what is known as big data pose new demands for more detailed, more accurate and timelier official statistics. The resulting technological and methodological challenges that will underlie the production of official statistics in coming years will have major implications on the work of National Statistical Offices (NSO). Issues such as collection and management of big data for official statistics, big data privacy and protection, increasing data accessibility but maintaining privacy and confidentiality, possible use of web-panels, mode effects, possible use of social network data, integration of administrative (big) data with surveys for running censuses will have to be studied and addressed. This raises the question as to what extent are universities preparing students to work at modern NSOs. We shall examine these and other issues based on national and international experience.

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