TWINNING CONTRACT

BA 15 IPA SR 01 17

Support to the reform of the statistics system in Bosnia and Herzegovina

MISSION REPORT

Activity 2.D.2:

Statistical programming in R – Advanced training

Component 2: Business Statistics

Mission carried out by
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10 – 13 December 2019

Version: Final

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List of Abbreviations

BHAS	Agency for Statistics of Bosnia and Herzegovina
BiH	Bosnia and Herzegovina
CBBH	Central Bank of Bosnia and Herzegovina
EC	European Commission
EU	European Union
FBiH	Federation of Bosnia and Herzegovina
FIS	Institute for Statistics of Federation of Bosnia and Herzegovina
MS	EU Member State
RSIS	Institute for Statistics of Republika Srpska
RTA	Resident Twinning Adviser
ToR	Terms of Reference

1. General comments

This mission report was prepared within the EU Twinning Project " Support to the reform of the statistics system in Bosnia and Herzegovina". It was the second mission to be devoted to training in the use of the R software within Component 2 of the project.

The purpose of the mission was:
- Training of non-IT staff to programming in R

The consultants would like to express their thanks to all officials and individuals met for the kind support and valuable information which they received during the stay in Bosnia-Herzegovina and which highly facilitated the work of the consultants.

This views and observations stated in this report are those of the consultants and do not necessarily correspond to the views of EU, BHAS, FIS, RSIS, CBBH, Statistics Denmark, INSEE, Statistics Finland and Croatian Bureau of Statistics.

2. Assessment and results

The Terms of Reference mentions the following expected output of the activity:

- More tools for programming in R have been learned

- Input provided to the ToR of next activity

The consultants have prepared a set of lectures (including both slides and exercises) which were presented to the participants. At least for the duration of this project the material will be available online.[1] The content of the lectures and the exercises have given the participants an introduction to statistical inference, linear modelling, data validation and editing, and imputation in R.

Topics covered include (but are not restricted to):
- Visualization of distributions
- Standard parametric and non-parametric statistical tests
- Linear models with normal and binary data
- Model fit diagnostics and assumption checks
- Reading in data from external sources
- Error detection and correction
- Transforming character variables to numeric and dates
- Detecting missing values and visualising patterns of missingness
- Regression imputation and multiple imputation

The consultants were impressed by the enthusiasm and eagerness to learn a displayed by the participants. The IT environment was working to a satisfactory level, and all participants have had the possibility to work on a functioning version of R/RStudio.

The purpose of the course was to give an introduction to a broad range of techniques, rather than a firm grounding in a smaller number of techniques, and thus some of the material covered will need more study in order to be implemented. However, if the participants are given time to review the syllabus and read the materials listed on the webpage, the consultants believe that the participants are in a position to acquire the further knowledge needed to implement those methods they deem to be of use in their daily work.

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[1] https://joliencremers.github.io/Course-Materials-Bosnia/

3. Conclusions and recommendations

- The participants should be allowed time to review the material once again;
- The participants should try to replicate in R work already done in Excel or otherwise;
- The participants should form small groups for exchange of examples of applications of R.

A further mission building on the results achieved within the first two missions has been discussed. The consultants participating in the next mission will be colleagues of the consultants responsible for this mission, and the consultants will communicate what has been taught so far.

Action	Deadline	Responsible person

Annex 1. Terms of Reference

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Terms of Reference

EU Twinning Project BA 15 IPA ST 01 17

Component 2: Business Statistics
10- 13 December 2019
Institute for Statistics of the Republika Srpska
Veljka Mlađenovića 12d, Banja Luka

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Activity 2.D.2: Statistical programming in R – Advanced training

1. **Result for the activity**
   - Knowledge gained on programming in R

2. **Purpose of the activity**

   - Training of non-IT staff to programming in R

3. **Expected output of the activity**

   - More tools for programming in R have been learned
   - Input provided to the ToR of next activity

4. **Participants**

Agency for Statistics of BiH (BHAS)
   - Edin Šabanović, Assistant Director in The Sector for Statistical Methodology, Standards, Planning, Quality and Coordination
   - Jasna Isaković, Head of Department for Sample Design and Methodology
   - Aida Zukanović, Senior Advisor in Department for Sample Design and Methodology
   - Ljiljana Okuka, Senior Advisor for Setting Quality Standards
   - Boro Kovačević, Senior Advisor for Forestry Statistics
   - Gorana Knežević, Head of Department for Society Development Statistics
   - Alen Bajramović, Head of Department for Services Statistics
   - Adisa Čubro, Senior Advisor for International Trade Statistics
   - Fahir Kanlić, Head of Department for Industry and Construction Statistics
   - Dajana Mitrović, Senior Advisor for Living Conditions

Institute for Statistics of Federation of BiH (FIS)

- Asmira Selimović, Head of Department for statistical methods and coordination
- Edina Mehidić, Associate for sampling and statistical analysis

Institute for Statistics of Republika Srpska (RSIS)

- Stana Kopranović, Senior Statistician for Environmental Statistics
- Vladimir Koprivica, Senior Statistician for Labour Force Survey
- Aleksandra Đonlaga, Senior Statistician for Service Statistics
- Vladimir Lambeta, Senior Associate for Standard Implementation and Methodology
- Lazo Šegrt, Senior Statistician for Agriculture and Fishery Statistics
- Tatjana Banjac Živković, Senior Statistician for Economic Accounts in Agriculture
- Dijana Maleš, Senior Statistician for Gross Fixed Capital Formation (GFCF)
- Nada Malinović, Head of Registers, Samples and Classifications Division
- Vedrana Dejanović, Statistical Sample and Analysis
- Dragana Mandić, Senior Statistician for Migration Statistics
- Dolores Peulić, Education & Science Statistics
- Danica Babić, Senior Statistician for SBS

Central Bank of Bosnia and Herzegovinia (CBBH)

- Maša Kamenica Jordamović, Senior Specialist in BoP Section
- Aida Kalčo, Specialist in BoP Section
- Ervin Zolić, Head of GFS and Financial Account Section
- Emina Milišić, Senior Specialist in MFS Section
- Bojan Savić, Head of Section for IT Applications

MS Experts

- Anne Vinkel Hansen, Statistics Denmark
- Jolien Cremers, Statistics Denmark & Copenhagen University

Twinning Project Administration

- Katja Møller Hjelvang, RTA
- Đemka Šahinpašić, RTA Assistant
- Haris Imamović, Interpreter