

## SAE Methods for Developing the Digital Economy and Society Index (DESI) at local level

**Kaja Sõstra**<sup>1</sup>

<sup>1</sup> Statistics Estonia  
e-mail: [kaja.sostra@stat.ee](mailto:kaja.sostra@stat.ee)

### Abstract

Digital Economy and Society Index (DESI) is a composite index summarising progress on connectivity, digital skills, use of internet by citizens, integration of digital technology by businesses and digital public services on national level. The aim of the current research was to test small area estimation (SAE) methods for estimating some DESI components on local government level. The following four human capital indicators were selected for analyses and testing: share of frequent internet users, communication skills above basic, share of persons who used online banking and share of persons who ordered goods or services online.

Data sources for the local DESI were sample survey of the Information technology of households, statistical population register and employment register. Administrative registers provided auxiliary information for small area estimation models. Four estimators were tested in the present research: Direct, GREG, Synthetic and EBLUP (EURAREA, 2004). The performance of estimators was tested using Monte-Carlo simulation. Artificial population was used for the simulation study. Samples with size 4000 persons were selected from the population by systematic sampling. The sampling design was similar to the real survey design. All possible 246 samples were selected with starting point from the 1st person to the 246th person. Four indicators were estimated from every sample for local governments. The simulation study showed that the Synthetic and EBLUP estimators are reliable estimation methods for local DESI components for small and medium municipalities. The choice between GREG and EBLUP for large municipalities depends on if one prefers unbiased estimator where it is reliable or to use the same method for all areas for better comparability.

The research report is published in Sõstra (2021). The data analysis and simulation study demonstrated that DESI human capital components could be well explained by demographic and socio-economic variables available for all population. Therefore small area estimation methods give reliable results for local DESI if administrative register data or/and some alternative data sources are available for statistical purposes.

**Keywords:** DESI index, small area estimation (SAE).

### References

EURAREA (2004) Enhancing Small Area Estimation Techniques to meet European Needs.

Sõstra, K (2021) Developing the Digital Economy and Society Index (DESI) at local level - "DESI local".  
<https://futurium.ec.europa.eu/en/urban-agenda/digital-transition/library/desi-local-developing-digital-economy-and-society-index-desi-local-level>

