Managing the knowledge base
– the DUVA system, from data entry to output tools -

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Abstract

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The concept of a statistical knowledge base implies that elements of information are organised in such a way that they can easily be retrieved, selected, combined and analysed within the system. DUVA is such a system. It has been developed by the KOSIS association DUVA over the last 25 years. Meanwhile, DUVA involves about 60 municipalities, state statistical institutes and research institutions. It supports data entry, retrieval, evaluation and presentation of results via the Internet and is controlled by a common metadata system.

DUVA enhances standardisation and guarantees further development according to the user needs. Standard data descriptions for common data sources facilitate data exchange and cooperative learning. Examples are periodical excerpts from the population register, the employment and unemployment registers as well as flow data on migration, births, deaths and construction statistics. DUVA is also applied in projects of cooperative data collection, like the Urban Audit, and it is the central instrument in a project for the development of comparable tools for local surveys, supported by the EU.

The DUVA system will be introduced at the conference, including examples of practical application and actual measures for further improvements. As a case of practical use the „Planning Related Information System for Spatial Monitoring“ (PRISMA) of the City of Berlin will be presented applying DUVA software components.

An upgrade of the English version will be available this year, mapping facilities are being developed and further steps web based components will follow.

1. The DUVA Association

DUVA was initiated as a cooperative project by the Association of German Municipal Statisticians in 1989. The aim was to provide public institutions with an information management system that was designed to meet their specific requirements. Detailed information on DUVA can be found under www.duva.de.

DUVA has at present 59 members, mainly municipalities but also state statistical offices, research institutions and regional computer centres. They are supported by frequent training courses. DUVA is managed by a steering group responsible for developments and improvements of the system. Maintenance and new developments are commissioned to contractors. DUVA is a non-profit organisation. All funds provided by its members are exclusively used for the maintenance and for improvements of the system. All public institutions can acquire the license to use the programmes.
2. The DUVA concept and solutions

The basic idea of DUVA is the comprehensive use of metadata for description, capturing, processing and presentation of the content data. DUVA provides mutually related modules comprising the total information process and supporting all tasks of information management in this process.

Data capturing is supported by modules which produce templates for data entry from PC or via Internet. The resulting templates are html-pages that can be freely formatted and extended by additional texts, data entry rules and plausibility checks, automated calculations, skip- and fill commands etc. The content data can be corrected and are available for retrieval and evaluation.

The referral system manages metadata and documentation, administration and further processing of the content data. This includes the description of variables, structures of the datasets, the links to the physical data files as well as processing rules for compilation. All information is stored in a central database, which is used by all DUVA modules.

The windows-based module “M-Direkt” and the web-based “Internet Assistant” support the evaluation and presentation of information - they produce tables, graphs and maps. Data sets can be combined, filters can be applied and new data can be computed.

DUVA has import and export interfaces and thus supports an exchange of information between different users and systems. There are interfaces for specific evaluation programmes like SPSS and SAS as well as for MS-Excel and MS-Word. A comprehensive tool for checking the consistency of data is part of the referral system as well as a tool for anonymising data “SAFE”. The “Web Catalogue” provides structured access to information in the internet.

All DUVA modules can be switched to other languages. They are designed to observe the current legislation on data protection and confidentiality. An extensive user administration allows access only to users explicitly authorised to handle the specified elements of information.

Maintenance and new development of the DUVA modules are controlled by the users who apply these modules themselves and can thus translate their practical experience directly into the work packages for further development.

3. Development in recent years

The development resulted in considerable improvements of the system:

- DUVA now supports the application of server databases (Oracle, MS-SQL);
- the data capturing tools were improved in cooperation with the German Urban Audit group;
- the presentation modules and the web-catalogue were functionally improved;
- a concept for the development of a so-called metadata-navigator was designed to facilitate the selection and transfer of information to other data processing and evaluation tools, including modules for the production of tables, graphs and maps (which are to replace the existing modules “M-Direkt” and “Internet-Assistant”);
- first steps were undertaken towards the development of a mapping tool in cooperation with other KOSIS associations and municipalities
- the concept for the functional and technical extension of the central referral system was prepared: the switch to further web applications, an extension of the data model, the im-

2 As example: [http://www.freiburg.de/servlet/PB/menu/1156915_l1/index.html](http://www.freiburg.de/servlet/PB/menu/1156915_l1/index.html)
3 [http://www.staedtestatistik.de/urban-audit.html?&K=0&F=3%20](http://www.staedtestatistik.de/urban-audit.html?&K=0&F=3%20)
plementation of internationally valid exchange formats (XML interface), multilingual metadata, more user friendliness etc.;

- preliminary thought for further improvements of the system based on an internationally acknowledged certification.

4. Examples for using DUVA Metadata Approach and software modules

The DUVA approach to metadata management and the DUVA software tools are used in many statistical projects. Some examples are briefly presented below:

- Data collection for Urban Audit in Germany
- PRISMA Berlin
- TooLS for the development of comparable local surveys.

4.1 Data collection for Urban Audit in Germany

DUVA software tools and a common set of metadata are applied for the standardised data collection in the Urban Audit. A uniform data description was developed and stored in the metadata repository of DUVA. The templates for entering the data were then automatically generated and combined with automatic plausibility checks. This way, all participating 86 municipalities in Germany can enter their data via the Internet and, where necessary, correct them straight away in a protected area.

4.2 Planning Related Information Service for Spatial Monitoring and Analysis (PRISMA) - The DUVA System in the City of Berlin

In Berlin, a new and powerful integrated planning approach with comprehensive current information on a small-scale basis has been developed. Together with all city administrations including eight senate departments, twelve boroughs of Berlin and the State Statistical Institute Berlin-Brandenburg a “Data Pool” has been built up to serve as the central information source and platform. About 60 data stocks with ca. 500 variables have been identified and will be kept in the data pool and provided by a multi-tenant information system which will allow to allocate specific data for specific user groups. This data pool will be combined with an already existing geo information system (“Map Pool”) for spatial analysis purposes using - on the basis of international standards - components of the Geo Data Infrastructure Berlin-Brandenburg which is in progress. To satisfy user needs a user-friendly Data Navigation Assistant (DNA) will be developed as part of the “Planning Related Information System for Spatial Monitoring and Analysis” (PRISMA). For these purposes DUVA software components will be used.

4.3 TooLS for developing comparable local surveys

Supported by the European Union

The development of “TooLS” focuses on the demographic change and the challenges of an ageing population. The task of managing and countering these changes with suitable measures will confront the local communities with great and still growing problems. Their solution first of all requires reliable information through continuous monitoring and repeated structural analyses.

According to the objectives of TooLS, information from different sources and a multitude of institutions is to be collected and evaluated. This requires not only comparability based on uniform definitions as well as uniform territorial and topical classifications, but also technical instruments that support a cooperative organisation of data management and data use - the DUVA software satisfy this requirement. Its further development for a Europe-wide application will now be supported by the TooLS project.

4 cf. http://www.tools-project.eu