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**Organization of data collection and sharing, and the management challenges for the implementation of Statistical Data and Metadata eXchange****Integrating Statistical Data and Metadata eXchange into existing processes and information technology systems at Destatis****Note by the Federal Statistical Office of Germany***Summary*

The Statistical Data and Metadata eXchange standard has become more and more widespread in many phases of the statistical production process. The resulting requirements cannot efficiently be met by individual solutions. That goal can only be achieved by integrating the Statistical Data and Metadata eXchange production and provision into the statistical business processes and into the information technology architecture. At the same time, the current activities of process standardisation must be taken into account. Integrating Statistical Data and Metadata eXchange into a standard workflow can therefore be done only gradually and the solutions aimed at have to meet both national and international standards.

Meeting that demanding requirement poses a major challenge to the Federal Statistical Office (Destatis), considering the cuts in resources. Lasting success can be expected only if existing systems and structures are included into the solutions, which would protect the investments made. This paper presents some results achieved in implementing the concept.

## I. Introduction and motivation

1. Currently some 380 statistics are produced by the statistical offices in Germany. Statistics production is based on a federal structure. The Federal Statistical Office (Destatis), as an agency at the federal level, produces official statistics in co-operation with the statistical offices of the Länder. In some statistics, further agencies, ministries and organisations are involved in the production.
2. Apart from that organisational structure, the production of official statistics in Germany is characterised by a varied environment of processes. Some of the information technology (IT) solutions that have gradually been developed to support the processes are based on various technological standards. Migrating them, with the goal of standardisation, would be possible only over a longer period of time, which is due to the size and complexity of the task. Changing over to a standard process architecture has already started in the federal statistical system of Germany.
3. A variety of technological and subject-related procedures and standards have become established also in the national exchange of statistical data and metadata. For the data exchange within the European Statistical System (ESS) between national statistical institutes (NSIs) and Eurostat, Statistical Data and Metadata eXchange (SDMX) is becoming established as a standard and has been required by Eurostat in some cases.
4. As a model of process standardisation in statistics production, the Generic Statistical Business Process Model<sup>1</sup> (GSBPM) has established itself. The version adapted for German official statistics (GMAS<sup>2</sup>) is the basis for standardising the processes at Destatis and the relevant IT systems applied. The Standardisation of Processes (SteP<sup>3</sup>) has been advanced in German official statistics for a number of years already.
5. At the same time, the general budget restrictions in public administration have led to a decrease in resources available. Introducing standards and uniform processes appears to be a logical and promising management strategy to achieve synergies.
6. Apart from their positive effects, it must also be mentioned that standards often are compromises which are more or less accepted by those concerned or which even encounter resistance. Additional problems arise where the same type of process must meet several different standards, e.g. for national and international requirements. Where influence can be exerted on the standards themselves and where harmonisation can easily be achieved, it is possible to solve the problem rather quickly. Otherwise, it would have to be examined to what extent, and in what way, different standards can simultaneously be met by combined solutions. In any case, this would involve higher complexity, posing a challenge both to the technical implementation and the subject-related shaping of the modified processes.
7. Other problems occur where the introduction of standards is considered as a technological task only. Generally, processes will have to be modified, which can be achieved only through active support by the management.

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<sup>1</sup> <http://www1.unece.org/stat/platform/download/attachments/8683538/GSBPM+Final.pdf?version=1>

<sup>2</sup> GMAS: Geschäftsprozessmodell der amtlichen Statistik.

<sup>3</sup> SteP: Standardisierung der Prozesse.

## II. Framework conditions

8. Implementing SDMX in national statistical production is not an isolated project. It faces an existing architecture of processes and their IT tools. Protection of investments is imperative here because, considering the resources available, a completely new development and implementation is impossible to achieve.

9. In addition, maximum continuity must be ensured, too, so that productive processes are not put at risk. This also applies to the internal production processes and to the interfaces with external customers and users of official statistics.

10. The consequence to be drawn for Destatis is that SDMX can be implemented only through gradual integration into processes and IT tools. As process standardisation according to the GSBPM is envisaged at the same time, the GSBPM phases which are relevant in the context of SDMX integration must be examined with particular care<sup>4</sup>. The decision as to what phases SDMX will be implemented in, and with what priority, is based on various aspects:

(a) Strategic aspects. SDMX is an international standard of data and metadata exchange. Applying it reflects the intention to create a broad basis for the access to, and the use of, data and metadata;

(b) Expedience. There is no standard that would completely meet all requirements. It should be applied where it is useful. Where suitable, it should be examined whether a combination of standards is advisable;

(c) Potential for synergies. For reasons of economic efficiency, a standard should be implemented where high value added is expected.

11. All the above reflections are not specific to SDMX. They apply to the introduction or non-introduction of any standard.

12. Two examples will be used below to show what results Destatis obtained when checking the aspects and how practical implementation is done.

## III. Examples of concepts and technical solutions

### A. Quality management

13. In the field of national official statistics, not only statistical data are produced but also quality reports on the statistical results. This is done according to national and international quality reporting requirements. Various standards and procedures of the national and international partners involved have to be taken account of (Eurostat, IMF).

14. For the ESS, the Commission of the European Communities has recommended using the Euro SDMX Metadata Structure (ESMS)<sup>5</sup>. It describes a standardised structure of a statistics quality report. That structure has been implemented within Eurostat; for exchange in the ESS, it will replace the existing types of reports over the next few years. This includes standardising the report transmission channels, that is, the related process.

<sup>4</sup> For a study on the relation between SDMX and the GSBPM phases, see also [http://www.czso.cz/conference2009/proceedings/data/process/becker\\_paper.pdf](http://www.czso.cz/conference2009/proceedings/data/process/becker_paper.pdf)

<sup>5</sup> <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:168:0050:0055:DE:PDF>

15. The management of quality information is a part of the GSBPM extending across the actual process steps. In that context, efforts are made at Destatis to combine the various forms of national and international quality reports in a central IT tool across the different statistics.

16. This involves a large potential for synergy. By using a central tool to administer quality information, it can be avoided that the specialised statistical units have to report several times. Instead, once entered, the individual data can be used several times for the various requirements. Through an adapter, reports will then be provided according to the ESMS.

17. A precondition here is that standards are combined. As there are especially national requirements – and standards – in addition to the ESMS, they must be compatible. Otherwise it would not be possible to achieve the goal of an integrated tool for quality reports.

## **B. Data exchange**

18. As the SDMX initiative focuses on the exchange of statistical data and metadata, the standards are shaped accordingly. So the aspect of expedience supports the idea of considering SDMX especially for these purposes when planning.

19. Another task is to meet the concrete Eurostat requirements regarding the use of SDMX for data and metadata exchange. With regard to the metadata, this means introducing the ESMS – cf. the above example. Other examples already implemented are the dissemination of the European census results (Census Hub project), economic indicators (SODI project), and its application in parts of environmental statistics.

20. The GENESIS information system developed jointly with the statistical offices of the Länder is the central information system for publishing statistical data and metadata of official statistics in Germany<sup>6</sup> and hence is particularly important for the concept of data provision. Through the GENESIS-Online website, current results of 200 statistics are published and external users retrieve some 100,000 tables every month.

21. Due to the central role the GENESIS system plays in data publication, there are two aspects supporting the idea of integrating SDMX here. As a result of participation in European projects, the system was enabled to exchange data in the SDMX format by means of an extension (referred to as SDMX Adapter). This generally allows offering further data in the SDMX format that are stored in GENESIS, beyond the current concrete data requirements of the projects. As the underlying standard now allows electronic processing of the data in an internationally harmonised way, the overall attractiveness of the data is enhanced and a possibly larger group of users is addressed.

22. From the GSBPM viewpoint, a publication system is an IT tool applied in Phase 7 (“Disseminate”). Any processes which are standardised to the extent that they converge in that publication system can directly benefit from the SDMX integration. With regard to process optimisation, the benefit of a standardised workflow is obvious.

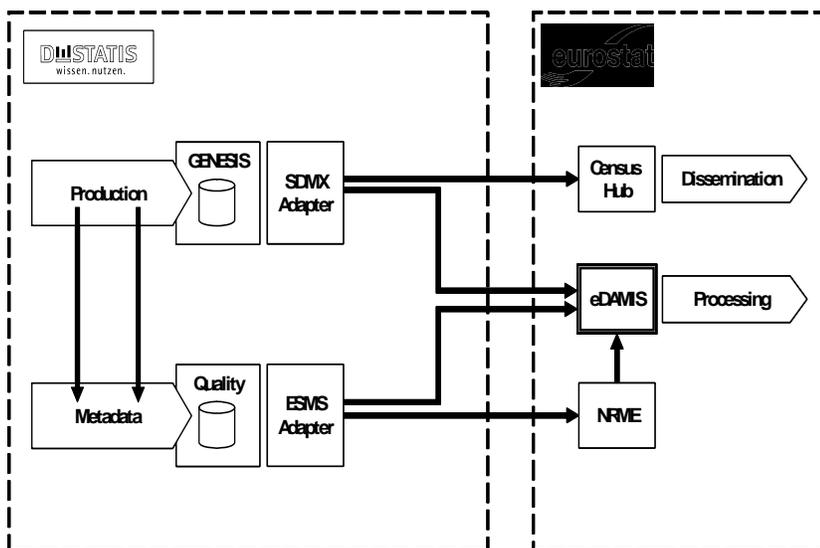
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<sup>6</sup> <https://www-genesis.destatis.de/genesis/online>

## C. Overview of examples

Chart 1

The GENESIS publication system and the integrated quality database as building blocks for a standardised workflow in the European Statistical System



23. Chart 1 shows the workflow by means of the integration examples. The two data and metadata production processes feed GENESIS and the quality information database. The latter then provide access to the data and metadata through the relevant SDMX integration (adapter).

24. The user shown here as an example is Eurostat. The electronic Data files Administration and Management Information System (eDAMIS) implements the Single Entry Point for data and metadata deliveries to Eurostat<sup>7</sup>. Not only this transmission channel is fed but also the infrastructure for European census results (Census Hub) and the National Reference Metadata Editor (NRME) for quality information.

## IV. Barriers and challenges

25. Implementing SDMX in national statistical production processes involves migration processes and first of all requires investments not only in technology and IT know-how. The integration of SDMX in concrete production processes also includes transferring the subject-related SDMX standards to the statistics departments and enhancing acceptance by demonstrating the benefit involved.

26. As described above, SDMX integration at Destatis is done gradually. In the processes, interfaces become necessary at the transition points from and to SDMX. Describing and developing these interfaces is a challenge that is crucial for an efficient

<sup>7</sup> [http://circa.europa.eu/Public/irc/dsis/edamis/library?l=/reference\\_documents/edamis/single-entry-point/\\_EN\\_1.0\\_&a=d](http://circa.europa.eu/Public/irc/dsis/edamis/library?l=/reference_documents/edamis/single-entry-point/_EN_1.0_&a=d)

implementation of the system integration and the protection of investments. Taking the GENESIS publication system as an example, this means that a mapping of metadata between the metadata models of GENESIS and SDMX is required, which has to be developed in subject-related terms and be supported in technological terms.

27. The benefit of SDMX implementation is closely connected with the potential arising from technological and subject-related standardisation. However, standardisation itself is a process, too, which has far-reaching strategic implications. For any organisation, this poses the question of how and by whom that process is shaped and who exerts what influence on it. As regards subject-related standardisation, the tasks to be mentioned here in particular are participation in the specification of metadata, classification and categorisations.

## V. Conclusion and outlook

28. The introduction of a standard such as SDMX at Destatis must definitely be considered in the context of existing production structures and processes. Those structures and processes, together with the limited resources and the need to ensure continuous production, shape the character of SDMX integration. In any case, this means that SDMX implementation is not a purely technical task. Instead, it touches upon aspects of process organisation and, consequently, is a management task.

29. SDMX can be implemented by gradual integration. Through well-aimed use of resources, it is thus possible to gradually achieve integration into an established system architecture and an existing process environment.

30. The producers of official statistics face other new requirements regarding the provision of their results to a variety of user groups. Initiatives such as OpenData reflect a new understanding of public administration as a provider of publicly accessible information. With the INSPIRE Directive<sup>8</sup>, a similar political goal has been set with regard to geographical information. Those developments, too, will lead to adjustments in the statistical production processes and have to be taken into account when further developing common standards.

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<sup>8</sup> <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2004:0516:FIN:EN:PDF>