



Title: Integrating Quality Management and Enterprise Architecture in Hungary

Presentation type: oral presentation

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Keywords: quality management, enterprise architecture, standards

Abstract

Producing high quality official statistics is the mission for all international and national statistical organizations. Considered to be the competitive advantage of official statistics in the data industry, the quality of the data, that of statistical products, processes, and the management system, appears in all strategic-level documents from international organizations to institutional strategies.

Behind each quality management system we find an enterprise architecture that constitutes the framework for all institutional processes. By defining the paths for implementing institutional strategies and establishing bridges between strategic level considerations and depths of processes of the organization, the enterprise architecture is one of the fundamental elements with direct impact on the quality of statistics. With integrated use of industry standards and models, a common foundation can be set up that is suitable to provide information for all levels of decision-making for a national statistical organization.

Apart from the opportunities and challenges of building a quality management system based on enterprise architecture, the paper presents how the Hungarian Central Statistical Office is building this common foundation and shares the practical steps taken, our lessons learned so far and the road ahead.

1. Motivation

In order to produce high quality official statistics, to improve user satisfaction, enhance organizational efficiency and effectiveness as part of continuous improvement, the Hungarian Central Statistical Office (HCSO) is highly committed to modernization. Modernization, standardization activities play a crucial role in streamlining business operations and therefore support statistical institutions in strengthening their competitive advantage of producing high quality official statistics in the data market.

The HCSO has set the goal to continuously improve its quality management system and to achieve an ISO 9001 certification for developing, producing and disseminating official statistics. Describing all processes using standardized elements in accordance with industry standards results in creating a tool that contains all the information about processes, its elements and the relationships among them, that is suitable to provide information for different levels of decision-making.

The approach a National Statistical Institute can take to build or further develop such an architectural framework heavily depends on the maturity of its process and information models. The HCSO has a long history in using integrated solutions to carry out its activities concerning official statistics. The backbone of the information

architecture of the HCSO has been developed and improved for decades starting from the 1970s.¹ By the late 2000s, the architectural framework of the HCSO was built around its metainformation system and integrated IT systems, providing an excellent basis for a more advanced enterprise architecture. The metainformation system is a real backbone of information and standardized objects that started its development also in the late 1970s and more than 50 years of dedicated work ultimately led to the mature metainformation system of today.²

With the introduction of international models for processes, information objects, there has been a big boost in development of enterprise architecture in the official statistical community for years. In this architecture development boom, the ModernStats models of the UNECE are playing key roles. With the use of these models and involvement in their continuous development, the HCSO has realized great benefits in building its own architecture.³

2. Starting points: quality management and enterprise architecture

Products and processes are at the core of a quality management system, and it was decided that for further use, a coherent, standardized description of all statistical products and processes is needed. Using standardized objects, building blocks to describe data production processes on different levels makes the elements reusable, and makes it possible to use the resulting information base for different management and decision-making purposes at the system-level.

Architectural elements, building blocks, such as tasks/process steps, products, organizational units, actors/roles, supporting IT systems and tools are at the basis of architectural models. The description of these building blocks and the relationships among them form the actual state of the enterprise architecture. Enterprise architecture, i.e. describing the structure and operation of an organization using standard elements, objects and the relationships among them facilitates analysis and design by depicting each architecture domain (business, data, application, and technology architecture).

In order to ensure common language and clarity between different statistical organizations building similar solutions, the architectural elements should also be in line with industry standards. Therefore, when creating the building blocks to be applied in the description of architecture domains at the HCSO, the standards and models developed as a result of international cooperation under UNECE guidance, ModernStats models were the starting point: (1) GAMS0 gives the structure of the process system; (2) tasks performed in the statistical production process are mapped to GSBPM and its Hungarian counterpart ESTFM; (3) actual inputs and outputs, information objects of the production process are mapped to GSIM elements.

¹ Ábry (2015): Improvement of Business Architecture model at the HCSO – Experiences of the Hungarian Central Statistical Office. ISI 2015. Link: <https://2015.isiproceedings.org/Files/STS071-P3-S.pdf>

² Baracza, Ercsey, Ábry (2009): Metainformation System of the Hungarian Central Statistical Office. Hungarian Statistical Review, Special Number 13. Link: http://www.ksh.hu/statszemle_archive/all/2009/2009_K13/2009_K13_103.pdf

³ Ábry, Györki (2019): National adaptation of the GSIM at the Hungarian Central Statistical Office. UNECE ModernStats World Workshop 2019. Conference of European Statisticians. Link: https://unece.org/fileadmin/DAM/stats/documents/ece/ces/ge.58/2019/mtg2/MWW2019_Hungary_AbryGyorki_Abstact.pdf

After thoughtful consideration, ARIS of Software AG was chosen as the IT tool to support the management of HCSO architecture and also quality management functions. The software supports multiple modelling languages and allows to select appropriate model types; enables an object-oriented approach; stores and manages all enterprise architecture elements in a common database; provides efficient reporting and additional components that enable publishing, performance monitoring, simulation, time and cost analysis.

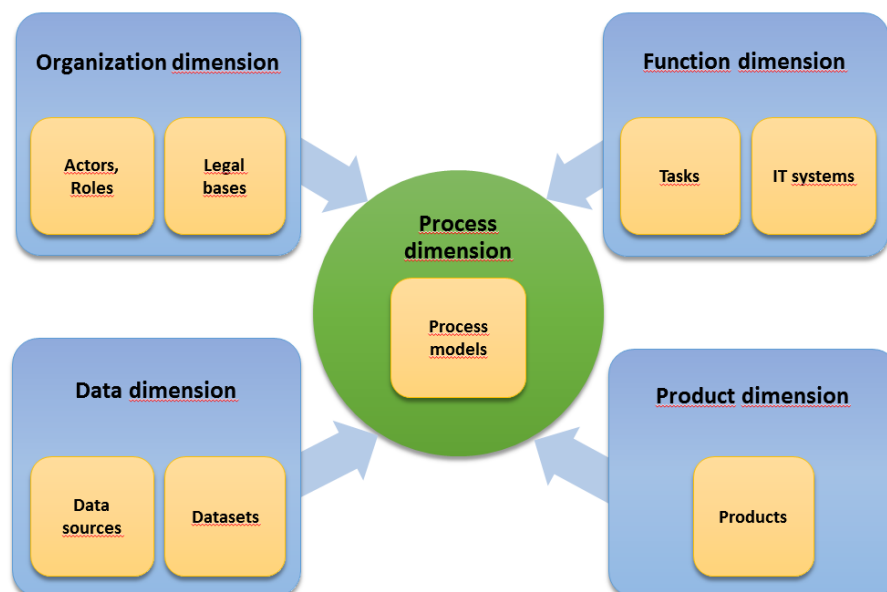
3. Steps taken, lessons learned

As an approach for designing, planning, implementing, and governing an enterprise architecture The Open Group Architecture Framework (TOGAF) standard was selected. In order to achieve the goals set and to improve quality throughout the organization, the work started out focusing on the business architecture, data production processes and involves the following steps:

- creating standardized elements to describe all production tasks, inputs and outputs, supporting IT systems and organizational actors and roles;
- mapping standardized elements to ModernStats standards, GSBPM and GSIM in order to ensure international comparability;
- creating the structure for mapping processes according to GAMS0;
- describing all production processes using ARIS based on information available in integrated IT systems and additional input from process owners;
- developing reports in ARIS to ensure implementation and usage in management processes.

As GSBPM is a generic model, the level of granularity was not suitable for the national environment. To capture tasks performed in data production at the HCSO, a more detailed breakdown and reflection on the specific national context were needed. Tasks were identified for the entire production process, mapped to GSBPM (its Hungarian adaptation: ESTFM), and described within the business architecture domain. Concerning the inputs and outputs, a standardized set of information objects is developed and mapped to GSIM. Actors and roles and IT systems supporting statistical data production processes were uploaded as lists and can be connected to the process steps. The work is scheduled to be completed by the end of the year.

All of these are represented by five dimensions for our architecture: processes, products, data, organization and functions (*Figure 1. Process models and their dimensions*).



1. Figure: Process models and their dimensions

4. Goals, the road ahead

The goals set and the expected results are aligned with the HCSO business strategy.

In order to improve operational efficiency and to enable the organization to quickly adapt to the fast-paced changes in its environment and in user requirements, the HCSO aims at constant improvement of its quality management system and set the goal to achieve an ISO 9001 certification. Processes are at the basis of all quality management systems: the process models created ensure transparent data production and enable continuous product and process quality improvement.

At the system-level, architecture-based tools and procedures integrated into the decision-making processes support evidence-based operational solutions and efficient decision-making in various areas: strategic planning, capability development, workflow optimization, methodological standardization, standardization of IT services, HR practices and many more.

Concerning methodological standardization, the tool will support identifying gaps where methodological solutions are needed. It will also help to identify the exact sub-processes where similar methodological solutions are used and areas where more standardization is needed, methods in order to improve process and product quality. Applying new methods or shared tools developed by the statistical community will also be much easier as the exact targeted processes/sub-processes/tasks can easily be identified.

Integrating the knowledge and experience of the project into organizational procedures, the efficient use of the information-base that is to be created, is expected to guide modernization and standardization in many areas. Also, the experience gained throughout the project will provide feedback for the architecture itself and will enrich the models.