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Topic (iv): Collaboration

Standardisation in the European Statistical System

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1. Introduction

1. In modern society, the demand for statistics is ever growing. At the same time, we have fewer resources to meet this demand. Our challenge as statistical institutes is to stay relevant to society and to keep providing quality statistics at acceptable cost. This calls for innovative and efficient approaches.

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The last few years, new technologies and communication facilities have sprung up and are reforming the landscape in which we do our business. The rise of storage capacity and processing power is staggering; the amounts of raw data available are mind boggling.

2. In order to benefit optimally from these developments, the production ways of statistics should be reconsidered. They should be based on common and standardised processes, transforming raw data into statistical products according to generic and commonly accepted information concepts. Reusable and modular building blocks are a prerequisite for flexible and cost effective production processes. International agreements may promote further harmonisation of production methods, processes and IT solutions.

3. The community of statistical offices can be considered the Official information industry. Like any mature industry, it needs its own industrial standards. Standards are a tool for exchange and collaboration. As such they are very valuable in environments where different entities collaborate. On the one hand, they will provide a necessary foundation for exchangeability of production means among statistics producers. Moreover, duplication in different institutes could be reduced because solutions from one office can be applied in another without much trouble. Statistical institutes are already starting to acknowledge that it is becoming too expensive to individually maintain their own tailored production systems. On the other hand, standards will consolidate the use of our statistical products in the global information community, improving their accessibility, interpretability and comparability.

4. The European Statistical System (ESS) has a long tradition in harmonising statistical products and regulating requirements within the different statistical domains. International cooperation has not put much effort on harmonizing production methods, processes and systems, however. In 2010, the highest ESS governance body, the ESSC, adopted a Joint Strategy¹. This Joint Strategy envisages further integration of the ESS and states –among other things– that this will require more harmonisation and standardisation of statistical methods, of the IT infrastructure and IT tools, and of metadata. All of this will eventually lead to better quality and higher productivity of the statistical data processing.

5. The ultimate goal of perfect interchangeability of statistical production processes, methods and tools is far away and probably not realistic. What we can do, however, is move a long way in that direction and mark a point on the horizon. This is where the Sponsorship on Standardisation comes in. The ESSC established the Sponsorship on Standardisation and approved its Mandate². According to this mandate, the Sponsorship is created for a period of two years and is expected to 1) define the scope and the business case for ESS standardisation; 2) review the state of the art, identify barriers and propose remedies; 3) set up an action plan and mechanism for standardisation in the ESS; 4) liaise with external initiatives and actively involve stakeholders. Six EU Member States agreed to participate, together with Eurostat, in the Sponsorship: Germany, France, Italy, Latvia, Hungary and The Netherlands.

¹ ESSC 2010/05/6/EN - Communication from the Commission to the European Parliament and the Council on the production method of EU statistics – joint strategy paper

² ESSC 2011-09-04-EN Mandate of the Sponsorship on Standardisation

6. The benefits of standardisation are linked to efficiency gains and quality improvement, but at the same time there are some caveats that should be considered. Excessive standardisation is counterproductive and can be incompatible with business strategies of stakeholders (e.g. Member States) or their national contexts. Moreover, standardisation requires significant investments. Costs and benefits could also be spread in an uneven way. Standardisation efforts in the ESS should therefore be carefully designed to address these issues.

7. This paper contains work on four related areas:

- the current state of the art of ESS standards;
- a formalised process for setting and implementing standards;
- a framework for standards inspired by ideas from business architecture;
- a more qualitative approach to assess the business case for standardisation.

II. The state of the art of ESS standards

8. To start a systematic approach one needs to clarify the concepts used. An accurate register of standards, open to the public, will provide knowledge and references to the standards adopted and used by the ESS. The inventory will help to identify the normative documents that fulfill the requirements to be considered a standard in the ESS. Moreover an inventory will provide useful feedback when starting the development of a new standard.

9. After thorough investigation it is proposed to use the ISO (International Organisation for Standardization) concept of "standard". It proved necessary, however, to provide a precise interpretation in order to facilitate its use in the ESS environment.

10. The ISO definition reads as follows:

'A standard is a document, established by consensus and approved by a recognized body, that provides for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context. Note: Standards should be based on the consolidated results of science, technology and experience, and aimed at the promotion of optimum community benefits.'

11. The concept of standard shall be analysed in relation to a related concept, the 'normative document'. *'A normative document is a document that provides rules, guidelines or characteristics for activities or their results.'* 'Normative document' is a generic term that covers documents such as standards, pre-standards³, regulations and others. One of the main differences between a standard and a regulation is the adoption procedure. *'A regulation is a document providing binding legislative rules that is adopted by an authority.'*

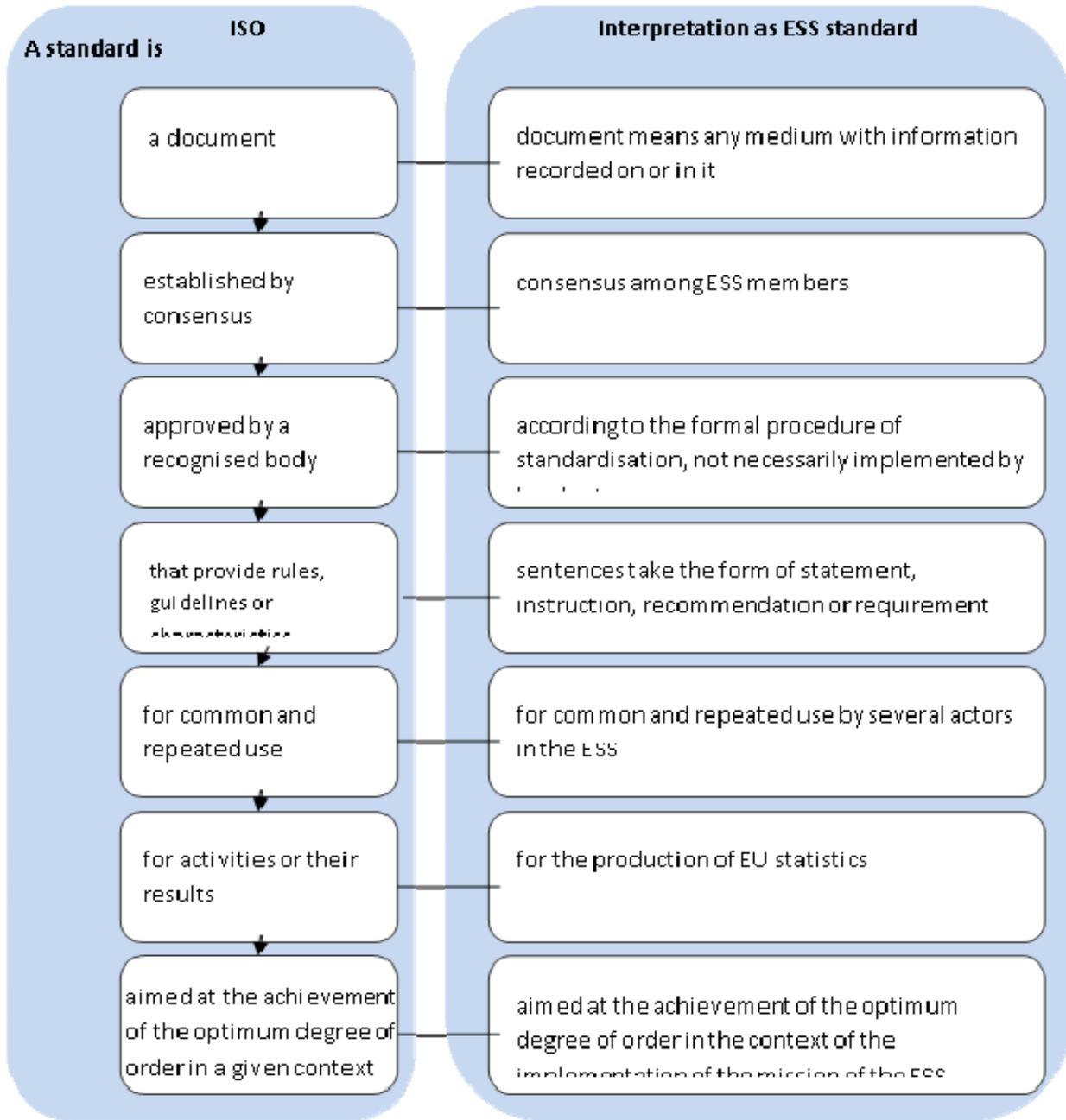
12. In this sense context *consensus* means general agreement, characterized by

- the absence of sustained opposition to substantial issues by any important part of the concerned interests
- a process that involves seeking to take into account the views of all parties concerned and to reconcile any conflicting arguments.

³A pre-standard is a document that is in the adoption procedure, but the procedure is not finished yet.

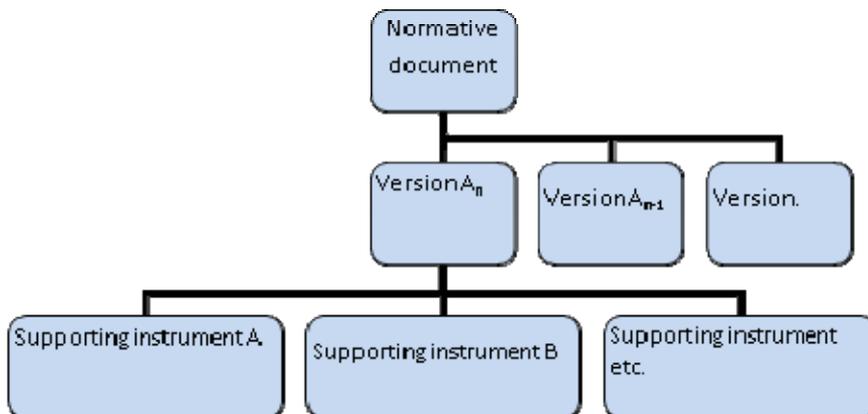
13. Concerning the concept of ‘standard’, the Sponsorship proposes the interpretation of standard in the ESS environment as presented in Figure 2.1.

Figure 2.1 Interpretation of the ISO definition of ‘standard’ in ESS environment



14. A preliminary list of normative documents has been compiled based on a) RAMON, Eurostat’s server for statistical metadata and b) a list of international IT tools used in the Hungarian Central Statistical Office (HCSO).

Figure 2.2 Structure of the intended inventory



15. A template has been compiled with attributes to characterise normative documents. The attributes are broken down in the following categories:

- ✓ Identification attributes (name, full name, short description and version).
- ✓ Classification attributes (mapping of normative documents against relevant dimensions (e.g. for constructing a hypercube GSBPM x Domain).
- ✓ Organisational issues (forums where the normative document was elaborated and approved, validity dates, etc.).
- ✓ Availability (contact to the owner and maintenance, language).
- ✓ Links with other normative documents (with description of their nature in order to assess consistency between these documents).
- ✓ Use of the normative document (which will inform about penetration in practice).
- ✓ Assessment whether the criteria for being a standard are met.

3. A process for setting and implementing ESS standards

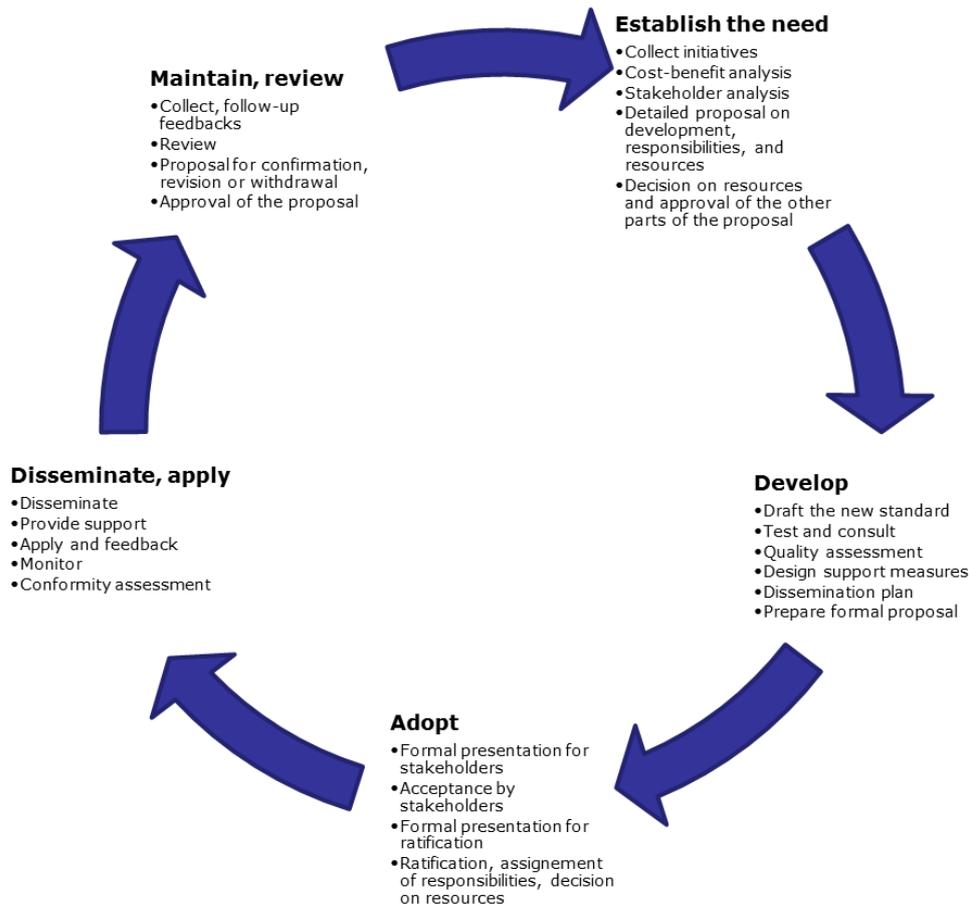
16. The integrated production of European statistics needs a set of tools, normative documents; standard is only one of them. This section proposes a process for setting and implementing ESS standards.

17. The standardisation process should provide guarantee on meeting the requirements of the ISO standard definition; it should be “*established by consensus and approved by a recognised body*”. Figure 2 below presents the proposed standardisation process. The process consists of five main phases; it describes the full lifecycle of a standard and is cyclical, i.e. a standard may become obsolete or needs to be replaced.

18. The key turning points of standards' lifecycle are:

- start of development based on a decision approving the need,
- the ratification/approval of the newly developed standard,
- withdrawal.

19. These crucial decisions should be formally approved. Figure 3.1 The standardisation process



The standardisation process should be managed in a formal and structured way according to the principles listed below:

- ✓ *Consensus.* Acceptance by consensus ensures that all views are heard and the resulting standard is

generally agreed to by those involved.

- ✓ *Transparency and openness.* Involvement of all parties ensures transparency of the process, and provides a public notice of a proposed standard in advance.
- ✓ *Balance* means that no one group's interest dominates the approach.
- ✓ *Due process* ensures that anyone with a 'direct and material interest' has a right to express a position and to have that position considered (where necessary including the right to appeal).

20. The preconditions and infrastructure for a standardisation process are the following:

- Organisation and responsibilities: the proposal is for the ESSC to be responsible for strategic issues and approval, and for DIME in close cooperation with the ITDG to look after managerial tasks.
- An accurate register of standards and pre-standards (for which the process is ongoing).

IV. Towards a Framework for ESS business processes integration and standardisation

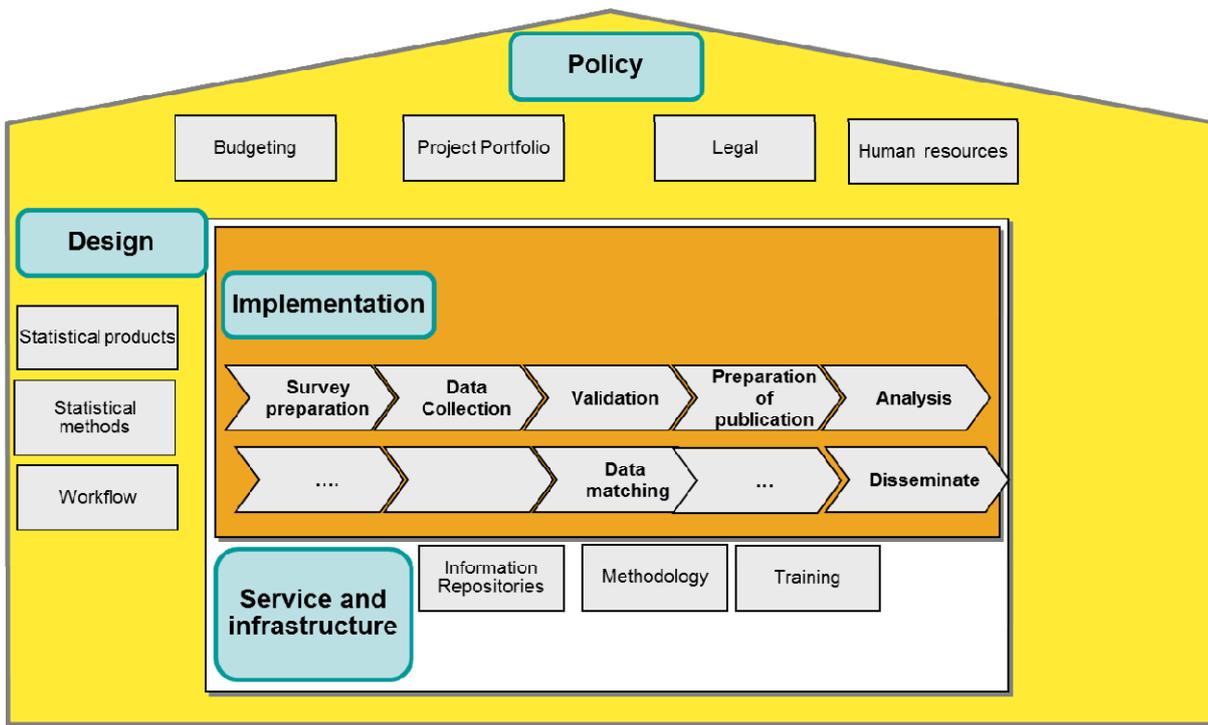
21. One of the most relevant obstacles to the success of such an ambitious project as standardisation and industrialisation of the ESS lies in the fact that the ESS is presently characterised by multiple organisational models that tend to be incongruous among organisations and sometimes within the same organization. The use of different vocabularies and terminologies can lead to conflicting descriptions. This heterogeneity makes change unnecessary expensive and complex; it draws the attention to the need for the ESS to have a degree of common understanding both the given situation (“*as is*”) and the one to be reached at the end of the change process (“*to be*”).

22. The description of the two states (present and future) allows to design a path towards the 'to be' state in a more rational and measurable way, defining specific actions, involving different organizations, and human resources that need to interact within a shared view of a tangible progress.

23. The scenario just outlined brings out the relevance of adopting an Enterprise Architecture (EA), which can be defined as the reference model by which an organisation operates and is structured to achieve its objectives, whereby each lower layer is governed by the higher one thus allowing to move from the level of conceptual representation to more and more operational and technological ones. The framework should aim to cover the production and processes of both European and national statistics.

24. All processes will need to be tackled in a holistic approach with a view to enable their integration and modularity within the whole statistical authority, across statistical authorities and with international organisations. The following picture illustrates the scope of a statistical ‘factory’.

Figure 4.1. The statistical factory⁴



25. A federated approach to an Enterprise Architecture seems to provide an adequate framework to cope with the system complexity and with the specificities of the ESS. The model of management of the federated approach defines whether the business processes have to be kept distinct, or be consolidated or coordinated at the ESS level or possibly for distinct subsets of the ESS organisations.

26. The proposed business process model identifies 4 main business functions which are all relevant at ESS level highlighting the importance of the governance split into policy and management; it gives visibility on the design activities. The design activities are particularly relevant and important for industrialization which requires standardisation and optimisation of processes

27. The 4 **business areas** (based on the CBS model) are:

- *Policy*: provides the frameworks for the control and organization of the statistical process. Policy products include regulations, agreements, strategy, etc.
- *Design*: provides the metadata that lays down specifications with regard to the functional organization and control of the statistical process. The products include designs, models, instructions, indicators and descriptions.
- *Management*: provides control so that the statistical process can be carried out. The products include schedules, quality standards, results, descriptions, progress reports, quality reports improvements and adjustments.

⁴ Inspired from Radermacher, UNECE HLG Workshop – Geneva – October 2011

- *Implementation*: provides products to satisfy the agreed output. Products of implementation are databases, statistical products and descriptive metadata.

28. Each Business Area is characterized by activities which transform the information objects in input into the desired information objects in output. At this stage, the model retains the following main 18 activities:

- *Policy*: budgeting, management of external sources, policy lay down in relation to the process improvement, capacity management.
- *Design*: determination of statistical information requirements, designing of statistical products, designing of data sources, designing of the process model, formulation of rules (of methods and processes).
- *Process chain management*: planning, monitoring, adjusting and adapting.
- *Process chain implementation*: data collection, verification, linking, deriving and editing, aggregation, estimation and integration, disclosure control and making data publishable, making statistics and Web 2.0 services available for fostering interaction with users and stakeholders.

29. Starting from the conceptual model of integration, the following four **scenarios** can be devised based on four levels of coordination of the different ESS organizations:

- Autonomous**: Business processes and systems are designed and operated without coordination with processes or systems in the ESS. This applies to those architecture components that are distinct.
- Interoperable**: Coordination is through interoperability. The NSIs have the autonomy to design and operate their own solutions, as long as they have the ability to exchange information and operate together effectively by appropriate use of standards.
- Replicated**: Coordination is through duplication. All NSIs have implemented identical business processes, solutions and information.
- Shared**: There are common business processes, a single instance of a solution and information that is shared by all the bodies. This level corresponds to a **fully integrated** view of ESS.

30. Different approaches and different levels of integration can be chosen for different business activities. For instance, the ESS 'as is' situation the ESS is characterised by a high degree of autonomy (scenario A) of NSIs in the management and implementation business areas. Interoperability requirements (scenario B) are at stake for the latest steps of implementation through the use of SDMX for transferring data sets. Some instance of replicated infrastructure (scenario C) when tools are shared across ESS partners (eg. Demetra+ or EDIT building block). Finally scenario D is at stake for some well-established common process for ESS work programme for EU official statistics.

31. Below for the business step 'design' the different scenarios are specified as an example.

Example of Different integration scenario for the Business Area Design

- A. The design function is carried out at organisation level on the basis of organisation current best methods optimising process with respect to business requirements established in many cases at ESS level.
- B. The design function is carried out at organisation level. The current best methods are documented for the most relevant domains at ESS level. Some constraints of operability (e.g. process output) are taken into account. The process design documentation is made available at ESS level.
- C. The design function is highly standardised: the set of ESS recommended methods is limited; ESS guidelines and template provide rules for the design of process that ensure compatibility with existing standards and metadata requirements; a central repository stores ESS processes; tools instance are available for most services. There is well-defined governance ensuring the maintenance of the platform.
- D. The design function is operated at central level. Processes can be operated in a distributed way on a service based platform.
32. **As is situation:** in some areas ESS guidelines exist. They are based on a ranking of a limited numbers of options in view of quality improvement: the design function is operated at organisation level.

<i>Supporting infrastructures and standards (to be developed)</i>	
<i>Scenario</i>	<i>Infrastructure, standard</i>
<i>B</i>	<i>Standard of Methods</i>
<i>C</i>	<i>Metadata model for designing processes</i>
<i>D</i>	<i>Central body for process design – Shared platform for process execution</i>

33. The framework needs certainly to be further developed and tested for its relevance in concrete situation. The framework proposed will be successful if it enables the detection of a good business case for standardisation and integration of ESS business processes and the management of gaps.

V. A SWOT analysis method for evaluation of standardisation scenarios

34. There is a clear demand for the business case to be provided for further ESS standardisation. In particular, we need a tool to assess the relative merits and costs of the main investments for building the infrastructure necessary for the different scenarios proposed above and for comparing the impact of these scenarios on each of the previously described activities. This assessment involves many different factors, most of which are not easily quantified. In order to overcome these difficulties it would be useful to consider the *categories* (Strengths, Weaknesses, Opportunities and Threats) of a qualitative SWOT analysis. This SWOT instrument⁵ consists of two key components:

⁵ The current proposal is based on a similar SWOT instrument by Kloek, Szűcs and Vereczkei (2011)

A) A fixed list of concrete SWOT aspects to be assessed. Proposed aspects are:

Strengths

- ✓ Improved process and systems quality (less risk)
- ✓ Easy development of new statistical processes and systems
- ✓ Easy incorporation of new data sources
- ✓ Easy incorporation of new dissemination channels
- ✓ (Re)use of existing ESS standards, systems and/or approaches
- ✓ Reduced personnel costs

Weaknesses

- ✓ Costs of development (one-off)
- ✓ Costs of transition (one-off)
- ✓ Costs of support and maintenance (recurring)
- ✓ Loss of autonomy (enforced vs. voluntary standards)
- ✓ Lack of flexibility (rigid standards)
- ✓ Lack of room for differences between parties (e.g. national differences)

Opportunities

- ✓ (Re)use of standards, systems and/or approaches from non-ESS parties
- ✓ Improved quality of individual data sets for strategic and other users
- ✓ Increased consistency of data over statistical domains
- ✓ Easier development of new statistical products
- ✓ Reduced burden on respondents
- ✓ Better communication with users and stakeholders

Threats

- ✓ Loss of identity for ESS partners
- ✓ Proprietary standards that hamper cooperation with non-ESS partners
- ✓ High entry costs for new parties
- ✓ Lack of coherence with national (government) policies
- ✓ Lack of synergy with other statistical communities (UN, OECD, ...)
- ✓ Lack of support from stakeholders/ funding providers

B) A scale for scoring each aspect. We propose a scale composed of two factors:

- ✓ *Relevance*. For example, the threat ‘High entry costs’ might be considered less relevant than ‘Lack of support’ (or vice versa).
- ✓ *Effect*. For example, a scenario with a lot of law-enforced rules has a large impact on the aspect ‘High entry costs’.

35. For each activity, relevance might be scored for every SWOT aspect on a scale from 1 to 4, regardless of the scenario, while effect might be scored on a scale from 0 to 3 for each aspect depending on the possible scenarios. For a given scenario, the value of an aspect is the product of both factors.

36. After fixing the SWOT aspects and scales, different standardisation scenarios/initiatives can be scored and analysed. For example, their relative performance can be compared. Please note that text can be added to explain the scores; these texts are a basis for further analysis of candidates that passed the first selection.

37. A major strength of the SWOT instrument is that many aspects can be studied simultaneously in a standardised, but still flexible, way. The key weakness is that the approach is very qualitative and does not provide insight into the various cost categories of a standardisation scenario. An important

opportunity is that SWOT results can be presented in an easy and intuitive way to stakeholders to give them a flavour of the directions taken. On the other hand, a threat is that the SWOT aspects can be criticised as incomplete or the SWOT scores considered arbitrary.

38. It is possible to combine the SWOT instrument with more quantitative ways to present business cases for standardisation, for example by calculating ‘guesstimates’ of development and maintenance costs or expected efficiency gains.

39. Lastly, the SWOT analysis should be carried out by the different organisations involved, and aggregated to a European business case, also identifying the underlying spread in merits and costs.

VI. Conclusion and way forward

40. Standardisation is a long-time effort. We have only just begun when the two-year mandate of the Sponsorship ends. The work of the Sponsorship tries to point out viable approaches, identifies issues and suggests ways to deal with them. Many issues, however, are clearly too big for quick and easy solutions. They will need continued attention.

42. One issue that has already been identified is that of governance. Existing standardisation experiences show that a strong and dedicated governance structure is needed to oversee and manage the whole standardisation and integration process. Such a governance structure currently does not exist within the ESS. A related issue is that of maintenance and support of standards, which also need a permanent ESS solution.

43. Another issue is that of the business case for standardisation. Expected benefits and resources needed can be quite unevenly distributed among ESS partners. The SWOT tool presented here may help to identify apparent asymmetries. We may have to develop new ways to share costs.

44. The Sponsorship results presented here will be followed up in several ways. During the first half of 2013, discussions will be organised among ESS stakeholders. This should lead to a set of recommendations for ESSC discussion and adoption later in 2013. This may lead to future work on standardisation, both on strategic and operational levels. At the same time, the ESSNet on Standardisation has been established which will follow up some standardisation work on a more operational level, e.g. completing the inventory of standards that are currently in use in the ESS according to the directions given by the Sponsorship. Another important ESS initiative is the establishment of an implementation program for the ESS Vision mentioned in the Introduction. This program may also benefit from the Sponsorship work.

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