Challenges and Discoveries in Developing Quality Indicators for the GSBPM

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Abstract

In 2014, the UNECE Modernization Committee on Standards created a working group to develop quality indicators for all sub-processes of the Generic Statistical Business Process Model (GSBPM). The working group proceeded step by step through the model, drawing inspiration from the ESS Code of Practice, the NQAF, ESMS, ESQRS and work done by NSOs, particularly Statistics Canada's Quality Guidelines. The group mapped quality indicators for surveys to the structure of the GSBPM.

The feedback received from international community confirmed that there is keen interest in quality indicators. This paper describes the quality management and challenges encountered in developing generic quality indicators, and highlights areas for further development.

Keywords: GSBPM, quality indicators, performance measurement.

1. Quality Management Concept in GSBPM

Quality management has a long history and it can be said that the concept of quality has evolved over the past decades. At first, the focus was on product quality and quality in statistics was dealt with mostly in connection with data accuracy in the narrow sense. There was no attention to process quality until the middle of twentieth century. Recently, NSOs have been focusing their attention on quality management.

Nowadays, the concept of quality is not only described as product or output quality, but in a broader sense it is described as the quality of the whole production process from the begining

to the end. In other words, it is related to the quality of the activities carried out in each phase of the production process, resources used and management of the production process. We can say that quality is business excellence.

It is difficult to separate product and process quality. Both product and process quality control should exist in an organization to ensure the overall performance of the organization. In his book "Business Process Management, Concept and How to Apply and Integrate with IT", Bernhard Hitpass says "product quality is directly related to process quality. A high quality product can only be achieved if there is effective control of the production process, avoiding failures in it" (Hitpass, 2014).

Both ISO 9000 series and CAF (Common Assessment Framework) models set principles for the improvement of the organization's performance and they mention the process approach. Both models indicate a desired result is achieved more efficiently when activities and related resources are managed as a process (ISO 2012), (CAF 2013).

Parallel to the above mentioned concepts, the Generic Statistical Business Process Model (GSBPM, 2013) describes and defines the set of business processes needed to produce official statistics. The main outputs of the GSBPM are quality management, metadata management, data management and process management. In addition, it also refers to knowledge management, statistical program management, data provider and customer management. The GSBPM indicates that "The main goal of quality management within the statistical business process is to understand and manage the quality of the statistical products".

The GSBPM also states that processes and products are the quality concerns of the organization. In order to improve product quality, quality management should be present throughout the statistical business process. In addition, a fundamental role in quality management is played by the set of quality control actions that should be implemented within the sub-processes to prevent and monitor errors.

The question "how well are we meeting customer requirements?" could not be answered without the proper measures in place. There is an old maxim in management that says, "What you can't measure, you can't manage". Therefore quality indicators provide information on the deficiencies in the system allowing for the management of the performance of the system from the process, services and product perspectives.

2. Developing Quality Indicators for GSBPM

The development of Quality Indicators (QIs) for the GSBPM phases and sub-processes was one of the priorities of the UNECE Modernisation Committee on Standards for 2014-2015[1]. This exercise was carried out by a Working Group of the Modernisation Committee on Standards set up in 2014. It was composed of experts from three NSOs (Statistics Canada, Italy and Turkey) as well as representatives from Eurostat collaborating through web-meetings, as is a common practice for the UNECE Committees and Task Forces. The first version of the QIs was presented and discussed at the Workshop of the Modernisation Committee on Standards: International Collaboration for Standards-Based Modernisation Meeting which took place in Geneva in May 2015 (Reedman et al., 2015).

QIs were developed to complement the quality management layer of the GSBPM, thus supporting the activity of quality management in the statistical production process. QIs were mapped to each phase (Phases 1 to 8) and sub-process of the GSBPM. QIs were also attached to the current overarching process of quality management covering general aspects related to quality commitment (e.g. availability of a quality policy) and to managing respondent burden (e.g. existence of a communication strategy to inform potential respondents). Indicators were prepared only for direct surveys, but extensions to administrative and big data sources were foreseen and are currently underway.

[1] The Modernisation Committee on Standards is responsible for the governance, maintenance, support and integration of key standards such as the GSBPM, GSIM and GAMSO developed under the supervision of the UNECE High Level Group for the Modernisation of Official Statistics (HLG-MOS).

Potential users and stakeholders were consulted on the GSBPM QIs via: i) a group work session during the already mentioned International Collaboration for Standards-Based Modernisation Workshop, and ii) an open consultation on the UNECE website. Between these two major consultation fora, the GSBPM QIs were also presented to the ESS Quality managers during their meeting at Eurostat in June 2015.

As a result of the discussions during the workshop, some interesting comments for future work emerged: e.g. the usefulness of developing indicators for the first level of the GAMSO model and the importance of enhancing the links between GSIM-GSBPM-GAMSO. This last point is currently being addressed by the HLG-MOS project for 2016 Implementing ModernStats Standards, which includes the development of a Modernisation Roadmap to aid NSOs in implementing these models.

The wider consultation was launched on the UNECE website from August to October 2015 and was aimed to obtain feedback from the community of potential users. The questions posed and the answers received are still available on the UNECE website (http://www1.unece.org/stat/platform/display/QI).

Even though sixteen institutes provided comments, the feedback was well articulated thus providing interesting input for the review of the current version of QIs as well as for future work. The review of the QIs required a considerable amount of time (November 2015- April 2016). Particularly demanding was the analysis of feedback concerning the additional indicators that were suggested. Despite the already large number of QIs proposed for GSBPM phases and sub-processes, many additional indicators were proposed in the feedback. The Working Group went through each of them and decided case by case whether to include them or not. An updated version of QIs for GSBPM (version v1.0) has been uploaded on the UNECE website which incorporates the results of the consultation process.

3. Challenges, Types and Levels of Indicators

Developing meaningful and useful quality indicators is not a simple task. Indicators can be quantitative, corresponding to a level or degree, or they can be qualitative, reflecting

characteristics or impacts. Some indicators are consumed by the producers of statistics, informing about the status of development or production steps, while others are intended for data users, to facilitate their assessment of fitness for use. Ideally, quality indicators are relevant, conveying meaningful information, and are reliable, in the sense that the value of an indicator would be the same in a given situation if two different people were assigning or deriving it. Useable indicators are those that are easy to interpret, and interpretation sometimes requires additional information. For example, a yes/no or flag indicator shows that a deliverable has been signed off or a policy exists, but does little more. Another aspect of interpretation is recognizing whether the desired value is high or low, and what is the expected or target value, if there is one.

Generic indicators were proposed in order to reflect the nature of the GSBPM itself. Thus, no formulas were indicated but explanations and reference to the related quality dimension were provided. Quantitative indicators were used whenever possible. Qualitative indicators were expressed in the form of yes/no or high/medium/low degree indicators. The formulation "extent to which …" has often been used. This can be applied as a percentage, a number or a qualitative description, depending on the situation at the NSO and the feasibility of implementing the indicator. Additionally, an NSO can define a target or expected level for its own indicators. The Working Group did not do this because it was felt that generic targets would potentially be too low for some and too high for others. While developing the indicators there was also some discussion regarding categorizing the indicators such as: i) key indicators; ii) user-oriented versus producer oriented; iii) qualitative indicators versus quantitative indicators; iv) process versus product indicators. However, it is left to the users to categorize the indicators for their own use. When developing the QIs, a certain degree of redundancy was allowed so that indicators were assigned to the sub-process for which their measurement was relevant even though they might be calculated at a later stage.

4. Coherence with Other Frameworks

Quality indicators are not new. There exist already many different frameworks for assessing and monitoring quality of products and processes. Why start over again with the GSBPM? The objective was not so much to invent new indicators, as it was to present for each sub-process in the GSBPM the indicators that are the most meaningful, informative and interpretable. Several well recognized sources were consulted, including the United Nations' Statistical Commission generic National Quality Assurance Framework (NQAF, 2012), the European Statistics Code of Practice (ES CoP, 2011), European Statistical System (ESS) Single Integrated Metadata Structure (SIMS, 2014) as well as national quality assurance frameworks (e.g. Statistics Canada Quality Guidelines, 2009). The NQAF dimensions were taken as reference for relating QIs to the corresponding quality dimension but mapping to the ES CoP was indicated only in case of discrepancies. The working group also categorized as key indicators the ESS Quality and Performance Indicators (ESS QPI, 2014). A web page will be set up to facilitate other NSOs sharing a mapping to their performance indicators.

5. Benefits and Uses

Quality indicators for the GSBPM provide a standard framework and common terminology. Since these indicators are generic, they can be modified by the users according to their own needs.

The QI document provides a process-oriented approach to quality management. Product quality can be monitored at each step using these indicators, rather than measuring the quality of the final product at the very end of the production process. Building the indicators into the GSBPM gives a sense of what to measure and when to measure it in the statistical production process.

The current situation at many NSOs is that processes such as data collection, sampling and estimation, strategic planning, etc. each have their own indicator frameworks, and often there are some indicators included in more than one framework. This results in a duplication of effort to gather or calculate the same indicator in more than one place, and also introduces the potential for confusion if the indicator does not have the same definition or value in all

instances. By adopting the quality indicator framework based on the GSBPM, an NSO can optimize which area is responsible for which indicators, unduplicate effort to maintain indicators and streamline the production of quality reports.

Quality indicators can be applied and consumed at different levels. For example, the imputation rate is of interest for particular variables, and for individual survey occasions, however a global imputation rate over many surveys is not very informative. On the other hand, a yes/no indicator for the existence of a dissemination policy is reflective of the whole NSO, while additional indicators of the type "was the dissemination policy followed?" would be appropriate for individual surveys or statistical processes. To monitor and compare quality aspects at the local and global level, a hierarchy of indicators can be applied. For example, sampling error can be observed for key variables using indicators based on the coefficient of variation or confidence intervals, and a global indicator of accuracy for a family of surveys can be derived from the percentage of key variables for which the observed sampling error is within an acceptable range.

The indicators listed in the QI document can be used to identify gaps in quality indicators used by NSOs. Also, the QI document contains references to the quality frameworks such as NQAF and ESS CoP as well as ESS Quality and Performance Indicators. In addition to these, other standard frameworks could be mapped to the QIs for GSBPM and gaps between these standards could be identified.

6. Future Development

As expressed in the feedback so far received, much more work can be done. As alluded to above, there is a mix of levels among the proposed indicators, and some could be grouped into hierarchies. One area of future development could be to categorize the indicators in terms of their level (survey, family of surveys, whole NSO) and their intended consumer (internal versus data user). Many NSOs have a suite of corporate performance indicators, which include quality indicators. Another area of future development could be to align the quality indicators with commonly used performance indicators. Another obvious future endeavor is

to expand the scope of indicators to include administrative and other types of undesigned or "big" data.

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