

Monitoring Quality in the Production Process Model: Experiences from the Ine of Spain.

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Abstract

Following the current trend towards standardization promoted by international organisms (UNECE, EUROSTAT), the INE of Spain is currently working on a deeper extension of the GSBPM to its production processes.

The GSBPM recognizes several over-arching processes that apply across statistical business processes. One of these processes is quality management, which includes quality assessment and control mechanisms. It recognizes the importance of evaluation and feedback throughout the statistical business process.

Together with the documentation of the production processes, the INE of Spain is organizing and enhancing its quality management system. The way forward has been to relate any step of GSBPM to the quality tasks, as they are carried out nowadays in the INE, and the evaluation procedures that should be undertaken. These evaluation procedures stem from the document of UNECE [1] with the proposed quality indicators for the GSBPM, adapted to the INE characteristics.

In a further step, the results of this process will be included in future revisions of the INE quality guidelines.

Keywords: GSBPM, standardization, evaluation procedures, quality management system.

1. Introduction

INE Spain is involved in different projects, trying to rationalize and make the production process efficient. The first step to achieve a homogeneous and streamlined statistical production process system is to really know how the work is done now.

Because of this, the INE is now implementing the GSBPM model all over the organization, to get all the statistical operation processes documented in a homogeneous way (**David Salgado, Ana I. Sánchez-Luengo: Process metadata development and implementation under the GSBPM v5.0 at statistics Spain**). From this documentation, it will be possible to realize which steps of the production process could be standardized and used by a majority of the statistical operations.

The first stage of this task is the documentations of the quality aspects of the production process. During the past three years, the INE has implemented the IME (Informe Metodológico Estándar). It is a version of the ESMS model, and in that time, we have managed to complete the templates for (almost) all INE statistical operation. This project has met two objectives: to offer our users a homogeneous information of our statistical operation in terms of its methodology, and a quality user oriented report. However, this report is mainly a product quality report and does not address quality evaluation in the production process itself.

In order to amend this situation and working together with the afore-mentioned GSBPM project, we launched this project. The aim is to document quality aspects of the production process in the first step, and knowing the current situation, go further in establishing an enhanced quality management system, which can help every production unit to carry on their work in a standard and correct way.

2. INE of Spain Quality Guidelines: main points

The INE have been working since the beginning of this century in different aspects of statistical quality. Putting together all the quality facts, a new version of our quality guidelines was delivered in June 2015. The document deals with quality in official statistics, which in the INE's case follows the recommendations of the EUROSTAT, as described in the different documents related to the subject. The main points detailed in the document are:

The concept of quality in official statistics: ESS Code of practices

The European CoP and the commitment of applying the CoP

The Quality management System: management and tools

Production Process Model

Relationship with stakeholders

3. Standard for the description of process metadata: GSBPM adaptation to INE of Spain.

One of the most important improvement actions emerging from the last Peer Review at the INE was the GSBPM adaptation to the working process at the INE. This action comes from the year 2011, when the Department of Methodology and Statistical Production Development, following the recommendation of principle 4 of the Code of Practice, started a pilot project covering seven statistical operations using GSBPM 5.0.

This pilot project showed several problems: some tasks were not documented in the same way in different operations, the detail of the documentation varied from one operation to another, the same task were placed in different phases in different operations... That pilot project

gave us a better understanding of the questions that could arise in the implementation of GSBPM over all the organization.

Now this project has received a strong boost, due to its nomination as an INE improvement action of the last Peer Review, and all the characteristics that go with this fact: the commitment of the top management, the existence of a timetable and the external monitoring of the compliance of the action.

In this process, in order to overcome the problems seen in the pilot project, the first step was to fix the tasks for the 3er level of GSBPM, adapted to the INE organizational context, to create an INE standard. A working group was set up in November 2014, led by the Department of Methodology and Statistical Production Development. The units of Sampling, Data Collection, Information & Communication Technologies, Statistical Dissemination, Quality and Good practices, Municipal register, Socio-Demographic statistics, Price & household budget, took part in the group and they worked to adapt the GSBPM to INE characteristics, obtaining the INE standard. The board of directors approved this standard 7-4-2015.

The action, which the INE has committed itself to follow through, has the following characteristics: every production process should be documented following this structure of process metadata. The details to be provided for every task are input, output, throughput, tools, documentation and unit(s) responsible of the execution. The tasks description will be completed by the workflows.

The following step was to apply this standard to a set of statistical operations, selected as a model of each type of statistical operation: Structural and Short-term Economic statistics, Social statistics, Statistical compilation, Municipal register. The aim was to get some examples to help the remaining production units to fulfil the information in the GSBPM model.

This process is explained in its entirety in the afore-mentioned paper (**David Salgado, Ana I. Sánchez-Luengo: Process metadata development and implementation under the GSBPM v5.0 at statistics Spain**)

4. The quality management layer

As stated in the document “**Generic Statistical Business Process Model GSBPM (Version 5.0, December 2013, UNITED NATIONS ECONOMIC COMMISSION FOR EUROPE, STATISTICAL DIVISION)**”: in the GSBPM model, there are two over-arching processes – Quality Management and Metadata Management. Quality Management is present throughout the GSBPM. Indeed, the entire GSBPM can be viewed as a framework for the quality management lifecycle”.

Therefore, taking the GSBPM as a frame, the long-term purpose of the Quality Unit is to link any quality activity or guideline to the corresponding phase. The idea is to re-arrange and amend our current quality guidelines, following the GSBPM structure. In that way in each phase, the methods and tools to be (preferably) used, the appropriated standards, and the indicators to evaluate the quality of the process would be described.

One of the missed characteristics of the **INE of Spain Quality Guidelines** is that it does not address quality evaluation in the production process. To amend this aspect the Quality Unit started this project, aiming to get process quality indicators for every INE statistical operation. This would be the first stage in our purpose to achieve a complete INE Quality management system.

We have begun making a first version of quality indicators extracted from the paper presented in the **Workshop on International Collaboration for Standards-Based Modernization (Geneva, Switzerland, 5-7 May 2015) “Quality Indicators for the Generic Statistical Business Process Model (GSBPM) Version 5.0”**. This paper map quality indicators to the structure of the GSBPM model. This is not their final version, and is only oriented to surveys. Nevertheless, most of these indicators are suitable for any type of statistical operations.

5. Quality in the production process: Quality indicators and GSBPM phases

The total number of indicators obtained for our GSBPM version are 213, distributed by phases as follows: Phase 1: 34, Phase 2: 30, Phase 3: 44, Phase 4: 33, Phase 5: 21, Phase 6: 16, Phase 7: 24, Phase 8: 11.

Most of these indicators are yes/no indicators, which does not imply any calculations, and others are easily obtained ratios. Some of them are in the model two or more times, as they are attached to every third GSBPM element of the Spanish standard. As we have said before, the aim of this project is to document the statistical process, so this list of indicators is a kind of checklist for reminding the units to include, while they are documenting its process, every quality aspect they carry out, in the correct place.

But the final aim (not of this project) is to get from the units values for these indicators. So to avoid over-burdening (or to intimidating) the production units, we decided to reduce the list obtained, linking indicators to the GSBPM sub phases, and then, classifying them in three stages. The first one involve most of the Priority Quality Indicators, as defined by Eurostat in the paper **“ESS Guidelines for the implementation off the ESS priority quality indicators” Luxembourg/ESTAT/D4/LA D (2014)**. Most of them are already systematically calculated by all the statistical operations in the INE (the ones included in the *“Informe metodológico estandarizado, IME”*).

The first column of Table 1 shows, the indicators already provided by the production and cross functional units(first stage) , and in the second one (second stage), in blue, the new ones that will be in charge of production units, while the Quality Unit and other cross functional units will obtain the ones in yellow. Most of the new values are already calculated, but are not provided systematically by all the units, remaining as internal information.

Table 1

Process Quality Indicators GSBPM			
Phase/ sub phase GSBPM	Indicator description	Present	2^a phase
Phase 2. Design			
2.4 Design frame and sample	Timeliness of the frame: How recently was the frame updated		X
2.6 Design production systems and workflows	Estimated cost for producing and disseminate designed outputs	X	
Phase 4: Collect			
4.1. Create frame and select sample	Over-coverage rates, The proportion of units accesible via frame that not belong to the target population.		A2
4.3. Run collection	- Unit non.response rate	A4	
	- Item non-response rate		A5
Phase 5 : Process			
5.1. Integrate data	The proportion of units covered by both the survey and the administrative sources in relation to the total number of units in the survey		A3
5.4. Edit and impute	Imputation rate :The unweighted imputation rate for a variable is the ratio of the number of imputed values to the total number of values requested for the variable		A7
5.7. Calculate aggregates	The sampling error, expressed in relative terms by means of the relative standard error, or by the coefficient of variation.	A1	
	Data revision-Average size: The average over a time of the revisions of a key indicator. The revision is defined as the difference between a later and an earlier estimate of a key item.	A6	
	Mean absolute revision	MAR	
	Relative mean absolute revision	RMA R	
Phase 7: Disseminate			
7.1 Update output systems	Rate of completeness of metadata; Ratio of the number of metadata elements provided to the total number of metadata elements applicable		AC3

7.2. Produce dissemination products	Rate of available statistics: ratio of the number output data elements provided in accordance to a relevant regulation to those required by the regulation,	R1	
7.3. Manage release of dissemination products	Punctuality of statistical outputs: Time leg between the delivery/release of date of data and the target date for delivery/release announced in an official release calendar.	TP3	
	Number of days, weeks or months, from the last day of reference period to the day of publication of first results	TP1	
	Number of days, weeks or months, from the last day of reference period to the day of publication of complete and final results	TP2	
	Availability of a dissemination policy defining dissemination practices and its availability on the web site		X
	Availability of a release calendar and its availability on the web		X
	Length of comparable time series: number of reference periods in time series from last break	CC2	
	7.4. Promote dissemination products	User satisfaction about the metadata availability	
Number of social media visitors/ followers		AC1	
Number of metadata consultation (ESMS) within a statistical domain for a given period of time			AC2
7.5. Manage user support	User satisfaction index		X
	Length of time since most recent user satisfaction survey		X
	Availability of an information service/unit or a call center to users to answer enquires about date and metadata issues.		X
	TOTAL	12	13
	IME or Quality Unit	12	8
	Production units or support units	0	5

The third phase involves 91 new indicators. We can see for example the ones selected for the Phase 2, Task 3: Design collection (**Table 2**) and Phase 3 Task 2: Build or enhance process components (**Table 3**).

Table 2

2.3 Design collection	Is the process re-using known methods and collection systems e.g. according to Guidelines/recommendations	(yes/no)
	How well does the collection method suit the nature and volume of the information to be gathered?	(fully/partly/no)
	When has the data collection technique last been revised/improved?	Date
	Indirect evaluation of response burden: number of questions on the questionnaire	number
	Trend in respondent burden with respect to the previous iteration	(increasing/stable/decreasing)
	Percentage of statistics produced from administrative data and other data sources instead of survey	%

Table 3

3.2. Build or enhance process components	Extent to which process components are using corporate tools	%
	Has new developed (ad hoc) software been tested and documented?	(yes/no)
	Have the test results been taken into account in the final implementation and documented in a report?	(yes/no)
	Has the coding procedure been tested?	(yes/no)
	Have the test results been taken into account in the implementation of the final procedure?	(yes/no)
	Has the editing and imputation procedure been tested?	(yes/no)
	Have the test results been taken into account in the implementation of the final procedure?	(yes/no)

These lists of indicators were proposed in the last meeting of the INE Quality Committee held in October 2015. The purpose was to make them known throughout the organization, to facilitate the documentation of quality aspects in the GSBPM project. A second target was to introduce the collection of the second phase of indicators, and subsequently, the third phase.

The indicators described up to here will be calculated by the production units and cross-functional units but not by the Quality Unit. However, in the 8 GSBPM Phase, the Quality Unit works in collecting every quality aspect of the process that should have been described in the previous phases. That process is ongoing, and a part of it would take place in the near future. Nevertheless, the Quality Unit is collecting all the quality information that we can find covering statistical operations, on the INE web page, on the INE Intranet, or in meetings with the units.

For instance, the information about improvement actions: “**8.1.1. Gather reports of implementation of previous action plans**”. In the INE is not common to formally document

improvement actions if they do not have a big impact. One place where we can find a register of such improvement actions is the INE web page, where we can find the “National Statistical Plan” for every 4 years. Each of these plans are developed in 4 “Annual Plan”, where we can find some not very detailed references to the improvement actions. In addition to this we have the “Implementation Report”, which explains the result of those actions from previous years.

8.1.2. Gather quality metadata: Another source of information available on the INE’s web is the Spanish version of the standard ESS ESMS (*Informe Metodológico Estandarizado, IME*), which provides the quality aspects oriented to users for any statistical operation. In addition to this, the ESQRS reports, which should make statistical operations under the rule of agreements with EUROSTAT, are available in the INE’s Intranet.

8.2.2. Analysis of quality indicators: Finally, using the indicators supplied to the Quality Unit every year by the production units (first stage), we prepare a file to show the evolution of them in every statistical operation.

In the future, this information will be completed once the production units provide the second and third stage of quality indicators.

With these inputs, the Quality Unit will undertake the quality analysis of the process: **8.2.2. Analysis of quality indicators.** This information, together with the information about error sources in the process: **8.2.1. Identify process errors**, will allow the production units to take decisions about future actions plans: **8.3.1. Develop an improvement action plan.** Finally, the process end with **8.3.3. Monitor the implantation of the action plan**, in which previous improvement actions are monitored.

The indicators considered in this phase to summarize the quality evaluation of a specific instance of a statistical business process are the following: (Table 4)

Table 4

Phase 8	8.1 Gather evaluation inputs	Ratio of the number of quality indicators collected for the different phases and sub-phases to the total number of indicators including cost and timelines.
	8.2. Conduct evaluation	Trends on quality indicators (improvement/ worsening) for recurring processes
		Percentage of Quality dimensions that were not possible to asses and why.
		If an evaluation report has been produced and on which basis
	8.3. Agree an action plan	Ratio of the number of actionable quality issues to the total number of quality issues
		Ratio of the number of Quality issues to take action on divided by the number of all actionable quality issues
		Completion rate of the action plan: the number of successfully improved quality issues divided by the total number of quality issues planned to be solved.

6. Lessons learned

Other projects similar to this have proved the need for strong commitment on the part of the top management, as this kind of process implies a new way of working, or even new tasks that increase existing ones. This can cause rejection in the units involved, which do not see clearly the advantages that may derive from this work, only the burden created for them. In our case, we have this commitment, but to facilitate the achievement of the targets, the team in charge (Department of Methodology and Statistical Production Development) maintain close contact with the units involved in the project, monitoring the progress made, and providing the help needed.

Another fact, which helps the implementation of the project, is the involvement of the cross-functional units. They have tasks to do in collaboration with the production units, and working together can facilitate the completion of the task. For instance, the Quality Unit has prepared a template with all the quality facts that thus far known about which, can be present in the Phase 8. The production units can work with this template and adapt it to its facts.

With these actions, we aim at achieving the successful implementation of the quality management layer over the Spanish GSBPM version.

7. References

UNITED NATIONS ECONOMIC COMMISSION FOR EUROPE, STATISTICAL DIVISION (December 2013), Generic Statistical Business Process Model GSBPM (Version 5.0)

UNITED NATIONS ECONOMIC COMMISSION FOR EUROPE, STATISTICAL DIVISION (2015), Quality Indicators for the Generic Statistical Business Process Model (GSBPM) (working paper)

ESTAT/D4/LA D (2014), ESS Guidelines for the implementation off the ESS priority quality indicators Luxembourg

Q2016, Session: 24 - Metadata Systems, Paper number: 106. David Salgado, Ana I. Sánchez-Luengo (2016): Process metadata development and implementation under the GSBPM v5.0 at statistics Spain