REPORT ON THE IMPLEMENTATION OF GSBPM
IN STATISTICAL OFFICE OF MONTENEGRO
(mapping processes and national implementation of GSBPM)

Podgorica, June 2021.

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I. INTRODUCTION

Based on international standards, recommendations and best practices, the Statistical Office of Montenegro has adopted the Total Quality Management / Quality Management model, which is a common framework for the quality of the European Statistical System.

The model has been defined through five elements, one of which refers to "*Quality Statistical Processes and Products*". This element refers to the standardization of statistical processes and therefore the Statistical Office of Montenegro decided to implement the **Generic Statistical Business Model - GSBPM.**

Generic Statistical Business Model - GSBPM is a standard view of a statistical business process that identifies activities, responsibilities, resources, documents statistical processes in a standardized way. Using the model, a system for monitoring, documenting and controlling all phases in producing the results of official statistics is being developed, but not only that, but also the staff who is trained and perfected for the application of the Generic Statistical Business Process Model - GSBPM model on a daily basis.

Generic Statistical Business Process Model - GSBPM is a model that defines and describes statistical processes in a coherent way. By applying this model, processes within and between institutions (producers of official statistics) can be compared and labelled, thus making better decisions about production processes and organization of resources. It can be applied to all surveys, independently from data sources (surveys, population censuses, administrative data, compilations and other combined data sources) for describing and evaluating the quality of statistical production.

The GSBPM model is not designed as a strictly defined framework in which all steps must be applied in the same order but as a model that identifies the steps in statistical production as well as the interdependencies between them.

The model is so designed to be applied to all activities performed by producers of official statistics, that is, to any statistical survey. It is independent from the data source, so it is used to describe the process in a sample-based survey, inventory, research using data from administrative sources, or in surveys that combine several methods or models.

II. THE PURPOSE OF ESTABLISHING A GSBPM MODEL AT THE STATISTICAL OFFICE OF MONTENEGRO

The purpose of establishing the GSBPM model is standardization of the process within the Statistical Office of Montenegro and harmonization with international standards. Implementation of the model provides a documented description of the production system of the results of official statistics, establishes a common and uniform terminology, which facilitates communication, training and integration of employees and facilitates rotation from one workplace to another.

Bearing in mind that this is a project that requires the engagement of all statisticians, in order to reduce the burden on employees it is necessary to prepare an application solution for documenting the description of the statistical business process.

In addition to the application solution, it is necessary to define a Documentation Guide to the description of a statistical business process that will help employees fill in the phases and sub-phases of a stagnant business process.

To estimate which level of data quality has been achieved by a statistical survey, it is necessary to study the information and procedures applied in detail, as well as to look at the input and output of the implemented statistical process. It includes an analysis of the methodology and implemented statistical production process (how the data were collected, statistically treated, processed and analysed). It also includes a comparison of results achieved towards the relevant standards with alternative sources of information, prior knowledge or logical expectations.

III. BACKGROUND AND CURRENT SITUATION

GSBPM has been adopted as a reference model, started (in 2018.) through IPA 2015 project when Statistical office of Montenegro prepared documents:

- *Guideline for the implementation of GSBPM* and instructions for filling out the template;
- *Description on nationally adopted version of GSBPM*;
- *Plan on the introduction of GSBPM model in the Statistical office of Montenegro;*
- GSBPM model tested on four (4) statistical surveys.

Thought IPA project 2015 the Quality working team for the introduction of the GSBPM model at the Statistical Office of Montenegro was in the first phase, worked on a sample of five statistical surveys, different in the manner of collecting and using data sources, and at a later stage it was plan to implement on all statistical surveys defined by the Annual Plan of Official Statistics. Matrix of GSBPM is made in word document, and test surveys are filled word document. Following are presented disadvantages of filling the matrix in that way:

1. Some of them described all phases very detailed and some of them very short. Also, there was necessary to fill date when that phase or sub-process need to be implemented and responsible persons for that survey;
2. It is very difficult to follow the bad sides of survey and make comparisons with others. For quality management it is very difficult to see what is need to improve in some sub processes;
3. It takes a lot of time for employees. Statistical office of Montenegro has a problem with lack of staff and any additional work and filling is considered as a burden on our employees. Therefore, the application solution for GSBPM is the best way to map statistical processes and to continuously work on improving.

The implementation of GSBPM continued through the IPA 2017 project. The analysis of the situation from the previous period showed that for the implementation of the GSBPM model in the Statistical Office of Montenegro it was necessary to meet the following preconditions which were realized through the following:

- Defines the project task (thought ***Quality Work plan IPA 2017 project***), on the implementation of the GSBPM model in the Statistical Office;
- To establish a working team **(**under ***Quality working group)*** for the introduction of the GSBPM model at the Statistical Office of Montenegro;
- ***Guideline for the implementation of GSBPM and instructions for filling out the template*** (prepared through IPA 2015 project – Annex 1);

- Development of a **national *Matrix of GSBPM model*** (excel file – mapping processes and national implementation of GSBPM as application solution – Annex 2);
- **Education of staff** for implementation GSBPM model in Statistical office of Montenegro with explanatory notes for fill-in matrix of GSBPM:
    - First presentation held on 28 and 29. December 2020.
    - Second presentation held on 15. February 2021.
    - Third 2 and 3. March 2021.

The source was used for implementation of GSBPM was ***Generic Statistical Business Process Model***, version 5.0, Joint UNECE/EUROSTAT/OECD prepared by High-level Group for the Modernization of Statistical Production and Services.

IV. PROCES OF IMPLEMENTATION OF GSBPM IN STATISTICAL OFFICE OF MONTENEGRO

Quality working team held three presentation in period from December to March (5 days) to present national Matrix of GSBPM model with explanatory notes for fill-in matrix of GSBPM.

In order to map all statistical processes and prepare activities for application development, in the previous period a model was developed through an excel file, with the main activities through which employees had to evaluate the activities they implement through their survey.

Through excel file it is easier to check which of the sub processes is need to be improved. Following are presented every phase of GSBPM, with main activities which are need to be improved.

All employees of the Statistical Office of Montenegro had the competencies to fill in the matrix in order to identify the applicability for the establishment of the GSBPM model in the Statistical Office. The activities were coordinated by the working team for the introduction of the GSBPM model in the Statistical Office.

The national matrix of GSBPM a has three levels:

- **Level 1** – the statistical business process;
- **Level 2** – the eight phases of the statistical business process;
- **Level 3** – the sub-processes within each phase.

The basic level of the statistical process is:

1. Identification of user needs and requests;
2. Planning and preparation;
3. Production and testing of the production system;
4. Data collection;
5. Data processing;
6. Analysis of results;
7. Dissemination of results;
8. Evaluation of the process.

V. RESULTS OF MAPPING PROCESSES AND IMPLEMENTATION OF NATIONAL GSBPM MODEL - description of the eight phases of the statistical business process

Mapping processes was done by national Matrix of GSBPM, which content 211 statistical activities (source: Annual plan of statistical surveys for 2020.). Each phase has questions and indicator which describe process coverage in percentage (%).

Total coverage for basic level of the statistical process (8 phase) is 62%.

Phase 1. Identification of user needs and requests

First phase ***Identification of user needs*** and requests have eight (8) question. This phase identifies the need for new statistics or feedback on current statistics triggers a review. It covers all activities related to the engagement of stakeholders to identify their detailed statistical needs (current or future), proposing high-level solution options that will meet these needs.

There is a legal basis for all statistical surveys. Every survey is implemented according to Law of official statistics and official statistical system and Annual plan of official statistics. Also, every survey has methodology according to which is implemented survey.

Mapping results for all statistical surveys in Statically office of Montenegro are that the main users are known and they are:

- international organizations,
- media,
- researchers and
- enterprises.

Recommendation for <u>Phase 1. Identification of user needs and requests</u> are:

1. Statistical office of Montenegro need to calculate relation cost/benefit. In that part it is neccesary to calculate production costs at the time of survey planning, in order to see the importance of conducting research according to the needs of users.
2. Direct more attention on user needs. Before each round of survey to see if users have a need for new variables and indicators.

Average coverage indicator for **Phase 1. *Identification of user needs*** is **61,3%.**

Phase 2. Planing and preparation

Phase 2. ***Planing and preparation*** describes the development and design activities, and any associated practical research work needed to define the statistical outputs, concepts, methodologies, collection instruments and operational processes. It includes all the design elements needed to define or refine the statistical products or services identified in the business case. This phase specifies all relevant metadata, ready for use later in the business process, as well as quality assurance procedures. For statistical outputs produced on a regular basis, this phase usually occurs for the first iteration and whenever improvement actions are identified in the “Evaluate” phase of a previous iteration.

Through the second phase of the GSBPM, all phases for the preparation of the survey were defined. Each survey describes the main concepts, variables and indicators. Also, the methodology of statistical research was prepared, the design of the sampling sample was done, and the research instruments were tested. Most of the survey had a pilot study before its implementation.

Also, in this phase some surveys has been mapped out that needs to be further improved.

Average coverage indicator for ***Phase 2. Planing and preparation*** is 62,2%. This phase have eight (9) questions.

Phase 3. Production and testing of the production system

Phase 3. ***Production and testing of the production system*** builds and tests the production solution to the point where it is ready for use in the "live" environment. The outputs of the "Design" phase are assembled and configured in this phase to create the complete operational environment to run the process. New services are built by exception, created in response to gaps in the existing catalogue of services sourced from within the organisation and externally. These new services are constructed to be broadly reusable in alignment with the business architecture of the organisation where possible.

In Statistical office of Montenegro all phases are tested and adapted to the needs of research. the questionnaires were tested and all other preparatory activities necessary for data collection. Project requirements have been defined when establishing surveys. Also, every survey build instruments for data collection (for sample surveys questionnaire and for administrative sources there are agreement or some applicative solution for sending/receiving data). Always testing tools for data collection and processing.

Recommendation for Phase 3. Production and testing of the production system are:

1. For some surveys it is necessary to build programme for support, and that is the main disadvantages of this phase.

Average coverage indicator for P**hase 3. Production and testing of the production system are** 44,9%. This phase has seven (7) questions.

Phase 4. Data collection

Phase 4. ***Data collection*** his phase collects or gathers all necessary information (e.g. data, metadata), using different collection modes (e.g. acquisition, collection, extraction, transfer), and loads them into the appropriate environment for further processing. Whilst it can include validation of data set formats, it does not include any transformations of the data themselves, as these are all done in the "Process" phase. For statistical outputs produced regularly, this phase occurs in each iteration.

For now, the biggest disadvantages in this phase is that household selection framework is the Census of population, households and dwellings in 2011. This framework is very old and often leads to a large non-response of households. Therefore, it is necessary to carry out activities related to the regular updating of the sample frame.

Also, for this phase of GSBPM one disadvantages is also that some surveys need to modernise data collection method. There some sample surveys that use PAPI method of data collection and should switch to the CAPI data collection method, while some surveys that have reporting units should switch to the CAWI data collection method.

Recommendation for **Phase 4. Data collection** is:

1. Increase the number of the survey which will use the CAPI and CAWI data collection method.

Average coverage indicator for **Phase 4. Data collection** is 44,9%. This phase has six (6) questions.

Phase 5. Data processing

Phase 5. ***Data processing*** describes the processing of input data and their preparation for analysis. It is made up of sub-processes that integrate, classify, check, clean, and transform input data, so that they can be analysed and disseminated as statistical outputs. For statistical outputs produced regularly, this phase occurs in each iteration. The sub-processes in this phase can apply to data from both statistical and non-statistical sources (with the possible exception of sub-process 5.6 (Calculate weights), which is usually specific to survey data).

For some surveys, there some sub processes which are done automatically, while some surveys still do manually defined processes such as coding and imputation and editing.

Logical control is done automatically for all statistical surveys, but the biggest problem is that is not documented.

Average coverage indicator for Phase 5. Data processing is 66,8%. This phase has seven (7) questions.

Phase 6. Data analysis

Phase 6. Data analysis - statistical outputs are produced and examined in detail. It includes preparing statistical content (including commentary, technical notes, etc.), and ensuring outputs are “fit for purpose” prior to dissemination to users. This phase also includes the sub-processes and activities that enable statistical analysts to understand the data and the statistics produced. The outputs of this phase could also be used as an input to other sub-processes (e.g. analysis of new sources as input to the “Design” phase). For statistical outputs produced regularly, this phase occurs in every iteration. The "Analyse" phase and sub-processes are generic for all statistical outputs, regardless of how the data were sourced.

Employees in Statistical office of Montenegro analyse data. After obtaining the first results, the analysis of consistency and comparability of the results, as well as investigating the causes of possible inconsistencies in the results of the analysis. Such data in aggregated form is compared with the corresponding aggregated data in administrative sources.

Regarding to confidentiality, articles 53 - 60 of the Law on Official Statistics and Official Statistical System (Official Gazette of Montenegro No 18/12 and 47/19) provide a framework for protection, use, and transmission of confidential data. MONSTAT has produced two

comprehensive rulebooks that cover the procedures for individual data protection as well as keeping individual records. With purpose of the meeting legal framework on functioning of security system and statistical confidentiality there was adopted the Rulebook on Keeping Statistical Data by which Manner, Time, Technical Conditions and Organization of Statistical Data Storage to Prevent Their Destroying, Misappropriation, and Unauthorized Use is Regulated as well as the Rulebook on Contents and Manner of Keeping Records on Users of Individual Statistical Data by which contents and manner of keeping records on users of individual statistical data is regular.

The biggest disadvantage is that Statistical office of Montenegro doesn't have procedure for disclosure control, general for Statistical Office, which can be applied for every survey.

Recommendation for Phase 6. Data analysis are:

1. Establish procedure for Disclosure control.

Average coverage indicator for Phase 6. Data analysis 78,6%. This phase has four (4) questions.

Phase 7. Dissemination

Phase 7. Dissemination - This phase manages the release of the statistical products to users. It includes all activities associated with assembling and releasing a range of static and dynamic products via a range of channels. These activities support users to access and use the products released by the statistical organisation. For statistical products produced regularly, this phase occurs in each iteration.

The beneficiaries of the results of official statistics are enabled to receive the necessary statistical data through the various channels of communication and services, request, request statistical services and be informed about statistical activities on time.

Communication channels for users are:

- The official website of the Statistical Office of Montenegro, which is the main channel for the dissemination of statistical results. On the website, the results are presented through releases and in a database that makes it easier for users to perform additional comparisons and analyzes in different ways;
- The official e-mail address of the Statistical Office of Montenegro contact@monstat.org and mediji@monstat.org enables users to submit requests for data that are not

published on the official website, additional questions and explanations related to the published results of official statistics. The deadline for responding to the request is up to 15 days, depending on the complexity of the request in accordance with the Law on Administrative Procedure (Official Gazette of Montenegro, No. 37/2017). The Statistical Office of Montenegro makes every effort to respond to all users' questions within a period of one day, upon the received electronic request, in case they refer to standardized and already processed data.

In the event that the request relates to data that do not constitute a standardized or processed information, it will be referred to an additional processing that requires a certain amount of time.

- Library of the Statistical Office of Montenegro where users can find and use newer and more historical editions of printed statistical publications.
- Traditional method of submitting applications where users have the possibility to submit requests for data, additional explanations or other additional questions to the address of the Statistical Office of Montenegro.

For almost all surveys there are prepared and published release. Some results of official statistics are published only in publications. Also, for all surveys there are excel file with more data then it is presented in release. For every result of official statistics it is neccesary to have comparative data with previous period and (if it is aplicable) compraios with other countries. All releases published by Statistical office of Montenegro are made in the same form according to the procedure for preparing releases and publications.

Average coverage indicator for Phase 7. Dissemination 79,4%. This phase has six (6) questions.

Phase 8. Evaluation of the process

Phase 8. Evaluation of the process his phase manages the evaluation of a specific instance of a statistical business process, as opposed to the more general overarching process of statistical quality management described in Section VI (Overarching Processes). It can take place at the end of the instance of the process, but can also be done on an ongoing basis during the statistical production process. It relies on inputs gathered throughout the different phases. It includes evaluating the success of a specific instance of the statistical business

process, drawing on a range of quantitative and qualitative inputs, and identifying and prioritising potential improvements.

All statistical surveys prepare National Quality Reports for Users which are published on MONSTAT website. In addition to Quality Reports For Users, Quality Reports For Producers are also prepared and they are on internal network. Also, where is aplicable, employees are preparing and sending Quality reports to EUROSTAT.

In accordance with the principles of official statistics of Montenegro, producers of official statistics regularly and systematically monitor user satisfaction, so that the Statistical Office, as the coordinator of the statistical system, conducted a survey on user satisfaction last year, where all employees could see how users evaluate their statistical domain.

According ***User satisfaction survey results***, action plan is prepared with actions what need to be improved in next two years.

The main disadvantage in this phase is that risk assessment is not done, yet.

Recommendation for Phase 8. Evaluation of the process are:

2. Establish Risk assessment

Average coverage indicator for Phase 8. Evaluation of the process 57,8%. This phase has six (6) questions.

Annex 1.

STATISTICAL OFFICE

DESCRIPTION ON NATIONALLY ADOPTED VERSION OF GSBPM

GUIDE FOR IMPLEMENTATION AND INSTRUCTIONS FOR FILLING OUT THE TEMPLATE

Podgorica, June 2019

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1. INTRODUCTION

Statistical Office adopted *Quality Management Strategy* and *Guide for Implementation of Quality Strategy* in November 2017, proposing the introduction of Generic Statistical Business Process Model – GSBPM.

GSBPM is a model which defines and describes statistical processes in a coherent manner. Implementation of this model enables comparison and definition of processes inside institution and between institutions (official statistics producers), and in this way to take better decisions on production processes and organization of resources.

The purpose of implementing model is the standardisation of process under the statistical system f Montenegro on one side, and one more step forward the harmonization with the international standards, on other side. It can be used for all surveys, no matter of data source (interview-based surveys, population census, administrative records, compilation and other combined data sources) for describing and assessment of statistical production quality.

GSBPM is an essential tool in: planning and introduction of new surveys: activities on the improvement of working processes under certain surveys; organization as an entirety, as well as for the purpose of education.

The model implementation provides a documented description of official statistics data production system in Montenegro statistical system; it establishes joint and uniform methodology, making easier communication, training and integration of staff, as well as job rotation.

The model has been such projected to use it in all activities done by official statistics producers, supported by IT, implying the production of application for GSBPM model implementation. It is not designed as a strictly given framework in which all steps must be implemented by the same order, but as a model which identifies steps in the statistical production, and interdependence.

A full implementation of model creates preconditions for important organizational changes in statistical system and change to the integrated access in planning and production of official statistics.

1. GENERIC STATISTICS BUSINESS PROCESS MODEL

1.1. Creation of Generic Statistical Business Process Model

International institutions UNECE/EUROSTAT/OECD prepared the Common Metadata Framework (CMF)[1] on the joint meetings on statistical metadata (METIS). Part C of this framework has title "*Metadata and the Statistical Business Process*" referring to the statistical business process phases (known also a chain of statistical values or statistical cycle) and it provides uniform terms for their description. From November 2013, this job was overtaken by Standard Modernisation Board functioning within the High-Level Group for the Modernisation of Official Statistics (HLG)[2] with Statistical office as its member from December 2017[3].

During the meeting on development of Part C, Common Metadata Framework (CMF) held in Vienna in July 2007[4], the participants agreed that business process model used by Statistics New Zealand offers a good basis for the development of *Generic Statistical Business Process Model*. After several drafts and public consultations, the version 4.0 GSBPM was released in April 2009. Afterwards, it was widely accepted by global official statistical community and one of pillars of HLG vision and strategy on the standard based modernisation was established.

In December 2012, a complete *Generic statistical information model (GSIM)* was published. The work on its development and afterwards implementation also resulted in the identification of several possible improvements of GSBPM-a. During 2013, HLG launched the project '*Frameworks and Standards for Statistical Modernisation'* that included a wide scope of GSBPM and GSIM to improve the interdependence of models and obtain the feedback information based on practical implementations. A current version of GSBPM (version 5.0) is the direct results of this work. While it is considered to be final at the time of implementation, expected are also improvements in the following years, so that further experiences can be reflected in the implementation of model in practice or due to the development of statistical production.

The main changes in GSBPM between versions 4.0 and 5.0 are the following:

Phase 8 (Archive) was removed and built in the comprehensive process of data and meta data management which gives an input that archiving can occur in any phase of statistical production;

- New sub-process: '*Build or improve dissemination components*' has been added to phase '*Build'* to reflect the importance of possibility for a large number of dissemination channels;
- Several sub-processes were renamed to improve their clearness;
- Descriptions of sub-processes are updated and expanded where it was necessary. Used terminology has been changed so that it is less survey concentrated concerning an increased use of data source (administrative data, databases, etc.).

[1] See: https://statswiki.unece.org/display/hlgbas/Part+C+-+Metadata+and+the+Statistical+Business+Process
[2] See: http://www1.unece.org/stat/platform/display/hlgbas
[3] Modernization of statistical system http://www.monstat.org/cg/novosti.php?id=2557
[4] Workshop documents are available at the following link: http://www.unece.org/stats/documents/2007.07.metis.htm

1.2. Basic information on Generic Statistical Business Process Model

In line with international standards, recommendations and best practice, Statistical Office adopted the TQM model (Total quality management), which represents a common quality framework of European Statistical System - ESS.

The model has been defined through five elements out of which one refers to '*Quality statistical processes and products*'. This element refers to the standardisation of statistical processes and this is the reason why Statistical Office chose the implementation of GSBPM in Montenegro statistical system. This is a standard overview of statistical business process which identifies activities, responsibility, resources, documenting statistical processes in the standardised manner. The implementation of model develops the system for monitoring, documenting and control of all phases in the official statistics data production, together with the continuous training and advancement of staff to use the Generic Statistical Business Process Model.

The model has three levels:
Level 1 - Statistical business process;
Level 2 - Eight phases of statistical business process;
Level 3 – Sub-processs under each phase.

Table 1: Generic Statistical Business Process Model - GSBPM

Quality management							
Phase 1.	**Phase 2.**	**Phase 3.**	**Phase 4.**	**Phase 5.**	**Phase 6.**	**Phase 7.**	**Phase 8.**
User needs	**Designing methodology of statistical surveys**	**Implementation and testing production system**	**Data collection**	**Data processing**	**Data analysis**	**Data dissemination**	**Process evaluation**
Determining user needs for official statistics data	Designing outputs and survey variable descriptions	Project request design	Select target population/sample	Integrate data	Integrate and explain official statistics data	Design and production of dissemination products	Output evaluation
Consulting and confirmation of users for official statistics data	Data collection methods	Build data collection instruments	Data collection preparation	Coding and validation	Interpretation, finalisation and confidentiality of official statistics data	Determining manner of disseminating products and result promotion	Measures to improve statistical surveys
Identification and establishment of concept for data production	Design frame and sample methodology	Build programme support	Data collection	Editing and imputation		Manage user relations	
Checking available data sources	Design methodology for data processing and analyses	Testing tools for data collection and processing	Using data from administrative and other secondary sources	Production of derived variables			
Schedule of main activities (Prepare business case, analysis)		Product and process configure	Entering data collected	Weight and aggregate design			
				Build final data set			

Beside phase and sub-process, every statistical process is also characterised by '*horizontal'* activity, i.e. processes which link all phases, i.e. they are present in every, or almost every phase.

The processes can be grouped in two categories, those having:

- Statistical component and
- General character that can be applied in any organization.

Horizontal processes containing statistical component comprise the following elements of management:

- ***Quality management*** – this process includes mechanism for estimate and control of quality. It recognises the importance of estimate and feedback information during the statistical business process;
- ***Metadata management*** – metadata are created and processed inside every phase, and thus it is strictly required from the composition for metadata management that appropriate metadata keep their links with the data during the GSBPM implementation;– includes development of standards, for example, methodology, concepts and classifications applicable through many processes;
- ***Management of statistical programme*** – includes integral surveillance and control of obtained requests for information, created and changed data sources through all statistical areas. This can result in determining new statistical business processes or reshaping of existing ones;
- ***Knowledge management*** – ensures the repeatability of statistical processes, mainly by maintaining process documentation;
- ***Data management*** – includes the aspects independently from the process, such as general data safety and ownership over data;
- ***Data management from process*** – includes the management of data and metadata derived from all parts of statistical business process, and providing on them information;
- ***Data provider management*** – includes the management of burden transmitted from process to process, as well as topics, such as profiling and managing the data for contact (and thus closely linked with statistical business processes that maintain registers) and
- ***Users management*** – includes general marketing activities, promoting statistical literacy, and proceeding with not defined feedback information from users.

1.3. Statistical survey as the main element of Generic Statistical Business Process Model

Statistical survey is the method of systematic data and information collection directly from reporting units, and only for statistical purposes[5]. It comprises a group of activities by which information on characteristics of interest for part or all units of certain population are collected in organized and planned manner. It is implemented based on defined concepts, methods and procedures and as the final result has official statistics data that meet the needs of users.

Statistical survey can be grouped by:

1. Type of coverage:
   - Census (the total population is observed);
   - Sample (only selected group of units is observed).
2. Manner of collection:
   - Interview (phone, by direct contact);
   - Questionnaire;
   - Administrative source;
   - Other manner of collection (Big data).
3. Collection frequency:
   - Monthly;
   - Quarterly;
   - Semi-annual;
   - Annual;
   - Ten-year and
   - Other frequency (multiannual).

The main process phases are:

1. User needs;
2. Designing methodology for statistical survey;
3. Implementation and testing production system;
4. Data collection;
5. Data processing;
6. Data analysis;
7. Data dissemination;
8. Process evaluation.

Table 2: Eight phases of Generic Statistical Business Process Model - GSBPM

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
User needs	Designing methodology for statistical surveys	Implementation and testing production system	Data collection	Data processing	Data analysis	Data dissemination	Process evaluation

[5] Article 4, point 3 of the Law on Official Statistics and Official Statistical System (Official Gazette of Montenegro No 18/12)

2. DESCRIPTION OF PHASE AND SUB-PROCESS

PHASE 1 - USER NEEDS

The process of introducing new statistical survey in the Montenegro official statistics system starts with the identification of users needs for new official statistics data.

This phase starts after the identification of needs for new statistical data or feedback information on current statistics which refer to existing statistical surveys and requires re-consideration of needs. It includes all activities related to engaging users to identify in details their statistical needs, proposing options and solutions for meeting those needs. In this phase, official statistics producers check the methodology of existing survey and make decisions is it necessary to introduce new survey or improve the existing one.

Five sub-processes, phase – *User needs* are:

1.1 Determining users needs for official statistics data;

1.2 Consulting and confirmation of users for official statistics data;

1.3 Identification and establishment of concept for data production;

1.4 Checking available data sources i

1.5 Schedule of main activities (Prepare business case, analysis)

Table 3. Phase 1 - User needs

PHASE 1 User needs				
1.1	**1.2**	**1.3**	**1.4**	**1.5**
Determining user needs for official statistics data	Consulting and confirmation of users for official statistics data	Identification and establishment of concept for data production	Checking available data sources	Schedule of main activities (Prepare business case, analysis)

1.1. Determining users needs for official statistics data

This sub-process means the implementation of activities which refer to the identification of user needs, i.e. collecting information on what users expect from official statistics producer aimed at the production of official statistics data. A need for new data occurs when the requested data do not exist or existing data do not meet the needs of users, both at national and international level. Additionally, a need for new data can occur upon requirements or recommendations by international statistical organizations.
The phase includes all consultative meetings with users paying attention to create database of requests from national and international users/organizations.
Introduction of new and development of existing official statistics data represents a comprehensive and systematic approach, as well as including all interested users. It is important to organize regular forums

with users aimed at observing their needs, as defined by Development Strategy of Official statistics for the years 2019-2023 (Operative aim 1 – ***Establishment of permanent dialogue with data users and partnership development***).

When producing the GSBPM application (IT support in the implementation of GSBPM model), it is necessary to create a consultation database with all national users listed (take from the *User Satisfaction Survey*), which is linked with the database EU *acquis* used by official statistics producers.

1.2. Consulting and confirmation of users for official statistics data

This sub-process refers to consulting with stakeholders and detailed confirmation of user needs for official statistics data. The most important is that official statistics producers and potential users achieve as much as possible mutual understanding both needs and possibilities. A good understanding of user needs is necessity so that official statistics producers know, not only what is expected, but also when, how and, maybe most importantly, why.

In repeating this sub-process, the main focus is on determining if previously identified needs are changed. Due to this, it is necessary to have good and permanent communication with users aimed at monitoring user needs.

1.3. Identification of concepts for official statistics data production

This sub-process identifies statistical data necessary to meet user needs for official statistics data determined by previous sub-processes.
The main activity is: (i) determining variables to be surveyed; (ii) determining their operative definitions, i.e. definitions based on actual possibilities of measurement and (iii) determining output table drafts. It includes the confirmation that proposed official statistics data harmonized with the quality principles and user needs.
Additionally, there are determined the concepts (units of measurement, characteristics, etc.) requested by users. The mentioned concepts do not need to be congruent in this moment with the existing statistical standards (this is done in sub-process 2.1 - ***Designing outputs and survey variable descriptions***).

1.4. Checking available data sources

By making decision to meet the needs of users for new official statistics data it is checked can the existing data sources (internal and external) meet the user requests and conditions in which they would be available, including all limitations of their use. This process also includes the assessment of possible and potential administrative data sources, in line with the survey methodology, to define if they can be used for statistical purposes.

In case that the data from administrative source can be used (have an advantage compared to the direct data collection), an analysis of administrative source quality is done together with the observation of the

methodology of administrative source. The analysis implies a precise consideration of differences between determined needs for data and available data.

The response in this part can be: administrative source (to list which are used), reporting units (to explain which reporting units), registers (to mention), compilations and households.

1.5. Schedule of main activities (Prepare business case, analysis)

As a continuation of previous sub-process, based on the analysis, the analysis results are documented for the purpose of obtaining approval for implementation of new or adapted statistical business processes.

The analysis results cover:

- Description of existing statistical survey (if there is one) with information on how actual statistics is produced, with the accent on shortcomings and issues to be solved;
- Proposal for future solution with detailed explanation on how the statistical business process which will produce new or revised statistics will be developed;
- Costs and benefits estimations as well as any external limitations.

PHASE 2 - DESIGNING METHODOLOGY FOR STATISTICAL SURVEYS

This phase describes development activities and all related practical work necessary for defining statistical results, concepts, methodologies, instruments for data collection and other operative activities (designing imputation method, editing, coding, etc.).

It covers all relevant metadata ready to be used later in the statistical business process, as well as in procedure for ensuring quality. For official statistics data regularly produced, this phase is usually occurred for the first iteration and whenever improvements happen defined under phase 8 (Process evaluation).

Activities on determining methodology for statistical survey imply application of international and national standards to reduce the length of process and increase comparability and usage of data. Additionally, activity results can establish a basis for future standards at the official statistics producers, both on national and international level.

This phase is divided in four sub-processes:

1. Designing outputs and survey variable descriptions;
2. Data collection methods;
3. Design frame and sample methodology;
4. Production of methodology for data processing and analyses.

Table 4: Phase 2 - Designing methodology for statistical surveys

PHASE 2 **Designing methodology for statistical surveys**			
2.1	**2.2**	**2.3**	**2.4**
Designing outputs and survey variable descriptions	Data collection methods	Design frame and sample methodology	Production of methodology for data processing and analyses

2.1. Designing outputs and survey variable descriptions

This sub-process defines results and descriptions of survey variables, implying the use of existing standards (methodology, classifications, nomenclatures, code lists, quality principles). It contains a detailed preparation of official statistics data to be produced, variables to be collected and production of derived variables.

Existing statistical surveys define and describe main results and variables obtained and collected by these surveys. It is expected that existing national and international standards will be respected whenever is possible. The results should be defined in such a manner that they are in line with the existing standards whenever is possible, so that inputs in this sub-process can include metadata from similar or previous data collection (including use of statistical, administrative and other non-statistical registers and databases), international standards and information on practice in other statistical organizations.

2.2. Data collection methods

This sub-process determines the most appropriate method for data collection. Data collection can depend on type of survey, survey units (enterprise, person or other) and availability of different data sources. There are determined the most appropriate methods and instruments for data collection. Activities to be implemented depend on the data collection method (CAPI, PAPI, CATI, and CAWI) including the instrument testing. All formal contracts on data delivery are produced (such as agreements on cooperation), and confirmation of legal basis for data collection.

2.3. Design frame and sample methodology

This sub-process is implemented only in those processes which include data collection based on sample, such as statistical surveys. The sub-process determines and defines the population of interest, defines sample frame (register from which is derived) and defines the most appropriate criteria and methodology of sampling. The most often sources are population census, administrative and statistical registers.

There should be prepared the sampling plan, i.e. to define if the frame contains the target population (does it cover units for which we would like to have the data in an ideal case).

2.4. Production of methodology for data processing and analyses

This sub-process explains the methodology for statistical data processing that will be implemented during Phase 5 (Data processing) and 6 (Data analysis). Statistical processing and analysis include all procedures used after finished collection phase so that the official statistics data express as much as possible the characteristics of the observed phenomena. This includes procedures for coding (coding), editing (control and correction of data), imputation, aggregating and tabulation, assessment, integration, verification and finalization of official statistics data that can differ depending on the manner of data collection and data source.

PHASE 3 - BUILD NECESSARY INSTRUMENTS FOR SURVEY IMPLEMENTATION

The phase *Building the necessary instruments for survey implementation* examines the production system to the point where it is ready for the use in the production environment. For the statistical surveys which are regularly implemented, this phase usually appears for the first iteration, after examination or change in methodology or technology, but both for every iteration. This phase should be adapted to the standardized production environment - IST (all statistical surveys which use it).

Phase 3 is divided in five sub-processes:

1. Project request design;
2. Build instruments for data collection;
3. Build programme support;
4. Testing tools for data collection and processing and
5. Product and process configure.

Table 5: Phase 3 - Build necessary instruments for survey implementation

PHASE 3 **Build necessary instruments for survey implementation**				
3.1	**3.2**	**3.3**	**3.4**	**3.5**
Project request design	Build instruments for data collection	Build programme support	Testing tools for data collection and processing	Product and process configure

3.1 Project request design

This sub-process includes the requests for data collection and processing with deadlines and holders, in line with the instructions for project task design to the IT Department.

An example, where appropriate, can be the following instructions: *Guide for Designing Project Requests* (for sample-based surveys) and *Instruction on Access to Databases* of MONSTAT (for administrative data sources).

3.2 Build instruments data collection

It means building the instruments to be used under Phase 4 (Data collection). Additionally, this sub-process is linked with Phase 2 (Designing methodology for statistical surveys), because the collection instruments are generated based on this phase.

Under this sub-process it is necessary to describe the manner of designing questionnaire, when its last revision was. The collection can be done based on one or several methods of collection, e.g. direct or phone interview, paper, electronic or web questionnaire.

Collection instruments can be also instructions for data use from statistical and administrative databases. Possible instruments for statistical data collection are: (i) web form; (ii) printed form and (iii) application for CAPI method entering.

3.3 Build programme support

This sub-process describes processes that should be done for building new and improving existing software components necessary for business process, designed under the preparation phase. Components can include control tables and reports, databases, data tables, data transformation tools, tools for data and metadata management.

A draft of different production process components is firstly built. Here different techniques are used, such as data modelling, logical data flow, etc. Then, it is worked on the development of software components, such as programme draft, interface design, etc. Each individual component is tested under the third process phase.

3.4 Testing tools for data collection and processing

It includes technical testing and approval of new programs and proceedings. It also includes testing the interaction between components and it takes care on production composition and functioning as an adjusted group of components. It includes the data collection for experimental surveys for the purpose of testing experiments for data collection. It is followed afterwards by processing and analysis of data collection. After the experimental survey, maybe there should be a need to return to previous steps and to do the adjustments.

3.5 Product and process configure

Configuring the production process flow refers from data collection to archiving final statistical results. It includes the activities by which the process is put in production, ready to be used in business areas. We sum up business processes.

PHASE 4 - DATA COLLECTION

Data collection is done by instruments for data collection and IT solutions developed in Phase 3 (Project request design). All necessary data are collected by using different collection methods and are put in an appropriate environment.

Phase 4 is divided in five sub-processes:

1. Selection of target population/sample;
2. Preparing data collection;
3. Data collection;
4. Data use from administrative and other secondary sources i
5. Entering of collected data.

Table 6: Phase 4 - Data collection

PHASE 4 **Data collection**				
4.1	**4.2**	**4.3**	**4.4**	**4.5**
Selection of target population/sample	Preparing data collection	Data collection	Data use from administrative and other secondary sources	Entering of collected data

4.1 Selection of target population/sample

Here is defined the selection of target population[6] for the implementation of surveys with design and preparation of necessary address books. For the sample-based surveys, a frame[7] is defined and sample for data collection is selected. It includes the coordination of samples inside a statistical survey (for example, management of overlapping or by rotation), and over different statistical surveys using the same frame or register. Selecting a sample is followed by designing address books and other related activities.

4.2 Preparing data collection

This sub-process confirms that staff members, interviewers, processes and IT support ready for data collection. This sub-process includes:

- Preparation of plan and address books for data collection;
- Training of interviewers and controllers that will collect the data (organization of trainings);
- Ensuring resources for data collection (for example, provision of tablets, applications);

[6] ***Target population of statistical surveys*** is a group of units whose certain characteristics are observed and which the survey results refer to.

[7] ***Sample frame*** is a realistic list of target population units available during the preparation of survey preparation, and it is used for the selection of target population units.

- Contracting conditions with persons collecting the data (interviewers, etc.)
- Preparing data collection instruments (e.g. questionnaire printing and sending, etc.)
- Ensuring confidentiality and protection of data to be collected;

4.3 Data collection

After the previously mentioned sub-process has finished, data collection is done by using different instruments for data collection. This sub-process refers to the contact with data providers as well as activities on additional monitoring and reminding (urgencies). This data collection process records every activity on time of contacting a provider; comments, questions, answers, and suggestions.

When the data collection fulfils the envisaged aims (what is especially indicated by the response rate), data collection is finalised, and a report on data collection is produced upon this, e.g. response rate.

4.4 Data use from administrative and other secondary sources

This sub-process for administrative data is short. A data provider is contacted and requested to transmit the data or a data provider sends himself/herself according to the signed agreement. Administrative data transmission is done based on the agreements signed by institutions while the transmission is done via different channels (network protocols, on CD, etc.).

4.5 Entering collected data

This sub-process includes the entering of collected data for further processing. The data collected and metadata are put in an appropriate electronic environment for the purpose of further processing. It can include manual data entering from printed questionnaires, automatic data transmission via Internet questionnaires and applications or converting a database in another (appropriate) form, received from other institutions.

PHASE 5 - DATA PROCESSING

Processing refers to arranging, control and correction of data. Calculating aggregates and their preparations for the analysis is done under this phase. It is consisted of six phases:

1. Integrate data;
2. Coding and validation;
3. Editing and imputation;
4. Production of derived variables;
5. Weight and aggregate design;
6. Build final data set.

Table 7: Phase 5 - Data processing

PHASE 5 Data processing					
5.1	**5.2**	**5.3**	**5.4**	**5.5**	**5.6**
Integrate data	Coding and validation	Editing and imputation	Production of derived variables	Weight and aggregate design	Build final data set

5.1 Integrate data

For this sub-process, the data can integrage from one or several sources. Input data can be produced by the combination of methods for data collection from external or internal sources, using also a part of administrative data. The result is a group of linked data. The data integration cana include:

- Combination of data from different sources, a part of creating integrated statistics, such National Accounts;
- Matching/screening the existing links with the aim of linking micro or macro data from different sources;
- Determining priorities when two or more sources containg the data for the same variable, with potentially different values.

The data integration may be done in any step in this phase, before or after any sub-process. Several data integration levels can exist in any of statistical business process.

5.2 Coding and validation

Coding, if any, validation of input data and identification by external values are done under this sub-process. Coding is allocation of alpha-numerical codes to textual responses, according to the determined code lists. It is necessary to mention the program in which logical and calculation control is done, if any.

In validation, data are analysed to identify errors and observe logics and validity of entered data. There are identified extreme values, non-response to certain questions, errors in coding, reporting units control is done. The validation is directed on discovering real and potential errors. If there are also other activities aimed at better data validation, it should be mentioned in this sub-process.

5.3 Editing and imputation

Editing and imputation are done in this sub-process: data are given with new values when missing, unreliable or noticed wrong values in the control procedure. There are many methods by which this is done. In this sub-process the following activities are done:

- Determining if new data are added or changed the existing ones;
- Selection of methods to be used;
- Adding/changing data values;
- Entering new values in existing data set and marking occurred changes;
- Production of metadata on editing and data imputation process.

Data imputation can be done both on data obtained from Data imputation can be done both on data obtained from statistical surveys and on data from administrative sources before or after the integration.

5.4 Production of derived variables

Activities on the production of derived variables refer to creation of variables and statistical units not explicitly ensured by data collection, and are necessary for the production of official statistics data. In this sub-process new variables occurr by using arithmetic formula on one or several variables already present in the data set or by using different estimation methods. This activity maybe needs to be iterative, since some derived variables can be based on other derived variables, thus it is important to ensure that variables can be derived in a correct order. New units can be derived by aggregation or splitting data by collection units or by different other estimation methods.

5.5 Weight and aggregate design

In the official statistics data production process we collect data on wanted characteristics of population, only to a part of population. This sub-process calculated the weights by methodology created in the sub-process 2.4 (Production of methodology for data entering and analyses), which are used for the assessment of surveys data based on the sample and making them in such a way representative for the target population or are used for correcting non-response in the full-coverage survey. In case of sample- based surveys, the weights can be used for expanding the results to represent the target population or to adapt the non-response in the total data. In other situations, variables should be weighted due to the data normalisation.

Additionally, this sub-process creates aggregated data and total data based on micro data or aggregates of lower level. This includes the following activities:

- Summing the data for syllables which possess certain characteristics;
- Determining measures for cross section and dispersion;
- Implementation of weights on the data from sample to calculate values for population.

5.6 Build final data set

This sub-process links the results of other sub-processes from this phase and results in the database used as an input under Phase 6 (Data analysis). It can be sometimes a database with intermediate data, not the final database, especially in those processes where a pressure exists in sense of time, as well as requests for production of both preliminary and final assessments.

Every survey has to possess tabulation plan and standardized tables. If it does not exist, it has to be determined what the standardized tables are and produce them. After this phase, depending on the request for data protection, the data can be anonymous, what is provided with the removal of identifier (such as name and address), to protect their confidentiality.

PHASE 6 - DATA ANALYSIS

This step of statistical production process analyses interprets and explains the obtained results. The aim of data analysis is to determine relevance, i.e. to discover and remove possible disadvantages by which the data quality is improved. This phase contains activities and sub-process which enable understanding of produced results for analysts.

It comprises tree sub-processes:

1. Preparation and control of the first official statistics data,
2. Statistical interpretation and additional explanation of official statistics data
3. Confidentiality and finalisation of official statistics data

Table 8: Phase 6 - Data analysis

PHASE 6 **Data analysis**		
6.1	**6.2**	**6.3**
Preparation and control of the first official statistics data	Statistical interpretation and additional explanation of official statistics data	Confidentiality and finalisation of official statistics data

6.1 Preparation and control of the first official statistics data

This sub-process covers all activities considering the production of the first official statistics data based on the collected data.

6.2 Statistical interpretation and additional explanations of official statistics data

This sub-process covers interpretation and explanation of obtained results. It also covers calculation of additional measures, such as indices or deseasonalized series, as well as producing quality assessments. Under this sub-process there is also done a verification of obtained results in accordance with the general quality framework: (i) control of coverage rate and response rate, and (ii) comparing obtained results with the results from the previous period (if possible). The main activities are:

- Finalization of consistency control;
- Determining dissemination level;
- Preparation of additional information (data interpretation, short instructions, quality reports, and other necessary metadata);
- Discussion with subject-matter statistician before publishing, and
- Preparation of explanations for publication of final data.

6.3 Confidentiality and finalization of official statistics data

The last activity under this sub-process refers to the finalization of obtained official statistics data. It implies to provide a requested quality level for the obtained data and that the data are ready for dissemination. This sub-process ensures that data and metadata prepared for the dissemination do not infringe the provisions on confidentiality. In accordance with the legal provisions, the access to micro data set that will be used for research purposes will differ from the access to the data set which will be disseminated.

Obtained results are observed from all aspects, used different tools and media, and detailed statistical analyses will be done. In addition to tables, different figures are produced as a useful analytical tool.

PHASE 7 - DATA DISSEMINATION

This phase determines manner of representing statistical products to users. It includes all activities, from collection and representing the scope of static and dynamic products by use of different dissemination channels. These activities enable for users access and use of data published by a statistical organization.

For statistical data that are regularly produced, this phase occurs in every iteration. This phase is divided in five sub-processes. They are usually ordered from left to right, but they can be also parallel and can be repeated.

Sub-processes under this phase are:

1. Design and production of dissemination products;
2. Determining manner of disseminating products and result promotion i
3. Manage user relations.

Table 9: Phase 7 - Data dissemination

PHASE 7 **Data dissemination**		
7.1	**7.2**	**7.3**
Design and production of dissemination products	Determining type of publication and promotion of products	Manage user relations

7.1 Design and production of dissemination products

This sub-process designs the product implying formatting data and metadata, filling the database with data and ensures the linking data and appropriate metadata. Additionally, this sub-process performs the preparation of official statistics data for dissemination to meet user needs.

Official statistics data may be presented in different formats: printed and electronic publications, press releases, Excel tables, web page, etc.

7.2 Determining type of publication and promotion of products

This sub-process refers to the activities by which all elements are ensured for publication, including managing release deadlines (calendars). This sub-process also covers the promotion of products. Different tools are used for the promotion of product so that that the relations with users are managed and potential users identified. The promotion of products aims at making user familiar with the product via different type of promotion (website, press conference, etc.).

7.3 Manage user relations

This sub-process implies recording user requests and ensuring conditions to process all requests in the determined deadline. The users can submit their requests in both paper and electronic form. This sub-process regularly observe the user requests and perform the analysis which needs to show to which degree producers meet the needs of users, when statistical data and services are in focus.

Observing and analysing user needs and requests (user satisfaction survey, user request analysis), as well as their structure, can indicate new or changed user needs. It is possible in this way to define a need for new product or new type of dissemination.

PHASE 8 - EVALUATION

This phase performs the assessment of implemented steps in statistical production process. This phase is done at the end of process.

The evaluation determines if additional iterations should be taken and, if needed, a plan for improvement of process quality is prepared. This phase is consisted of two consecutive sub-processes that can be done in the same time and can be repeated:

1. Evaluation of official statistics data, and
2. Measures to improve statistical surveys.

Table 10; Phase 8 - Data dissemination

PHASE 8 **Evaluation**	
8.1	**8.2**
Evaluation of official statistics data	Measures to improve statistical surveys

8.1 Evaluation of official statistics data

Evaluation starts with the data/information collection for its implementation. The information can be feedback from users and data providers, metadata on processes and suggestions from staff. After data collection, analysis is done and information is summed in form of *Quality Report*. The report contains all problems that relate to quality and which are specific for certain iteration of statistical process.

8.2 Measures to improve statistical surveys

Based on the quality report from the previous sub-process, measures are determined to improve statistical surveys, with a special attention on critical points in the implementation. Based on the report and determined measures, there are observed activities that should be implemented to improve the process as well as mechanisms for monitoring the influence of these activities that can in return serve as entering for the evaluation of future iterations of certain process.

ANNEX 2:

GENERIC STATISTICAL BUSINESS PROCESS MODEL							
PHASE 1	**PHASE 2**	**PHASE 3**	**PHASE 4**	**PHASE 5**	**PHASE 6**	**PHASE 7**	**PHASE 8**
User needs	**Designing methodology for statistical surveys**	**Design necessary instruments for survey implementation**	**Data collection**	**Data processing**	**Data analysis**	**Data dissemination**	**Evaluation**
							
1.1	**2.1**	**3.1**	**4.1**	**5.1**	**6.1**	**7.1**	**8.1**
Determine user needs for official statistics data	Designing outputs and survey variable descriptions	Project request design	Selection of target population/sample	Integrate data	Preparation and control of the first official statistics data	Design and production of disseminatio n products	Evaluation of official statistics data
1.2	**2.2**	**3.2**	**4.2**	**5.2**	**6.2**	**7.2**	**8.2**
Consulting and confirmation of users for official statistics data	Data collection methods	Build data collection instruments	Preparing data collection	Coding and validation	Statistical interpretation and additional explanations of official statistics data	Determining type of publication and promotion of products	Measures to improve statistical surveys
1.3	**2.3**	**3.3**	**4.3**	**5.3**	**6.3**	**7.3**	
Identification and establishment of concept for official statistics data production	Design frame and sample methodology	Build programme support	Data collection	Editing and imputation	Confidentialit y and finalization of official statistics data	Manage user relations	
1.4	**2.4**	**3.4**	**4.4**	**5.4**			
Checking available data sources	Design methodology for data processing and analyses	Testing tools for data collection and processing	Data use from administrative and other secondary sources	Production of derived variables			
1.5		**3.5**	**4.5**	**5.5**			
Schedule of main activities (Prepare business case, analysis)		Product and process configure	Entering of collected data	Weight and aggregate design			
				5.6			
				Build final data set			