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Topic II: Planning and management of statistical projects

**PLANNING AND MANAGEMENT OF THE IMPLEMENTATION OF IT-RELATED
STATISTICAL PROJECTS WITH OUTSOURCING DEVELOPMENT**

Invited paper

Submitted by the Central Statistical Bureau of Latvia¹

I. INTRODUCTION

1. This report is based on experience gained from the planning, management and implementation of IT related projects in the Central Statistical Bureau (CSB) of Latvia. Since 1993, more than 20 different projects have been successfully implemented and maintained. From these projects, we have learned that the different types of IT related projects can be grouped as follows:

- Supply of standard products (hardware, software);
- Supply and installation of standard products with adaptation;
- Non-standard software development and implementation;
- IT system development and implementation;
- IT system development, implementation and integration.

2. Serious development projects require a very high quality and a significant number of IT specialists. At the same time, it is well-known that the higher qualified IT specialists, especially system software developers, are very expensive. Specialised IT companies can employ such specialists because of their permanent current workload. This is not possible for National Statistical Institutes (NSIs), especially those from small countries like Latvia.

1 Prepared by Karlis Zeila, Ilmars Vanags and Janis Linde.

3. All of the above types of projects have quite different levels of preparation to be completed before implementation, especially where "outsourcing" is used. Outsourcing is a very popular and efficient way for IT related projects to be developed and implemented. If outsourcing is used for development activities, the NSI can employ regular IT personnel for the implementation and system maintenance.

4. With outsourcing there can be different situations where NSIs could split the various tasks between the in-house specialists and the outsourcers as follows:

- Total insourcing - all IT services in-house - scope of project limited by in-house skills;
- Selective sourcing - part of IT services outsourced, part of IT services in-house;
- Total outsourcing - all IT services outsourced, no in-house IT specialists involved.

5. In cases of total outsourcing and selective sourcing we fully or partly:

- Manage contracts, not people;
- Manage demand, not supply;
- Manage revenues and costs, related with NSI IT;
- Balance costs and risks by monitoring vendors (Lacity, 1995).

6. In this paper we shall analyse the case of selective sourcing -where system development will be outsourced, but all the pre-project planning and preparations as well as system maintenance and part of the implementation will be completed by the NSI IT specialists.

II. EVALUATION OF THE PRE-PROJECT SITUATION

7. NSIs begin to think about the new IT projects when the following situations occur:

- The existing IT environment cannot expand to meet the growing data processing requirements in terms of capacity, speed, and ease by which changes can be implemented;
- The modern standard software tools that are available cannot be efficiently used due to restricted RAM size or PC speed limitations;
- The users become frustrated by the increased number of bottlenecks in the LAN or server network.

III. CSB IMPROVEMENT GOALS

8. The first step in the preparation of a new project is the definition of the goals to achieve. In case of CSB, this has been defined as follows:

a) Improve the quality of the primary data used to produce statistical information by:

- Reducing the non-response of respondents;
- Reducing the time necessary for collecting information from respondents through reduction of repeated information requests or clarification of errors;
- Improving the quality of data by "getting closer to respondents";

- Where applicable, improving the quality and relevance of data through increased frequency of surveys;
 - Working with respondents to improve the quality of responses, increase time spent on understanding respondents and working with respondents to obtain better quality data with less effort.
- b) Increase the quality of the produced statistical information by:
- Improving the of quality of the statistical source data and the flexibility available by a modern IT data management system.
 - Improving compliance with EU requirements related to statistical indicators and correct data, unifying and integrating the classifiers according to the EUROSTAT requirements.
- c) Increase the quality of the main IT processes at CSB - production of statistical information through the use of modern information technologies by:
- Eliminating routine manual or labour intensive tasks - work consuming;
 - Increasing standardisation (uniformity) of data processing;
 - Reducing the duplication of primary data in the statistical surveys;
 - Decreasing costs of dissemination of statistical information by introducing electronic dissemination;
 - Optimising the distribution of workload between the CSB central office and regional offices;
 - Where possible, reducing the use of surveys and questionnaires for collecting information, making wider use of indirect sources of data from administrative registers , other company's data bases and other alternative sources;
 - Implementing an IT system that can be easily modified in order to form new surveys or upgrades to the methodology of existing surveys;
 - Implementing an IT system which could allow in-house IT specialists administrate and maintain all the processes without hard-code programming;
 - Where appropriate, increasing the quality of hardware base.
- d) Increase effectiveness of dissemination of electronic statistical data using State data transfer net and Internet to:
- improve access to statistical data for internal and external users satisfying local (regional) users of information by providing statistical data directly from the local (regional) statistical departments;
 - improve access to statistical data for international users.

IV. HOW TO ACHIEVE THESE GOALS

9. To achieve the goals stated above, we have to start with the analysis of existing processes and data flows by the preparation of the data processing model which could help to define the requirements for the new IT system. We have to be sure, that all

processes and methodologies are optimal and the most efficient way to analyse the current situation is to use modern modelling procedures. There are many different modelling software tools available on the IT market. During the preparation period for the project on the Integrated Data Management System, CSB decided to use a modelling tool named GRADE. This choice was based on the following reasons:

- GRADE is a modelling tool which has been partly developed by the specialists of Latvian University;
- It was not necessary to spend a lot of time to prepare our specialists to work with this tool, the Latvian language can be used;
- CSB had an agreement with the University to assist in the preparation process of the model;
- Consultations of qualified specialists from the University were always available;
- All the modelling work and analysis could be completed in a relatively short period of time.

10. The standard technological processes covering full statistical data life cycle has been defined as common for all kinds of statistics produced in CSB (business statistics, social statistics, price statistics and macroeconomic statistics) and is shown on diagram 1. A detailed description of the processes and data-flows were obtained from the CSB Grade model which provided a kind of snapshot of the current situation. The GRADE model determined the complete structure of CSB data processing system as follows:

- How the data processing is carried out;
- What is the task of each CSB sub-structure;
- What are the data flows within the organisation;
- What (if any) are the links between different surveys;
- What are the external data links.

11. The GRADE model of the Central Statistical Bureau of Latvia contains information about data flows that exists within the current data processing technology in CSB. It includes information on the following:

- Existing data flows,
- Time frame when information is being received or a document (array, table, etc.) being produced,
- Workload in man days necessary for all the information processing steps,
- The software environment that is used, and
- Other relevant information for specific cases.

12. The various information obtained from GRADE is represented in the form of diagrams, however these diagrams are too detailed to be presented here. The GRADE diagrams enable easy navigation of the diagram data, using joint data group (surveys in statistics) or data objects (tables, requests etc). Synonyms or according object colours, as well as aggregation levels or CSB graphic model via multidimensional system levels can also be investigated and dictionary filters can be used for navigation.

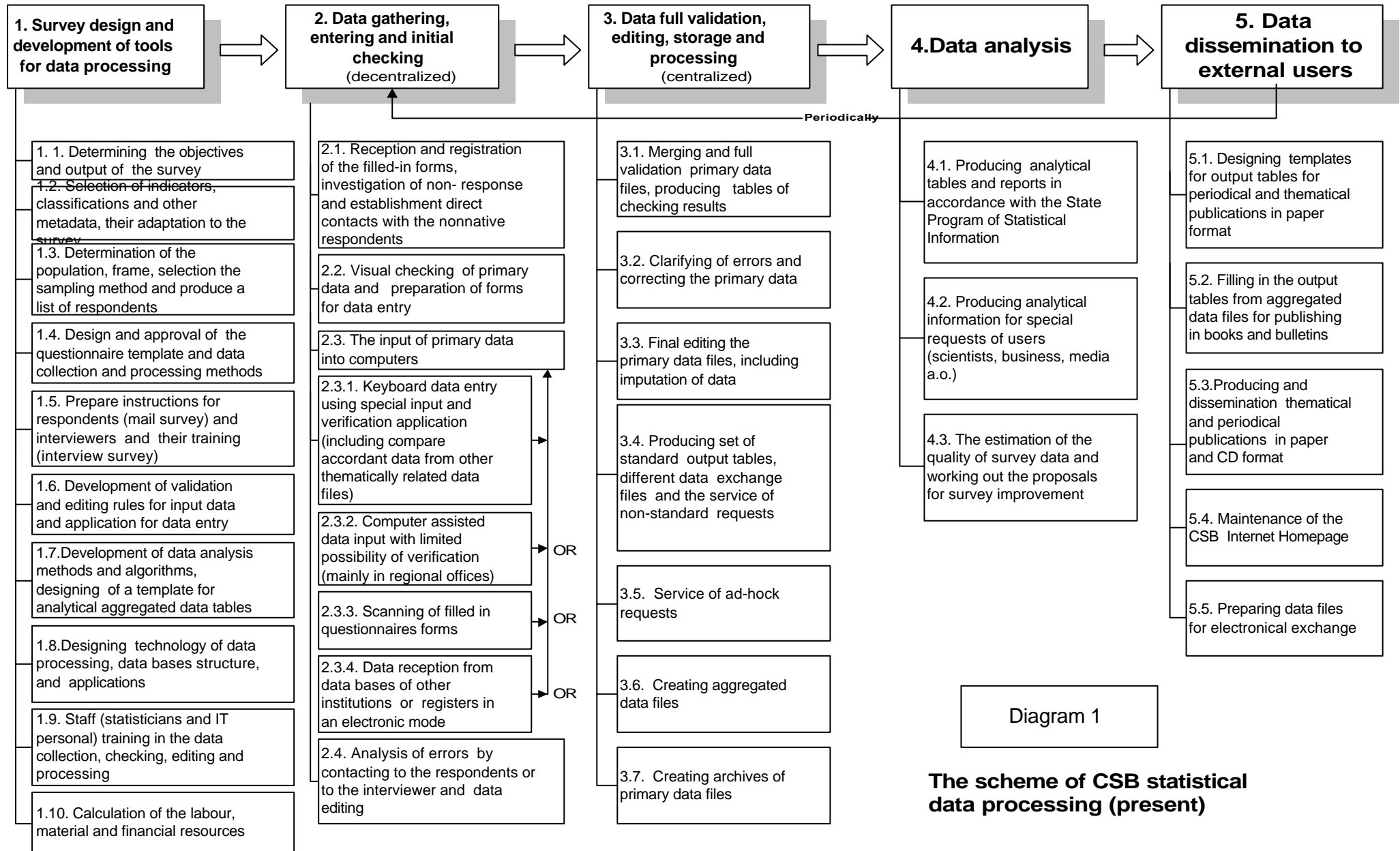
13. Each new situation requires a new solution and in this case the GRADE tool needs an enhancement because the model simulation (in order to see the problematic places in the statistical data processing that need extra attention) was not possible. In order to acquire more information about the GRADE tool, see Internet, Home page:

<http://www.latnet.lv/LU/MII/Grade/default.htm>; or Hot line service: e-mail to

grade@cclu.lv

14. The results from the analysis of the GRADE model were that the general structure of the data flows in CSB and hence the functional requirements for the data management system were shown. These results are illustrated in diagrams 2 to 7, the so-called "To be processes". As can be seen, these processes are similar to the processes illustrated in diagram 1.

15. The business processes identified by GRADE formed the kernel of the technical specification which is illustrated in diagram 8.



1. Survey design and preparation

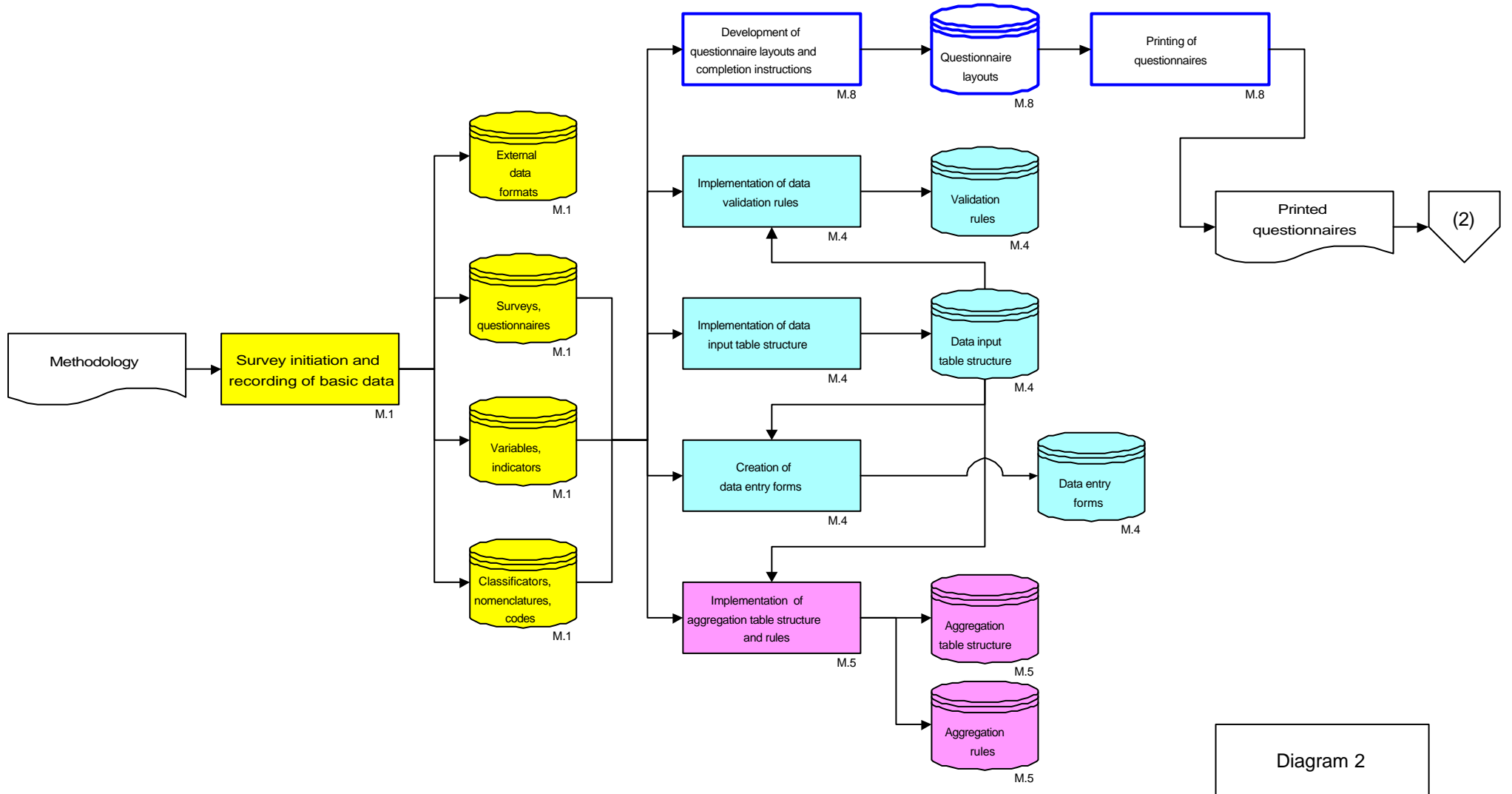


Diagram 2

2. Register maintenance and the selection of respondents

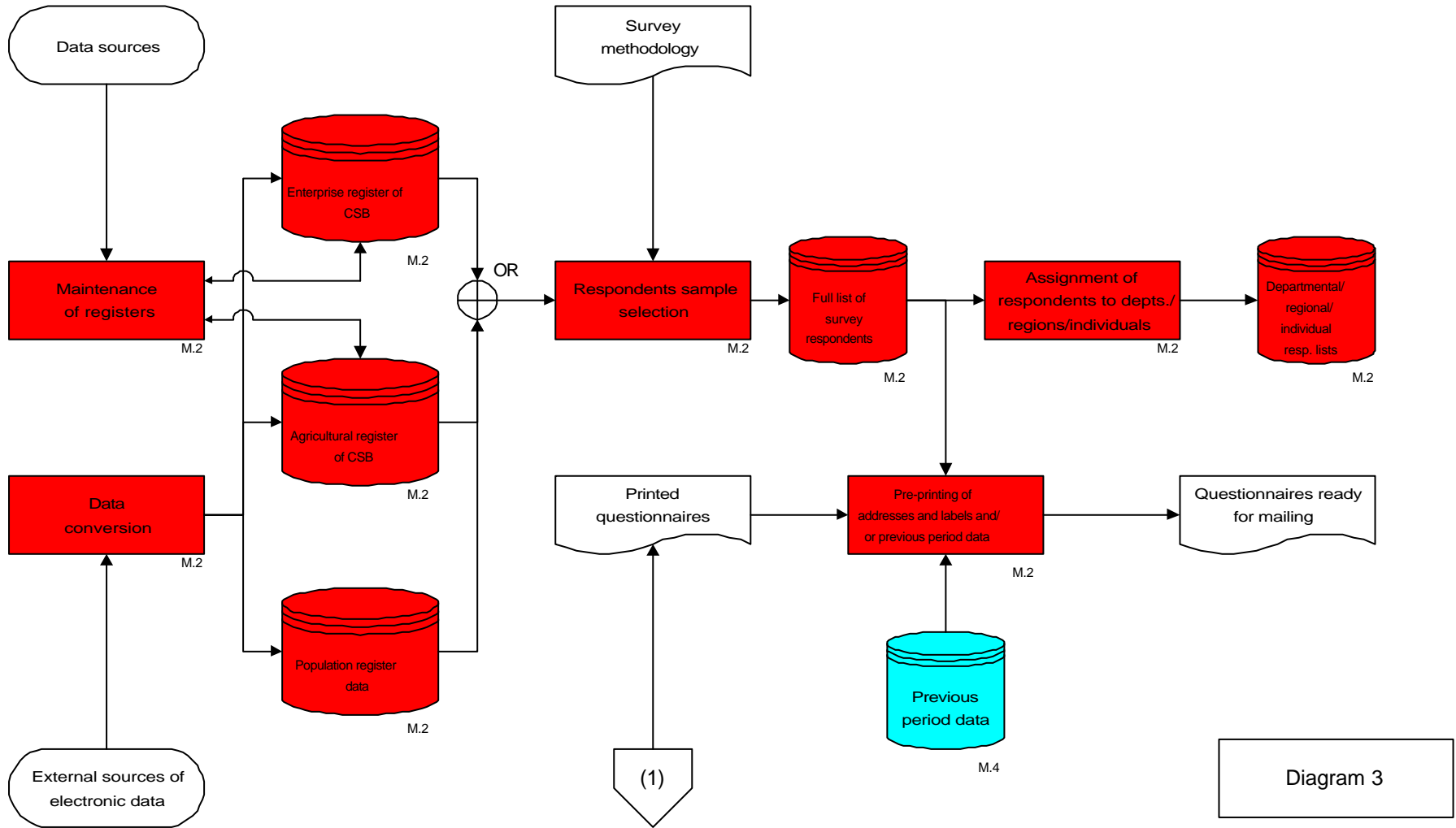


Diagram 3

3. Data entry and validation (CSB)

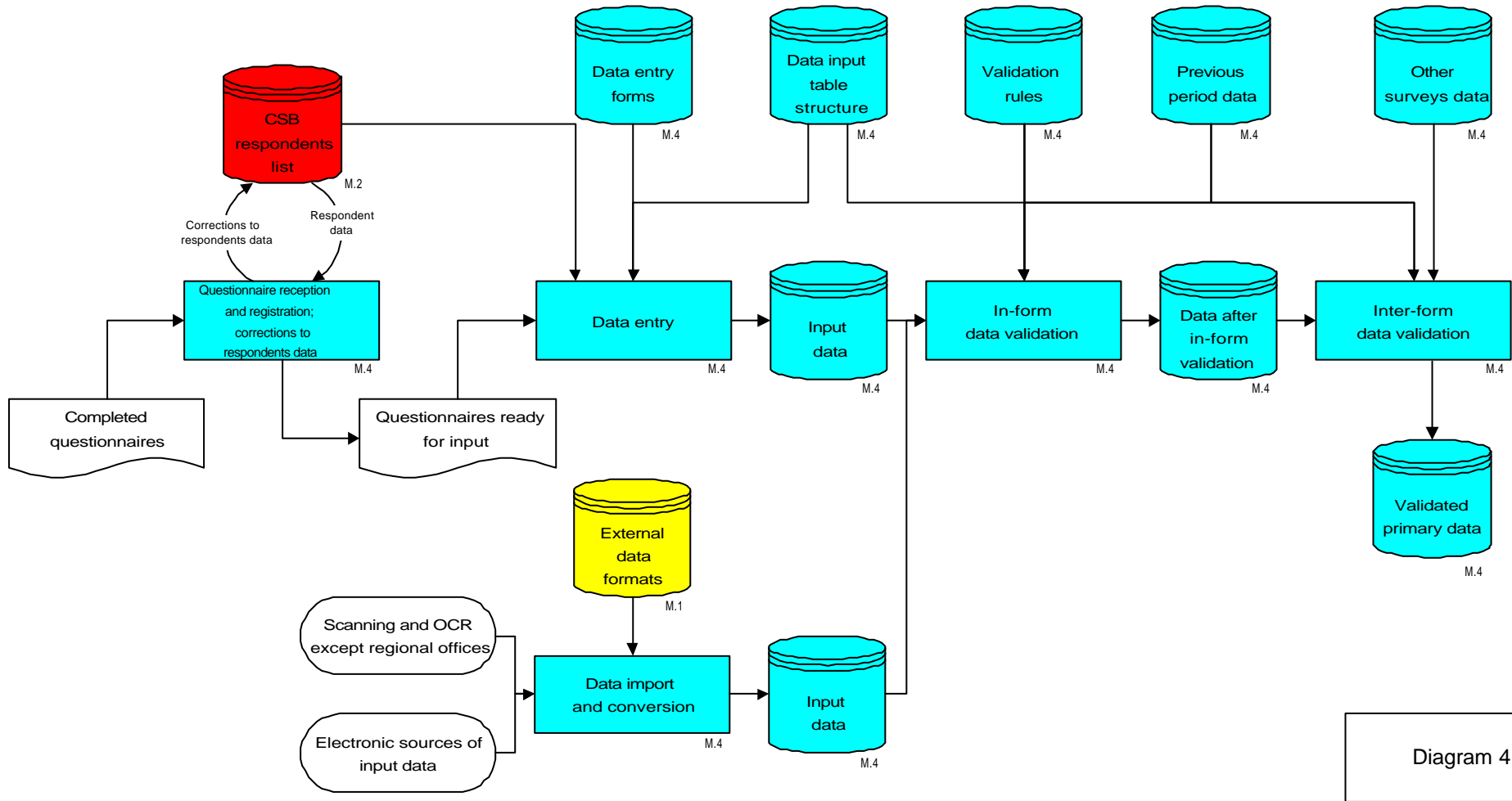


Diagram 4

4. Statistical data processing

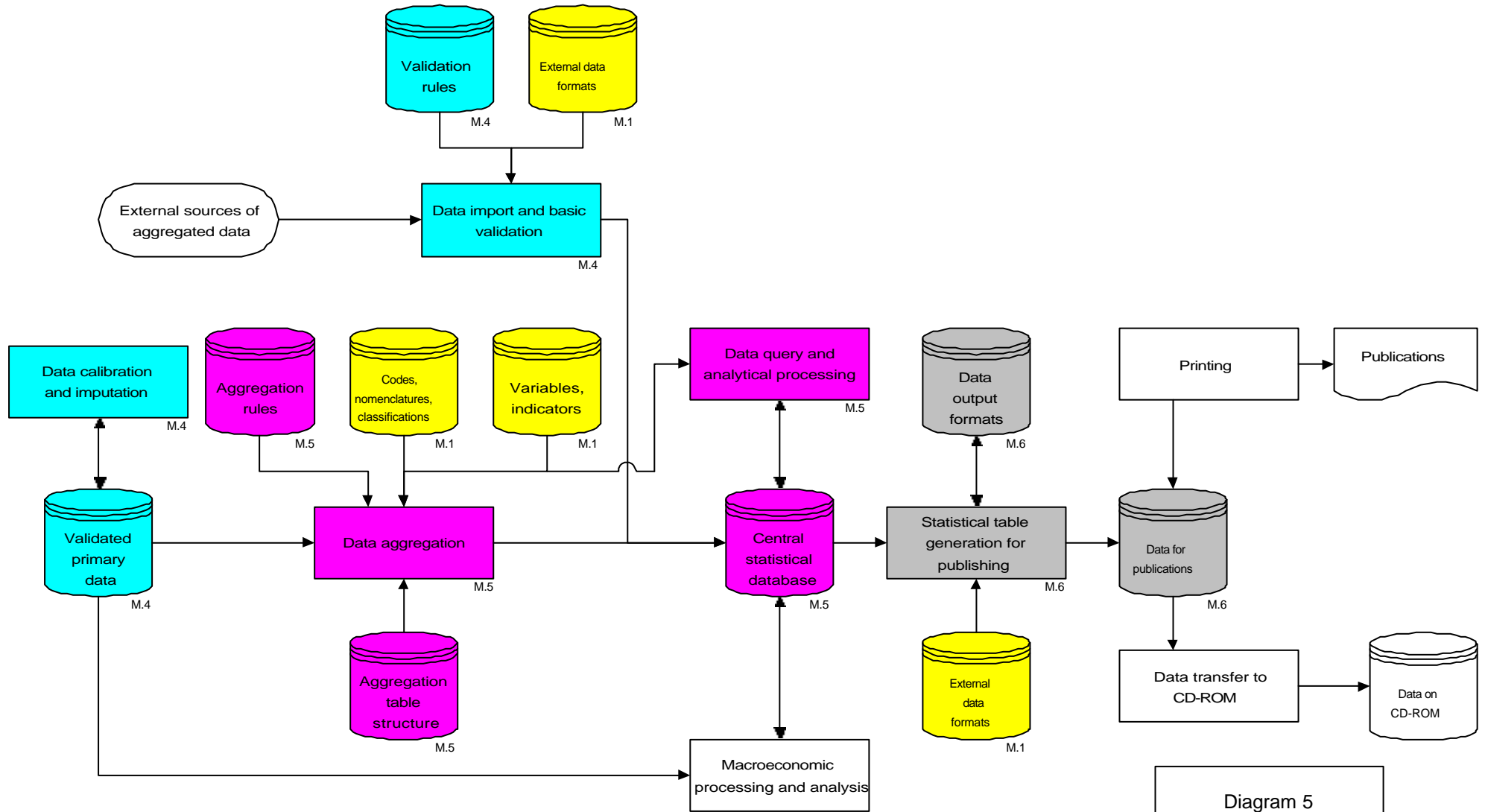
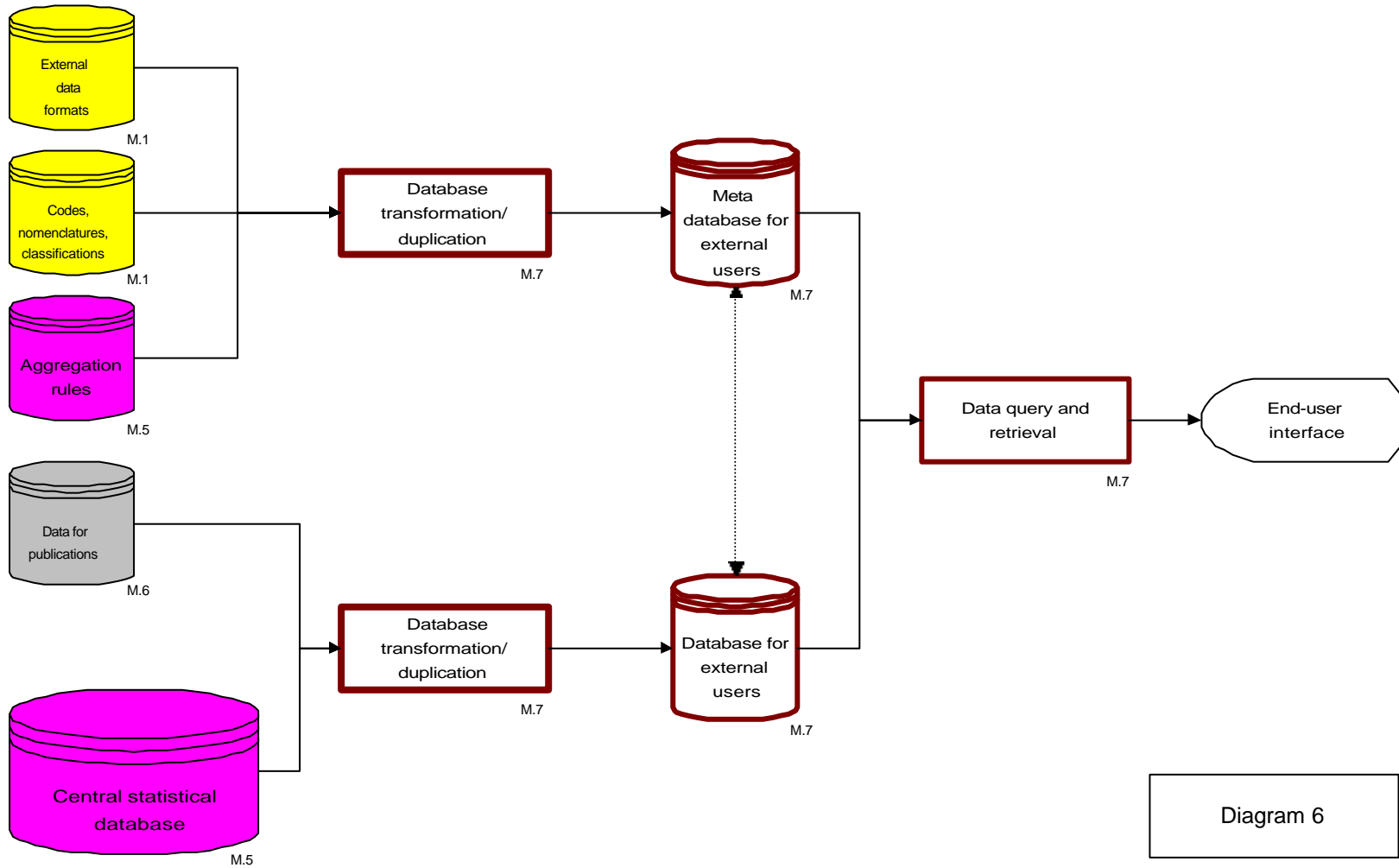
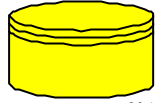
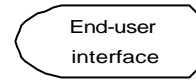
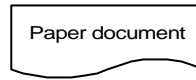
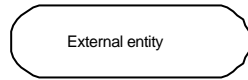
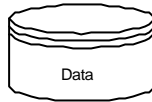


Diagram 5

5. Data dissemination to external users



Legend

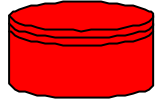


Relates to core meta data base module (Module 1 - M.1)

Lot 3.1

M.1

M.1



Relates to registers module (Module 2 - M.2)

Lot 3.2

M.2

M.2

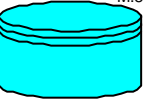


Questionnaire design and printing (Module 8 - M.8)

Lot 3.3

M.8

M.8

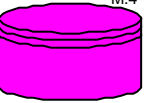
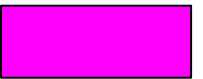


Relates to data entry and validation module (Module 4 - M.4)

Lot 3.4

M.4

M.4

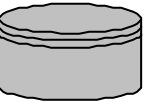


Relates to data aggregation and analytical processing module (Module 5 - M.5)

Lot 3.5

M.5

M.5



Relates to table layout generation module (Module 6 - M.6)

Lot 3.6

M.7

M.7



Relates to data dissemination module (Module 7 - M.7)

Lot 4

M.6

M.6

Diagram 7

V. PLANNING AND MANAGING THE IMPLEMENTATION PROCESS

16. The important stages of planning were presented in diagram 8.

17. The first stage of the management of the implementation process is to ensure that a very thorough and detailed technical specification is prepared. This specification must clearly state what is needed throughout all aspects of the project. The level of necessary detail is clearly illustrated below and includes the requirement for the Project Implementation Design (PID). The PID is a document that is prepared by the outsourcing company following a format defined by the Programme Director. The PID defines exactly how each element of the project - each element of the Data Management System has to be designed and implemented. The PID must also define all details of project implementation, aspects of system performance, training and documentation and is based on the technical aspects of the specification outlined below.

18. The next step is the elaboration of detailed technical specification of the project which have to include following items:

- i. CSB background;
 - Description of current situation and activities,
 - Organisational structure,
 - Organisational improvement goals,
- ii. IT strategy and current data management processes;
 - IT strategy,
 - Current data management processes

Information is necessary for better understanding of the IT environment,
- iii. Data management system - functional requirements;
(Here we have to describe the functionality of the system we would like to achieve)
 - General description of high level key processes,
 - Survey design and preparation,
 - Register maintenance and the selection of respondents,
 - Data entry and validation,
 - Statistical data processing,
 - Data dissemination to external users,
- iv. Data management system - technical requirements;
(Here we have to set all technical requirements for the new system taking in account utilisation of existing software and hardware tools)
 - Technical platforms,
 - Network and communication requirements,
 - System software requirements,
 - Standard software requirements,
 - Security and control requirements,
 - Resilience and recovery,
 - The Latvian language requirements,
 - Performance,
 - Support requirements,
- v. Product design and delivery requirements;
(This is very important section in case of outsourcing due to payment structuring to the outsource company)
 - Project structure - general approach,
 - Lot 1 Project implementation design,

- Lot 2 Hardware and standard software,
- Lot 3 Business application software modules,
 - Core metadata base module,
 - Register module,
 - Questionnaire design and printing module,
 - Data entry and validation module,
 - Data aggregation and analytical processing module,
 - Table layout generation module,
- Lot 4 Hardware and software for data dissemination module,
 - External data dissemination module,
- Requirements for the quality of product delivery,
- Documentation and on-line help requirements,
- Know - how transfer and training requirements,
- Project implementation organisation,
(We have to pay very serious attention to the project implementation management. The structure of the project implementation management is showed on diagram 9. The success of the project depends very much on the implementation management which covers all relationships between three or more parties involved)
- Provisional acceptance principles,

vi. Data management system - technical appendices;
(Here we have to add all extra information which could be useful for outsourcers)

- CSB GRADE model - current data processing,
- Current IT environment,
- Statistical themes and surveys,
- CSB Wide area network,
- CSB improvement goals The "To be processes" diagrams and legend.

19. A very special step at the project implementation phase is the Project Implementation Design. No implementation activity can start before the PID document will be completed and approved by the Programme Director. It is very important for the NSI to be aware that the outsource company has a full and clear understanding of the functional requirements and goals of the project.

20. The technical specification identified the requirements for: new high-speed servers; upgrades to the existing LAN at the central office; the installation of a WAN to connect the regional offices; the increase of the existing Microsoft licenses; the supply of the resilience software and the supply of a software tool (without hard-code programming) that satisfy the requirements of outsourcing development, implementation and maintenance by the IT staff of CSB. The PID, therefore, has to define all the necessary details described above with respect to all of the above-mentioned technologies. The structure of the PID document could be the same as the structure of the technical specification but the content has to be more detailed.

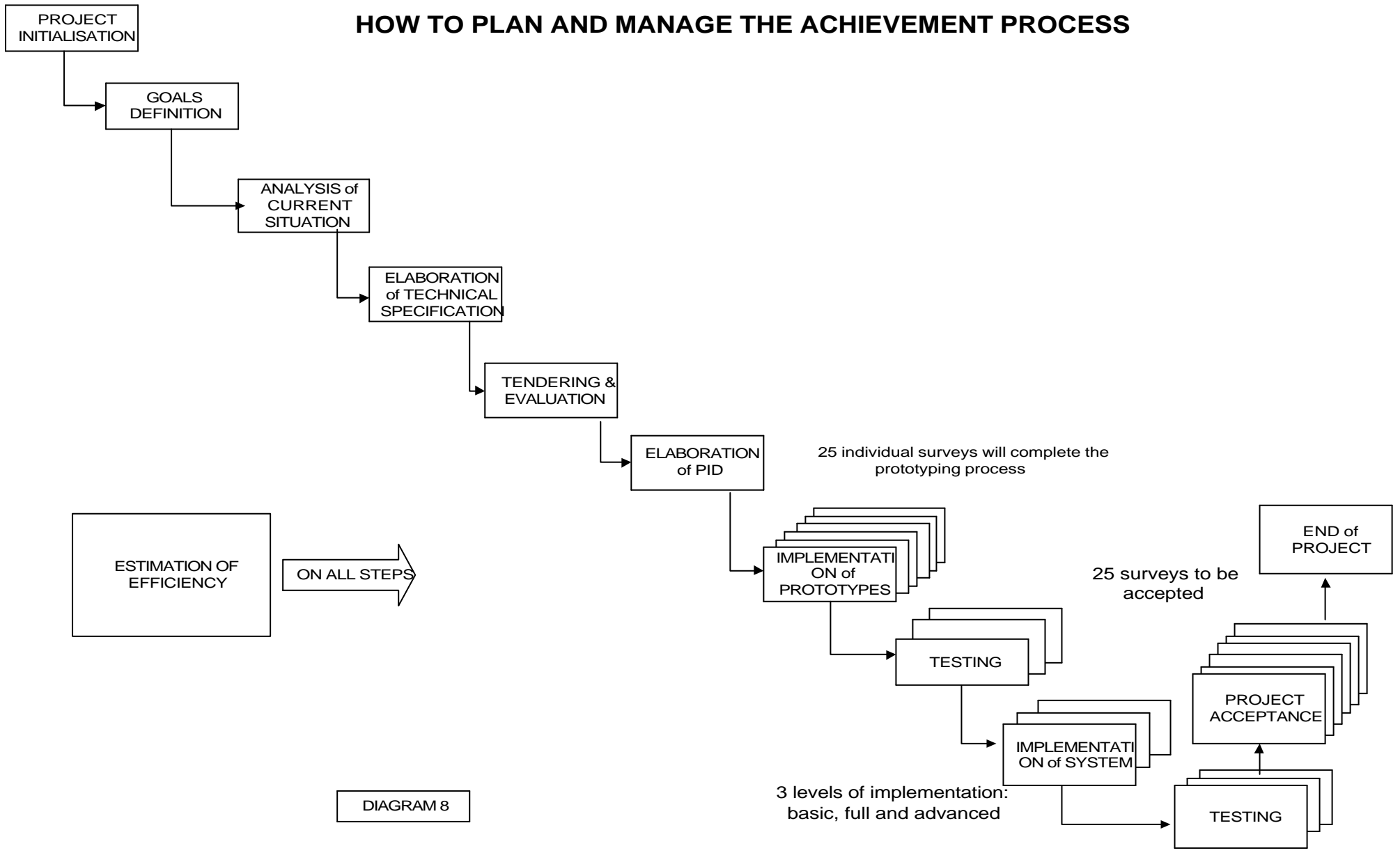
21. For the supplies of standard software, hardware and installation of networks (WAN, LAN), PID has to include the description of all steps of implementation, as well as training plans and the transfer of know-how.

22. For the design and/or adaptation of the special software, PID should include full description of the mentioned software as well as steps of adaptation, design and testing of a system, design and implementation of the final data management system, acceptance procedures. All items of PID have to be supported by exact time schedules showing, when the activities will take place and how the in-house specialists will be involved.

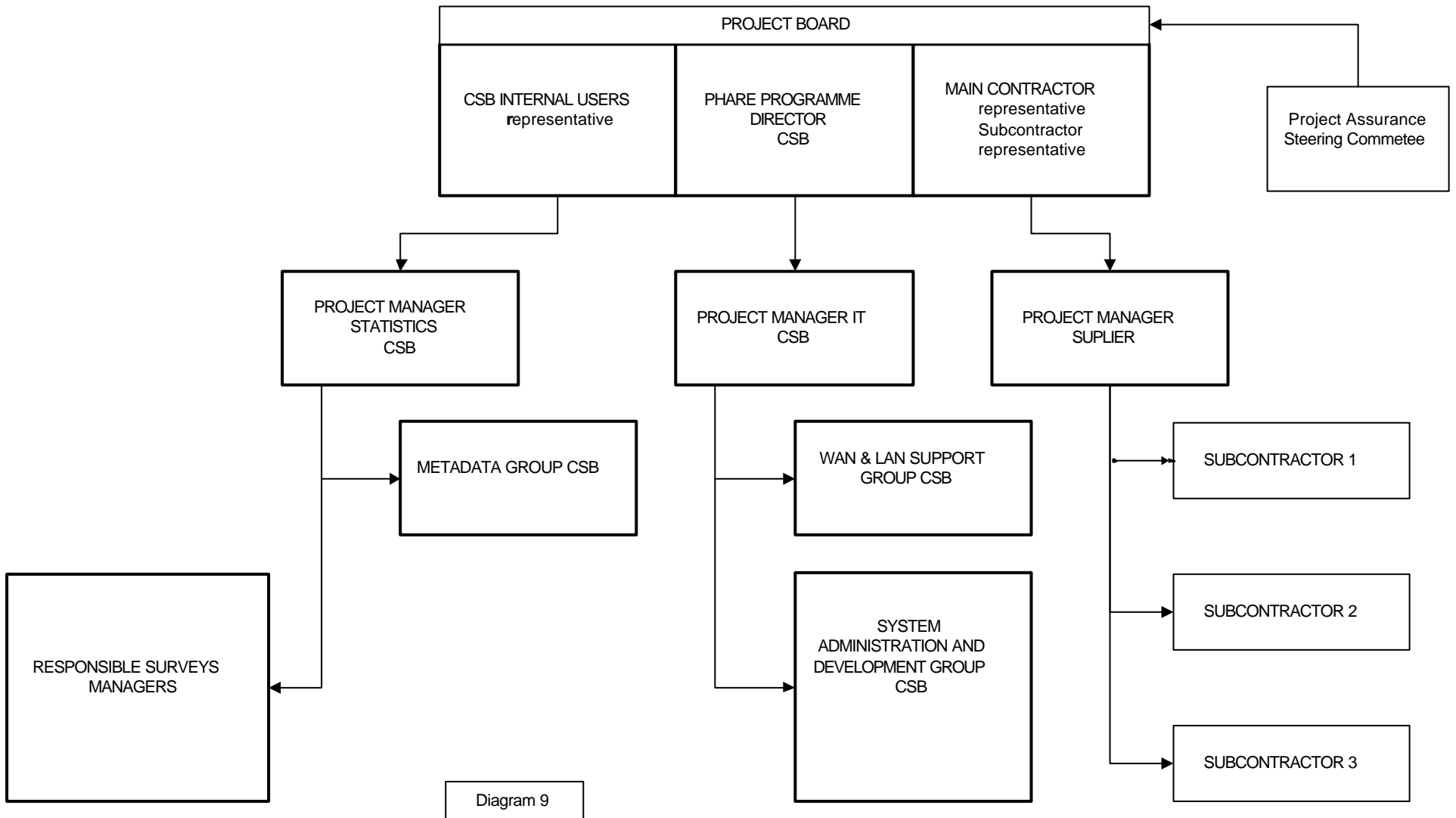
23. The PID document is very important from the project implementation management point of view because it will help:

- Project Assurance to follow the implementation processes - are they going to the right direction,
- Project Board to take the right decisions within the project implementation process,
- To achieve stated goals at the end of the process of implementation,
- To complete the project within the planned budget and time-frame.

HOW TO PLAN AND MANAGE THE ACHIEVEMENT PROCESS



DMS IMPLEMENTATION MANAGEMENT STRUCTURE



VI. HOW TO ESTIMATE IT EFFICIENCY AND CHOOSE THE BEST VARIANT

24. The efficiency evaluation of the following objects is evaluated in the NSI: statistical information system, its subsystem, survey, statistical project, technological operation, items of technical infrastructure and others (Diagram 10). The efficiency should be estimated in diverse stages of planning, development, implementation and functioning IT. The choice of the best IT option, estimation of planned and actual efficiency is based on a cost-benefit approach. Quantitative and qualitative financial and non-financial measures of efficiency should be taken into account when selecting which of the following IT strategies should be used in a National Statistical Institute:

- total outsourcing;
- total insourcing;
- selective sourcing.

25. Selective sourcing, which capitalizes on the inherent cost advantages of both internal IT department and external vendors, is recommended (Lacity, 1995). A combination of both outsourcing and insourcing often enables a statistical office to exploit the prevalence of both.

26. In individual statistical projects the same approach should be used: the orientation on quantitative measures of economic efficiency and taking into account other features in comparable variants.

27. Calculations of efficiency are very important at the pre-project stage and first planning stages. At the same time, the primary data at these stages are less reliable which lead to more approximate indicators of IT efficiency.

28. An ideal situation would be when economic efficiency of IT in a statistical system is estimated, first from the position of the state as a whole, and only secondly, from the standpoint of the National Statistical Institute and other participants in the collection, processing and use of statistical information. Nevertheless, in the cases of outsourcing or selective sourcing, the calculations of efficiency can be restricted to local efficiency from the standpoint of the NSI. These calculations in the above mentioned cases are simpler (all costs related to the vendor are estimated as payment of the NSI to the vendor for services; it is not necessary to know capital and current costs of vendor for services to NSI). In many cases, the development, implementation and integration of IT in the statistical system have an effect only in the NSI. But in cases when these activities have an effect on respondents, users of statistical information and other participants, it is necessary to take it into account. Such efficiency can be considered as local efficiency with elements of efficiency from the viewpoint of the State as a whole.

29. Calculations of economic efficiency with the aim of choosing the best variant of IT can be simplified taking into account that only relevant costs and benefits - expected future costs or benefits that differ among alternative options - should be accounted for in comparable variants (Horngren,1991).

30. According to the theory of efficiency, the preferred type of efficiency used in the estimation of projects would be the absolute efficiency-category which is oriented on the accounting and comparing benefits and costs. Nevertheless, particular difficulties in determining benefits resulting from the use of statistical information (or better quality statistical information) make it necessary to prefer the second category of efficiency - cost efficiency. It should be mentioned that in the centrally planned economies, for many years the choice of the best variant of investment, innovation or technical measurement was permitted only based on cost efficiency. The use of cost efficiency requires that one and the same content and amount of output and one and the same content and amount of primary data are used in comparable variants.

31. It is not always possible to attain identical features in all comparable variants. This leads to the use of an intermediate formula between cost efficiency and absolute efficiency. Using this formula, the effect of IT is calculated as a sum of the savings in data processing and of additional benefits of using better quality information (better quality compared to the base variant).

32. Although the discounted cash flow methods give more precise results of efficiency, often it is more convenient to use the accounting rate of return method based on previously determined average annual current costs and capital investment. It is recommended particularly in the cases of evaluation of IT system development, implementation and integration projects.

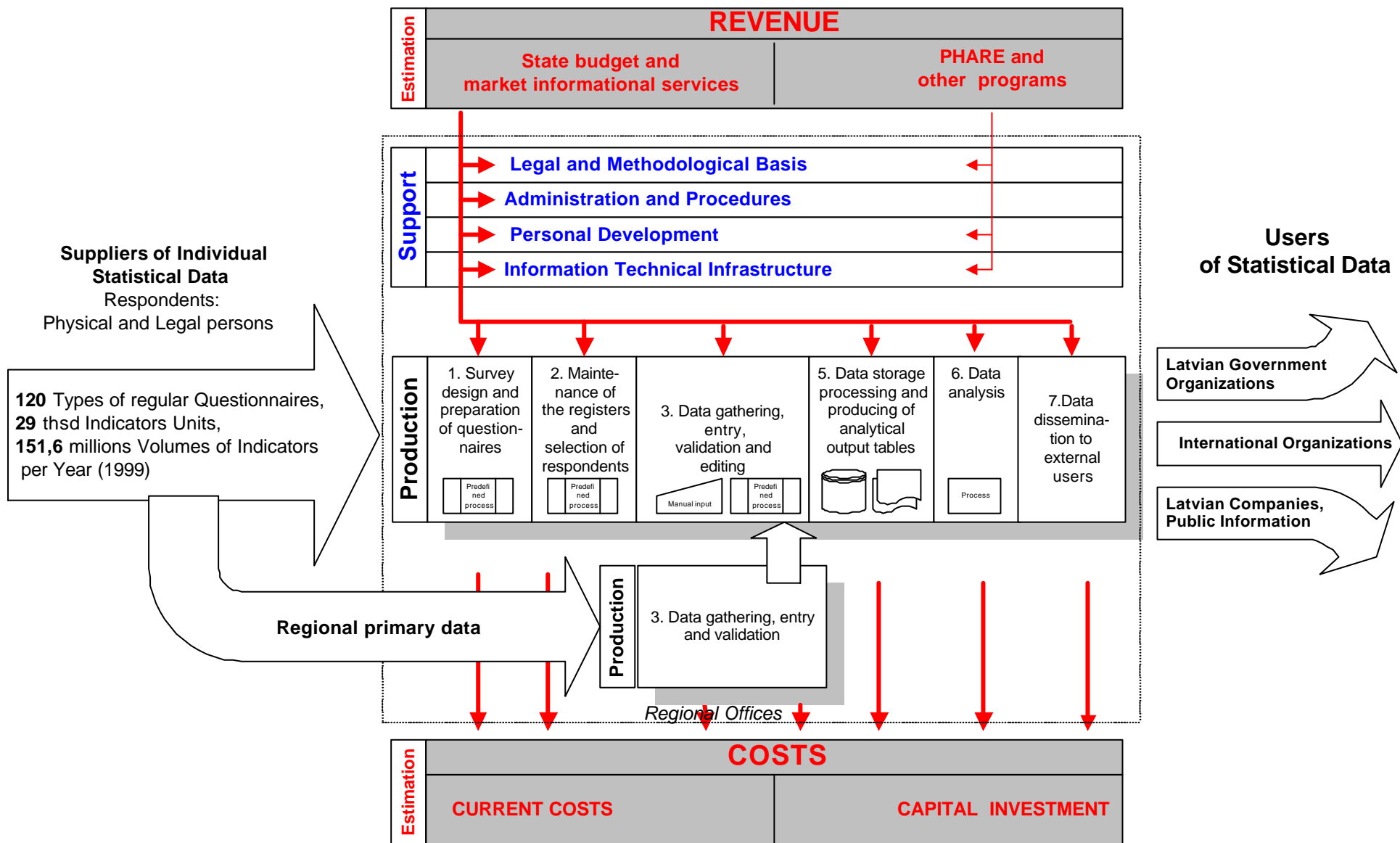
33. Estimation of IT efficiency in the stage of tender is simpler. In many cases it is enough to compare the prices of bids and to take into account divergences of other parameters of the project variants.

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Value chain for CSB of Latvia

Diagram 10