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MANAGEMENT INFORMATION SYSTEM AUDIT & RECOMMENDATIONS - FINAL

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LIST OF ABBREVIATIONS AND ACRONYMS

ACC	Apă Canal Chișinău
EBRD	The European Bank for Reconstruction and Development
CRM	Customer Relationship Management
ERP	Enterprise Resource Planning
FIFO	First In First Out
GIS	Geographical Information System
IAS	International Accounting Standards
KPI	Key Performance Indicators
IMS/MIS	Information Management System

TABLE OF CONTENTS

EXECUTIVE SUMMARY	1
1. REPORT BACKGROUND	2
1.1. SUBJECT OF THE REPORT	2
1.2. MAIN FINDINGS	2
1.2.1. The lack of an integrated information management system	2
1.2.2. Fields of activity not covered or insufficiently covered by the applications	3
2. PROGRESS AXES	4
2.1. ON THE SHORT TERM	4
2.1.1. joining the databases dealing with the same type of information.....	4
2.1.2. Integration of applications dealing with the same process or with different parts of the same process	4
2.1.3. development of existing applications	4
2.1.4. interfacing of existing applications	4
2.1.5. Coding of information.....	5
2.1.6. correct and rapid entering of information in the system	5
2.2. ON THE MEDIUM OR THE LONG TERM	5
DETAILED REPORT.....	6
1. BACKGROUND AND PURPOSE OF THE REPORT	7
1.1. REPORT BACKGROUND.....	7
1.2. PURPOSE OF THE REPORT	7
2. GENERAL DATA ON INFORMATION SYSTEMS.....	9
2.1. CURRENT CONFIGURATION OF SYSTEMS.....	9
2.2. SWOT ANALYSIS.....	10
2.2.1 Strengths.....	10
2.2.2 Weaknesses	11
2.2.3 Opportunities.....	11
2.2.4 Threats	11
3. CUSTOMER RELATIONSHIP MANAGEMENT PROCESSES AND SYSTEMS	13
3.1. CURRENT SITUATION	13
3.1.1 General configuration	13
3.1.2 Subscriber management and invoicing systems	13
3.1.3 Customer request management systems	14
3.1.1.1. Findings regarding processes	14
3.1.1.2. Findings regarding the systems used	14
3.1.1.3. Drawbacks of current systems	14
3.2. RECOMMENDATIONS	15
3.2.1 Unification of customer databases	15
3.2.2 Including the debt recovery process	16
3.2.3 Additional validations in the invoicing process	18
3.2.4 Recommendations regarding the interface with mobile phones.....	19

3.2.5	The use of current systems for taking incoming calls from customers	21
3.2.6	Unification of customer request management applications.....	21
3.2.7	Integrated customer management system template	22
4.	LOGISTICS INFORMATION SYSTEMS	25
4.1.	CURRENT SITUATION AUDIT.....	25
4.1.1.	the key element of a logistics information system: the coding of items and categories.....	25
4.1.1.1.	Classification of items	25
i)	Coding of items	25
4.1.1.2.	Item categories	26
4.1.2.	procurement management.....	27
4.1.2.1.	Tender and contract management	27
4.1.2.2.	Procurement application management	28
4.1.2.3.	Order management.....	28
4.1.2.4.	Performance and report monitoring.....	28
4.1.3.	stock management.....	29
4.1.3.1.	Management of physical flows of products	29
4.1.3.2.	Management of information flows	30
i)	Management of physical flows and transactions.....	30
ii)	The existing information system	30
4.1.3.3.	Management of stocks and re-supplies	31
4.1.3.4.	The absence of management reports; rapid findings	32
4.2.	RECOMMENDATIONS.....	32
4.2.1.	Designation of items - creating an encryption of the items	32
4.2.1.1.	Creating a project team	33
4.2.1.2.	Identifying the procurement categories	33
4.2.1.3.	Identification of technical attributes and creation of codes	35
4.2.1.4.	Preparation of the information system and anticipation of the FIFO management problem with the Accounting Department	36
4.2.1.5.	Big-Bang	37
4.2.2.	Procurement management	37
4.2.2.1.	Management of tenders and contracts.....	37
4.2.2.2.	Management of procurement applications	38
4.2.2.3.	Order management: creating an order ticket	38
4.2.2.4.	Monitoring of performance and of reports.....	39
4.2.3.	STOCK MANAGEMENT.....	39
4.2.3.1.	Physical flows of product management	39
i)	Reducing the number of warehouses and the connection with the Supply service	39
ii)	Better organisation in the warehouses	40
4.2.3.2.	Information flow management	40
i)	Management of receipts.....	40
ii)	Management of transfers	40
iii)	Management of outputs	41
iv)	Management oh the alert levels	42
4.2.3.3.	Creating management reports.....	43
i)	Warehouse keeper and supply management	43

ii) Management control	44
4.2.4. Implementation of an integrated system	44
4.2.4.1. The general diagram of the processes into an integrated system - advantages	44
4.2.4.2. What are the expectations concerning the stock and procurement management modules within the ACC?.....	47
i) Stock management	47
ii) Management of procurement applications	47
iii) Management of suppliers, tenders and bids.....	48
iv) Management of the orders and of the contracts	48
v) Management of receipts.....	49
5. FINANCIAL- ACCOUNTING INFORMATION SYSTEM	50
5.1. THE CURRENT SITUATION	50
5.1.1. The general framework.....	50
5.1.2. Deficiencies found.....	52
5.1.2.1. Deficiencies found during stocks management	52
5.1.2.2. Deficiencies found during the management of fixed funds (fixed assets).	53
5.1.2.3. The deficiencies found in relation to the management of the suppliers	53
5.1.2.4. Deficiencies found in the records concerning the available funds.....	54
5.1.2.5. Deficiencies noticed in the salary module.....	54
5.1.2.6. Deficiencies found at the general accounting module (ledger)	54
5.2. RECOMMENDATIONS:.....	54
5.2.1. Short term solutions - with a minimum financial effort	54
5.2.2. Long-term solutions	55
5.2.2.1. General functionalities and benefits of the integrated system	56
5.2.2.2. The structural elements of the integrated accounting system	58
6. GEOGRAPHICAL INFORMATION SYSTEM (GIS)	63
6.1. CURRENT PHASE OF THE PROJECT	63
6.1.1. Digitalization of the network.....	63
6.1.2. The completion of the new database structure	63
6.1.3. Mandatory and non-mandatory fields	64
6.2. THE GOALS TO BE ACHIEVED AT THE END OF THE JOINT ACC - SEURECA PROJECT.....	64
6.2.1. Training the ACC operators on the ArcGIS.....	64
6.2.1.1. ArcGIS operators	64
6.2.1.2. Databases administrators	64
6.2.2. ArcGIS – An useful instrument for the operational teams.....	65
6.2.3. recommendations for the digitization of networks not showing on drawings	67
6.3. RECOMMENDED INTERFACES	68
6.3.1. GIS – commercial application interface	68
6.3.2. GIS – water and sewerage INTERVENTION application interface with Irlax	68
6.3.3. GIS – pumping station and network pressure monitoring application interface	69
7. CONCLUSIONS.....	70
7.1. IMPLEMENTATION OF AN INTEGRATION SYSTEM OF ERP TYPE	70

7.1.1. what is ERP?	70
7.1.2. what are the success key factors for ACC to implement an ERP?	71
7.1.3. general configuration of an integrated system	72
7.1.4. Cost estimation for the implementation of an integrated system	73
7.1.5. Action plan – preliminary actions preparing the implementation of an ERP system	74
7.2. INTERNAL DEVELOPMENTS.....	75
7.2.1. development axes.....	75
7.2.2. recommendations on the management of internal projects.....	76

LIST OF FIGURES

Figure 1: Debt recovery process	17
Figure 2: Integrated customer management system diagram	23
Figure 3: ERP integration diagram	24
Figure 4: Images of storage conditions	29
Figure 5: Shipping invoice interface - Print screen	31
Figure 6: Stock age	32
Figure 7: Transfer Flow Management Chart	41
Figure 8: Outputs Flow Management Chart	42
Figure 9: Diagram of supply processes	47
Figure 10: Architecture of an integrated accounting system	58
Figure 11: Intervention location diagram	66
Figure 12: GIS – other system interfaces	68
Figure 13: ERP integrated system template	72
Figure 14: IT project – stages and deliverables	77

LIST OF TABLES

Table 1: List of observation codes	20
Table 2: File with different inventories – codes for the same item	25
Table 3: Identical units of measurement represented in different ways	26
Table 4: Manual input of items	26
Table 5: Product categories	27
Table 6: Example of list of domains	33
Table 7: Example of list of families.....	33
Table 8: Example of list of sub-families.....	34
Table 9: Example of list of categories	34
Table 10: Example of list of sub-categories	34
Table 11: Example of code table.....	35
Table 12: Example of attributes	35
Table 13: Example of unique codes.....	36
Table 14: Example of code dictionary	36
Table15: The proposal of codification of the chart of accounts	55
Table16: Estimated costs of ERP implementation	74
Table17: Action plan.....	75

EXECUTIVE SUMMARY

1. REPORT BACKGROUND

1.1. SUBJECT OF THE REPORT

This report is intended to assess the performance and the degree of adjustment of information management systems used in ACC, which is one of the objectives set for the Feasibility Study, according to the reference contract documents - Terms of reference.

The report was drafted as a result of the mission assigned to four consultants at ACC, in the period 14th -17th November 2011 and is based on the findings made based on discussions with ACC staff, the documents provided by ACC and the viewing of the main features of the applications considered.

The subject of the analysis consisted in the information management systems supporting the following processes:

- Customer relationship management - customer contracts, reading, invoicing, collection and debt recovery, customer request management
- Stock and procurement management
- Financial and accounting flows
- Network computerized management by means of the GIS system, under implementation in ACC

1.2. MAIN FINDINGS

1.2.1. THE LACK OF AN INTEGRATED INFORMATION MANAGEMENT SYSTEM

Most computer systems used in ACC are developed internally by the Computerization Department. As regards the interfaces used and their adjustment to the users' requirements, two types of systems can be distinguished:

- Systems developed directly on Oracle or rewritten in Oracle (examples: subscriber management and invoicing systems, dispatcher intervention inventory system)
- Old systems of MS DOS type, difficult to use and not meeting ACC needs (e.g. accounting system)

ACC lacks an integrated information management system and the existing applications have been developed at the request of certain departments or services, to meet the needs related to the activity of the service in question. Most times the applications deal only with a part of the process, namely the activities in the service having requested the application and do not ensure visibility on the whole process. e.g. No full report can be obtained at ACC on the customers' requests due to the following reason: there are several applications used in various departments carrying out activities with the customers, the schedule of requests is not the same, many complaints particularly the

requests in writing are not entered in the document management application and most times the information on the date and settlement method lacks.

Although efforts are made for creating automatic interfaces between applications, there are still uncovered areas where the information is entered manually in several applications (e.g. cash desk operations, bank operations, the salaries do not communicate directly with the accounting application).

The drafting of reports is pretty difficult particularly when it comes to collecting information from various applications. An exception consists in the reports from the invoicing application based on Oracle - however, in this case too, they cannot be extracted in Excel, which makes the subsequent data processing difficult.

1.2.2. FIELDS OF ACTIVITY NOT COVERED OR INSUFFICIENTLY COVERED BY THE APPLICATIONS

The management of stocks, orders and contracts is currently carried out manually. A first step was the development of an Oracle interface for the management of warehouses that can be used as a starting point for developing other features.

The debt recovery process is performed also manually by the manual filling of notification forms (prescriptions) and the manual drafting of lists of customers to be notified, to be disconnected or to be the subject of sue petitions. A first step in the process automation is the application "Lawyer" under development, managing a part of the process, but which can be extended to cover all stages of the debt recovery process.

2. PROGRESS AXES

2.1. ON THE SHORT TERM

The main recommendation refers to the implementation of an integrated ERP system (including the CRM component – for managing customer-related processes). As the implementation of an effective solution involves financial resources that may not currently be available in ACC, several recommendations have been made which can be implemented on the short term with minimum financial efforts, based on the existing information and resources.

The main recommendations refer to the following aspects:

2.1.1. JOINING THE DATABASES DEALING WITH THE SAME TYPE OF INFORMATION

Example: there are several customer databases, established by category of customers, but dealing with the same types of information and processes.

2.1.2. INTEGRATION OF APPLICATIONS DEALING WITH THE SAME PROCESS OR WITH DIFFERENT PARTS OF THE SAME PROCESS

Example: mail management applications, customer visits, with the possibility of entering phone calls; integration must be based on a unique classification of complaints, regardless of the communication channel.

2.1.3. DEVELOPMENT OF EXISTING APPLICATIONS

Development can cover many aspects:

- Including activities of the same process, not yet covered by the applications. Examples: developing the application Lawyer to include the entire debt recovery process and the connection with the commercial management system; developing a platform for managing acceptances, transfers, exits and alert levels – in the warehouse management system.
- Including additional fields to allow entering information useful for the monitoring of the process in question, including activity reports. Examples: additional fields in the warehouse management application or in the accounting application; drafting of management reports.
- Create editable forms directly from the system: non-payment notification form (prescription), order form, purchase order, etc.

2.1.4. INTERFACING OF EXISTING APPLICATIONS

The application interfacing effort should continue to cover the areas currently deficient.

2.1.5. CODING OF INFORMATION

A detailed presentation on the coding of items is found in the chapter on stock management. This is also an example of "cleaning" the databases and systematization of information in order to move to a new system of ERP type.

Another example provided in the report concerns the unitary coding of types of complaints and notifications from customers.

2.1.6. CORRECT AND RAPID ENTERING OF INFORMATION IN THE SYSTEM

This aspect concerns the use of applications and is extremely important. Regardless of the performance of the systems used, these are totally ineffective if the information is not entered at all, is inserted late, incompletely or erroneously.

An example of poor use refers to the document management application.

A warning regarding system efficiency, in terms of input quality, can be found in the chapter dedicated to the GIS implementation project, focusing on the need to collect real data from the field during technical interventions to correct the data taken from the boards provided by the City Hall.

This must represent primarily a concern of the management both in terms of operation and customer relationships. The IT systems represent a support of the processes and the way these processes are organized and operate is a responsibility of the company's management. The monitoring of activities and their performance, as shown in the reports generated by computer systems are also closely related to the tasks of the management. Therefore, the management must be directly interested in the entry of data in the system, the quality of the data and the time required for their entry in order to have a clear picture of business performance. Moreover, the involvement of the management is essential in the successful implementation of an integrated information system.

2.2. ON THE MEDIUM OR THE LONG TERM

As mentioned previously, the implementation of an integrated information management system is the main recommendation.

Each chapter of the report dealing with a particular process lists:

- The benefits of integrated process management;
- The components of the system managing the sub-processes;
- The elements related to other components of the integrated system;
- Process changes to improve performance and preparatory steps that can be taken before the implementation of the integrated system.

In addition, the conclusions of the report present various general recommendations regarding an integrated system implementation project.

DETAILED REPORT

1. BACKGROUND AND PURPOSE OF THE REPORT

1.1. REPORT BACKGROUND

The Feasibility Study on Chisinau water supply and sewerage system is intended to provide an analysis of the commercial and operational efficiency of the company, in terms of invoicing and collection processes, including through an assessment of the performance evaluation and the degree of adjustment of information management systems used within the company.

The association between the information system analysis and process analysis is not random:

- The information systems used influence the performance of processes within the company: any possible weaknesses in the information systems lead to malfunction or hindering of processes; the existence of several systems dealing with the same processes or the lack of automated interfaces between applications lead to the multiple recording of the same information, to inconsistencies or unreliability of information.
- The improvement of existing information systems or the implementation of a new system to produce the expected results in terms operational performance should be analysed in conjunction with the changes that can be made at process level.

For this reason, the recommendations to be made in this report will focus not only on features of the applications, but also on changes in current processes.

1.2. PURPOSE OF THE REPORT

The report includes an analysis of the information systems currently used by ACC to support these processes and flows that define the company's main field of activity:

- Commercial management processes and customer service: contracts, reading, invoicing, collection and debt recovery, customer requests
- Procurement and inventory management processes
- Financial and accounting flows
- Operational flows: computerized management of water and sewerage networks

This report does not include:

- The analysis of applications supporting processes such as: protection equipment records, samples and water quality records, electricity records...)
- Hardware infrastructure analysis
- Recommendations regarding a certain product that can be purchased by Apa Canal

Therefore, the report focuses on information systems that support the company's core processes and that are generally subject to CRM systems (Customer Relationship Management) and ERP (Enterprise Resource Management).

The analysis of each of the processes analysed will present:

- The current situation
- Recommendations regarding the improvement of applications used and the processes covered by these applications

In terms of recommendations, they largely converge towards the implementation of an integrated information system. But since the implementation of such a system depends on many factors such as the availability of financial resources, the degree of adaptation of existing processes to standard processes covered by widely used applications, the recommendations were made on several levels:

- Short-term recommendations: regarding process changes and changes in the existing applications
- Medium and long term recommendations: regarding the integration of existing internal systems or the implementation of an ERP system

The recommendations will not refer to a particular CRM / ERP product or to a particular supplier. The purpose of the report, according to the objectives set out in the reference contract documents (ToR), is to conduct an analysis of the adaptability and performance of the current information management systems in relation to business processes. Therefore, the scope of the report will consist in the analysis of the main information systems used in relation to the processes they support and recommendations on improving their features, including from the perspective of an integrated information management.

The recommendations regarding the processes and features of applications, as well as the interdependencies between them, may be followed by ACC irrespective of a decision regarding the implementation of an external solution or further internal developments and regardless of the information solution chosen, since they are examples of good practice in the field of information management systems.

2. GENERAL DATA ON INFORMATION SYSTEMS

2.1. CURRENT CONFIGURATION OF SYSTEMS

The strategy of ACC was to develop applications internally to support the company's activity. The existing systems have been developed over time within the Information Department subordinated to the General Manager.

In terms of the development platform, there are two categories of applications:

- Older applications developed on MS DOS system (e.g. accounting applications)
- Applications rewritten on Oracle platform (customer management, invoicing applications) or newer applications developed directly in Oracle (mail management applications, operational applications used in Dispatch)

In terms of covered processes, programmes or software packages were developed at the request of the beneficiary departments:

- Customer management processes (at the request of Customer Relationship Department)
 - "Customer" system: records of customers in departmental housing, CCL, IMGFL, APLP, budget bodies, economic agents
 - "Private sector" system: records of customers with private houses
 - "Apartments" system: records of apartment subgroups
 - "Customer relationships" system: records of visits at the single information desk
 - Reporting systems: "Manager's automated position", "operative information" software packages
- Systems and software packages for the central Dispatch:
 - Records of the works, failures and leaks on water and sewerage networks
 - Records of the phone calls regarding failures and leaks
- "Accounting" system: salaries, cash desk operations, banking, assets, fixed funds, capital equipment, personnel, expenses, settlements with suppliers, logs, books
- Payroll
 - "Payroll records" software package: training of personnel, distribution of the wage bill by accounts, organisation charts, job centraliser
 - "Staff" system
- Network management
 - "Network records" software package

- “Viewing failures, leaks, disconnections, analysis of works on the water and sewerage network” software package
- “Issue of technical requirements” software package
- “Records and archiving of technical documentation” software package
- Other processes
 - “Forecasting and economic analysis” software package
 - “Electricity record” system
 - “Vehicle transport records and planning” system
 - “Sample and water quality records” system
 - “Protection equipment record” software package

2.2. SWOT ANALYSIS

The general analysis of the current configuration of systems and the detailed analysis of applications supporting basic processes within the company shows the strengths and weaknesses of the current system, the opportunities it offers, but also the risks it generates.

2.2.1 Strengths

The strengths are the applications mostly supporting the processes they manage:

- The subscriber and invoicing record system
- The system for tracking technical interventions at the dispatcher

The fact that ACC has a reliable subscriber and invoicing record system is a good thing, as the company's sources of income are the invoiced volumes and the amounts collected from customers. Also, taking and monitoring phone calls from customers reporting technical issues is important in two respects: first, the rapid management of customer requests is an indicator of the quality of the service provided to them; second, technical phone calls are likely to report network problems which, once solved, lead to better network performance.

In addition to their importance in the company's activities, these systems have been considered to yield more performance as:

- They treat managed processes on the whole (unlike other applications dealing with parts of processes separately)
- They provide visibility and easy access to information
- They ensure the traceability of various actions
- They contain relevant reports for the managed activity

2.2.2 Weaknesses

The weaknesses are related to the overall system configuration and the context in which they were designed.

The simple listing of existing applications shows that they were developed by various stages, based on feedback from departments or services and given the operational requirements and desired features in that department. Less attention was paid to the way in which that activity is part of a wider process, with certain inputs and outputs conditioning the operation of other services.

The fact that at first there was no overall approach to the interdependencies between activities (i.e. between the systems they manage) has two objective explanations:

- Since the internal IT development resources are limited, the approach was progressive and the systems were built along the way, starting from individual needs expressed by the internal structures
- The very current organisation of ACC is not always based on processes (see, regarding Customer Relationship Department, the findings and recommendations in Chapter 3 of the report regarding customer relationship management)
- The ACC computer equipping is very low which will hinder the change process.

The consequences of this approach are the following:

- There is a fragmentation of the systems in terms of sub-processes (e.g. customer contacts are not managed unitarily, there are separate applications for mail, visits at the counter, phone calls), which makes it difficult to obtain an overview;
- The transfer of information between systems is not always automatic, resulting in additional time for information processing, high risk of error and entry of the same data several times in different systems.

2.2.3 Opportunities

The explored opportunities are mostly related to the possibility of fast data transfer in a future integrated system - if ACC decides to launch such a project - and rewriting in Oracle the applications which are currently in an older system.

- The information that is currently in Oracle in customer management and invoicing applications is easily transferable to a future CRM system.
- Older applications, such as accounting applications, can be rewritten and adapted to current needs on an Oracle platform. This would also facilitate the transfer of data from the invoicing system. Another advantage is the possibility of data corrections that would be made with the transfer in Oracle, to prepare them for future transfer into an ERP system.

2.2.4 Threats

The main risks identified in the current system are the following:

- The failure to adapt to future expected legislative changes (in terms of public procurement, European accounting standards, tax systems)
- IT security (the possibility to restore data, configuring access profiles, passwords secure ways to access the system, etc.)
- The quality of data entered in the systems – this is not a failure of information systems, but of the use method; if information is not entered systematically and correctly, a proper follow-up of the activity is impossible, with risks in terms of management activity quality

3. CUSTOMER RELATIONSHIP MANAGEMENT PROCESSES AND SYSTEMS

3.1. CURRENT SITUATION

3.1.1 General configuration

ACC does not have at the moment an integrated customer relationship management system to treat processes such as:

- Contracting and customer database management
- Meter reading
- Invoicing
- Collection and debt recovery management
- Management of customer requests

There is a subscriber management and invoicing system dealing with most of the processes except for the debt recovery management and customer request management processes.

The specific activities of debt recovery process is conducted manually and the management of customer requests is not performed unitary, but through several applications. Customer databases are also separated by categories of customers (three distinct systems for the private sector, apartments and legal entities, respectively).

3.1.2 Subscriber management and invoicing systems

Currently, the subscriber and invoicing management application enables optimum performance of the following activities:

- Registration of new customers, amendment of the contract data
- Registration of counters and of their measurements
- Calculation of water and sewerage volumes according to the meters, average consumption or standards
- Invoicing
- Receipts
- Reporting

The application provides easy access to all information relating to a customer through the display called "Customer passport". This allows a quick viewing of data such as customer identification and contact data, the services provided and places of consumption, the meter mounted on the connection, history of invoiced amounts indicating the calculation method (based on indications of the meter, estimate or standards), the invoices issued and their amounts, the receipts made.

This interface is important both in the back-office activity of services in charge of contracting, measurement recording or invoicing, for the inspection of data on customers

as well as for the customer relationship office that can rapidly provide the information requested by customers.

The application contains a number of reports relevant to the invoicing activity, statements on receipts and balances by age, by categories of customers.

Another positive aspect related to commercial application is the project under progress concerning the interface that will allow reading using mobile phones. The new system will allow loading the reading routes from the application into the mobile phone and automatically downloading the read data - this activity is currently performed manually.

3.1.3 Customer request management systems

3.1.1.1. Findings regarding processes

The management of customer requests is not a unitary activity conducted within an entity representing a unique channel of communication with the customers and assuming responsibility for this process.

Although within the Customer Relationship Department there is a service called "Subscriber Service", it conducts meter installation activities, reading activities, entry of meter indications in the database, field inspections, etc.

The activities that are normally included in the management of customer requests are conducted by other services:

- Contracting: information and document drafting centre, namely the single information and cash desk for the receipt of contract applications and technical terms;
- Customer reception: single desk - this is the official channel, but actually, customers still have to go to other services at the ACC headquarters;
- Phone calls: only technical calls are answered by the Dispatch; no calls of a commercial nature are taken within ACC;
- Mail: there is no specific structure. The administrative office and chancellery act only as registry office; the letters are distributed to various services, depending on the nature of the problem and currently, there is no unified tracking.

3.1.1.2. Findings regarding the systems used

From the perspective of the systems used, there are several applications:

- An application for technical terms and contracts at the Information and Document Drafting Centre
- A new application at the Single desk for technical terms, contracts and related documents
- A new document management application: entries, exits, petitions, technical terms, etc.

3.1.1.3. Drawbacks of current systems

- The same types of information are entered in several applications

Letters relating to contracts are recorded by the Information and Document Drafting Centre in own application. In this application the date of entry is inserted, but not also the application settlement date. In addition, the settlement of an application is marked in the system by deleting the respective registration! There is no trace of settled applications; the system shows only the applications that are still under processing.

On the other hand, any letter is registered (or should be registered) in the document management application).

The information on technical terms is introduced in three applications: in the single Desk application, in the contract drafting application and in the document management application.

- The information is not entered systematically in the applications

The new document management application is not properly used, as: document entries are not included entirely (they are still noted in books); for most inputs, no information is entered regarding the assignment and settlement method.

- There is no unified and complete follow-up of customer contacts

Since no single system is used, but several different applications, depending on the services that manage certain types of applications, currently it is extremely difficult to achieve a seamless tracking of all customer applications.

At Customer Reception statistics can be obtained on customer visits, but the visibility on the nature of problems is low, because there are only three types of entries: calculations, meter indications and other. For other types of requests, customers are generally indicated another contact or are advised to submit a letter to the office.

The application at the Dispatch is the most complete in terms of phone call recording and monitoring of technical interventions in the field to settle requests. But it contains only the technical problems reported on the phone; those reported at the single Desk or by means of letters are no longer tracked. Most times, the document management application contains no information on the settlement method, while the registers at the office contain inputs and outputs in different registers and the information is not correlated with each other.

Currently, it is therefore impossible to extract reliable reports on the actual number of requests in a certain period of time, according to the channel of communication and types of requests.

3.2. RECOMMENDATIONS

The recommendations focus on possible developments in the current applications and opportunities of use for the purpose of new activities.

3.2.1 Unification of customer databases

Currently, there are several customer record systems by categories: the "Customer" system - IMGFL, APLP, CCL, departmental housing, budgetary bodies, economic agents, the "private sector" system - customers with private houses and the "apartments" system.

Although currently, the Customer Service department is organized into residential and corporate department - so that each works with its own database, the separation of databases creates however some inconvenience:

- The single information desk works with three applications, whereas it would be much easier to find the information in a single database.
- In a future call centre that could take also commercial calls, it will be difficult to find information in several applications
- The interfaces with other systems multiply unnecessarily raising the risk of error and maintenance effort.

Therefore, the unification of customer databases would be likely to facilitate both the users' activity and the maintenance activity of IT teams.

3.2.2 Including the debt recovery process

Currently, the debt recovery procedure is carried out manually by printing lists from the system containing customers with unpaid invoices, by drafting lists with notification proposals to be approved by the Manager of Customer Relationships, by the manual filling in of customer data in a pre-printed format. Subsequently, the check of payments made is also carried out manually and the non-paying customers are placed on lists submitted to the Legal Department for taking legal action in court. The Legal Department first sends a new notification.

The Computerization Department is now working on a new application for the Legal Department, which is expected to contain the following data:

- Drafting of files submitted to the lawyers – by the Accounting Department, namely the list of customers with debts for which there is a wish to take legal action.
- Filling of data by the Legal Department regarding the procedure conducted by this Department: notifications, sue petitions, enforceable titles.

Currently, the list of customers with debts is filled in individually, but work is carried out on the automatic filling in facility, by selecting all the customers meeting certain criteria based on which sue petitions are filled.

The development of this application is a good step that can be improved by:

- Including in the application all the stages of the debt recovery process, not only those taking place in the Legal Department
- Integrating this application in the subscriber management and invoicing system

This "Lawyer" application development project is an example of designing an application at the request of a particular department and only for the needs of the department in question. The Legal Department activities relating to debt recovery are however part of a much wider process, with stages taking place also within other departments.

The development of an application for the Legal Department only would solve an internal problem of this department regarding the monitoring of requests for bringing legal

proceedings against bad payers, but will not provide a general overview of the whole debt recovery process.

In addition, some features that are now developed for the Lawyer application can be extended to manage also upstream activities such as sending notifications – the possibility of mass selection of notified customers according to certain criteria: value of unpaid invoices, debt age.

An example of a process scheme that could be the basis for extending the current application is shown below

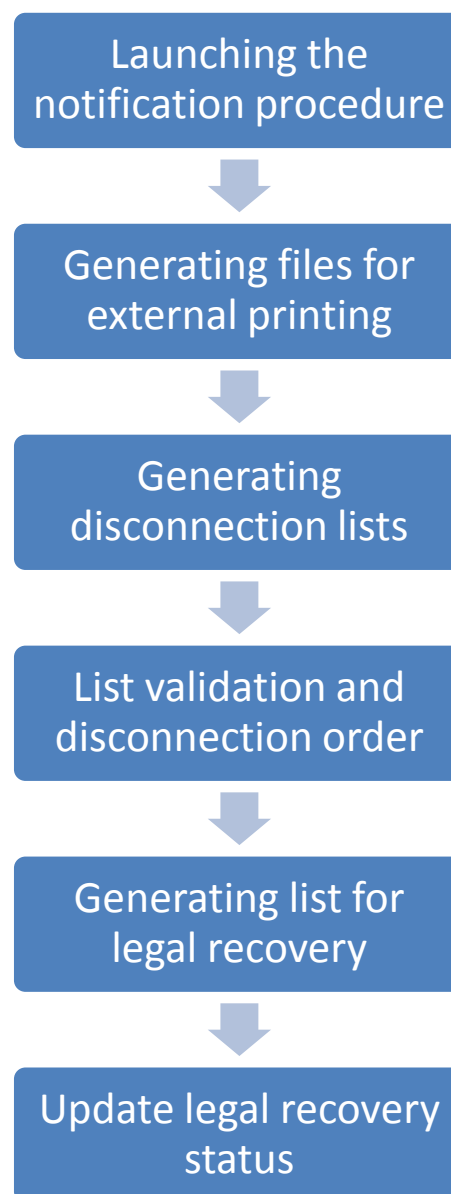


Figure 1: Debt recovery process

The debt recovery application could have the following features:

- Mass launching of notification batches based on criteria established by ACC that can be configured: minimal debt value, age, customer category, etc.
- The possibility of excluding certain customer categories from notification: customers that have already been disconnected or subject to legal proceedings; customers excluded for other reasons (VIP etc.)
- Automatic printing of notifications in the system or generation of variable data files to be sent to an external company for printing, enveloping and shipping in case ACC decides to outsource this activity
- Automatic generation by the system of disconnection proposals for the notified customers who did not pay the debts within a certain deadline
- The individual or mass validation of disconnection proposals
- The generation by the system of disconnection orders
- The generation of sue petitions for the customers that have not been disconnected or that did not pay the outstanding amounts following disconnection, based on configurable criteria (debt value, age, etc.)
- Filling in of details regarding the stage of the file by the Legal Department

The automating of the debt recovery process would simplify the activities that currently require many manual operations.

For better monitoring of the disconnection process and the facilitation of access to information, it is recommended that the debt recovery application be integrated in the customer management system. Besides the general arguments in favour of integrating applications described in the preceding paragraph, the following advantages can also be considered:

- the possibility of viewing, for each customer, any possible notifications received, with related details (notification date, value, invoices contained in the notification)
- the possibility of viewing the disconnections in the system
- the possibility of viewing the balances subject to court proceedings

3.2.3 Additional validations in the invoicing process

Generally, the validations in the invoicing process concern the following aspects:

- All the customers in the invoicing batch must be invoiced
- The invoiced consumptions must be plausible

Currently, the system notifies abnormalities such as the lack of index or current index lower than the previous index, but it does not perform automatic consistency checks, such as:

- The falling of consumption under a certain margin against average consumption (ex. +/- 10%)

- Very high or very low consumptions / 0 consumptions

The introduction of such validations is not compulsory, but it is recommended in order to discover possible abnormalities in due time, and to prevent any further claims from customers. (Example: a very high consumption may be the result of an error upon reading or during the entry of reading in the system, which is now done manually).

3.2.4 Recommendations regarding the interface with mobile phones

Whereas the development of the interface with mobile phones is in the beginning, the following issues could be considered:

- As regards the information downloaded from the information system into the mobile phone

The main information consists in the reading routes associated to readers. For this purpose, the commercial system must contain, on the counter or at the place of use, information on the reading route and route order. Moreover, this information must be required each time a new meter is entered in the database. The system could be configured to automatically propose a route, depending on the address where the meter is installed, allowing an authorized user to change this allocation.

It is also recommended that the interface allows the partial assignment of meters on a reading route, in case one of the readers is on leave and his tasks are assigned to other colleagues.

As regards the information taken on the reading route, besides the address and serial number of the meter, the following information can be displayed:

- Index history

The system can generate an alert if the entered index does not fall within the margins of variation allowed; in this case, there may be a validation of the index to confirm that the reader checked the index again and that the record is correct.

If the consumption is very high compared to average consumption, the reader can explain the customer that it is likely to have a loss on the internal network.

- As regards the information downloaded from the mobile phone

In addition to meter indexes, the application may allow the configuration of observation codes allowing the submission of other information collected by the readers on the field.

This information can be of two categories:

- observation codes regarding reasons for the failure to read the meter (e.g. access not allowed, damaged meter, etc.)
- codes regarding other observations collected on the field (e.g.: no seal, clandestine consumption, unsanitary manhole, etc.)

Observation codes may generate various actions once taken in the system:

- estimation of consumption (for the codes assigned to failure to read meter)
- generation of a standard letter to the customer (notifying the issue of an estimated consumption invoice or the customer's obligation to allow the access / to maintain the connecting manhole on his property in good condition, etc.)
- generation of intervention orders for the technical teams (replacement of defective meter, resealing, checking clandestine consumption, etc.)

If the generation of intervention orders based on observation codes is a complex development in the system, another solution would be to generate reports based on intervention codes downloaded into the system; the intervention orders would be generated manually.

An example of observation codes and associated actions is given below:

Table 1: List of observation codes

A. Codes for failure to read the meter			
Code	Reason	Explanation	Action
A1	Access not allowed	Customer denies access to the meter	Estimated invoice; notification
A2	Absent customer	Customer not at home	Estimated invoice; notification
A3	Blocked access	Car parked on manhole, materials stored in the manhole	Estimated invoice; notification
A4	Damaged meter	Any damage to the meter preventing the reading	Estimated invoice; meter replacement at the expense of the customer, if on private property
A5	Stolen meter	Lack of meter	Estimated invoice; mounting of meter at the expense of the customer, if on private property
B. Codes for other information			
Code	Reason	Explanation	Action
B1	Illegal consumption	Consumption without contract with ACC	According to clandestine regularisation procedure
B2	Damaged seal	Illegal intervention on the seal	Resealing at the expense of the customer, plus penalties
B3	Lack of seal	No seal was mounted	Seal mounting
B4	Loss before meter	ACC responsibility	Loss correction
B5	Loss after meter	Customer's responsibility	Customer notification

The table above is an example. The observations, the coding thereof and generated actions can be adapted by ACC.

3.2.5 The use of current systems for taking incoming calls from customers

Currently, there are two official channels of communication available to customers:

- Single information and payment desk
- Dispatch, for technical problems

Commercial complaints are not taken by phone, leading to a large influx of customers at ACC headquarters to request information or to file complaints of a commercial nature.

The information which is currently provided at the single Desk can be provided to customers also on the phone. This is possible by using the same subscriber management and invoicing system providing easy access to information about a particular customer.

Moreover, the meter index communication by phone can also be considered. Currently, customers must come at the ACC headquarters for this.

Whereas the establishment of a single call centre for technical and commercial issues with a single telephone number would represent the final level of integration of services, the intermediate step would be the setting up of a commercial call centre:

- Either at a number different from that of the Dispatch
- Or at a joint number, with the possibility of diverting the calls according to their nature: at the dispatch for technical issues or at the commercial department for commercial problems

3.2.6 Unification of customer request management applications

For a consistent follow-up of customer requests, it is imperative that all requests be entered in one system with the following features:

- The customer must be easily identified
- Customer data (regarding contracts, meters, reading, invoices, payments, etc.) must be easily accessible
- To have a unique classification of types of requests or complaints, regardless of the transmission channel (in writing, visit at the desk, by telephone, e-mail) - to have a follow-up by types of requests
- When entering a request in the system, choose the method of communication, to allow a follow-up depending on the communication channel
- The ability to generate intervention orders (according to the existing model in the dispatcher application) or task orders for other back-office services; upon their closing the method and date of settlement will be mentioned
- If the above mechanism is more complex to achieve, the system must provide as minimum requirement the date, method of settlement and the entity in charge.

This integration could be achieved in several stages:

1. Choosing a single application for customer mail management and the unification of complaint classifications with those at the single Desk, where customer visits are

registered; a greater level of detail is required than the one existing in the single Desk application, to have a clearer picture of the types of problems

2. The unification of customer mail and customer visit management applications with the introduction of new channel of communications: phone calls.
3. The integration of the application for tracking customer requests with the subscriber management system - "customer passport" platform, to quickly access information about the customer in the same application (and on the same display). This feature is very important in taking telephone calls, where it is necessary: to easily identify the customer calling, to have easy access to information about that customer in the database (including the history of contacts with that customer), to enter his request in the system and to follow the manner of settlement.

In order to be effective, the centralisation of the tracking method regarding customer requests involves a reorganization of activity by:

- Appointing a structure in the Customer Relationship Department to be directly responsible for taking and managing the customers' requests, regardless of the channel of communication.
- Implementing a customer – internal provider system between the above mentioned service and other services within the Customer Relationship Department or within other departments, to accomplish certain tasks in order to solve the problem reported by the customer.

For details regarding the proposed organisation, see chapter 3 of the report on Customer Relationship Management.

3.2.7 Integrated customer management system template

An integrated application for the management of commercial processes and customer relationships is reflected in the diagram below:

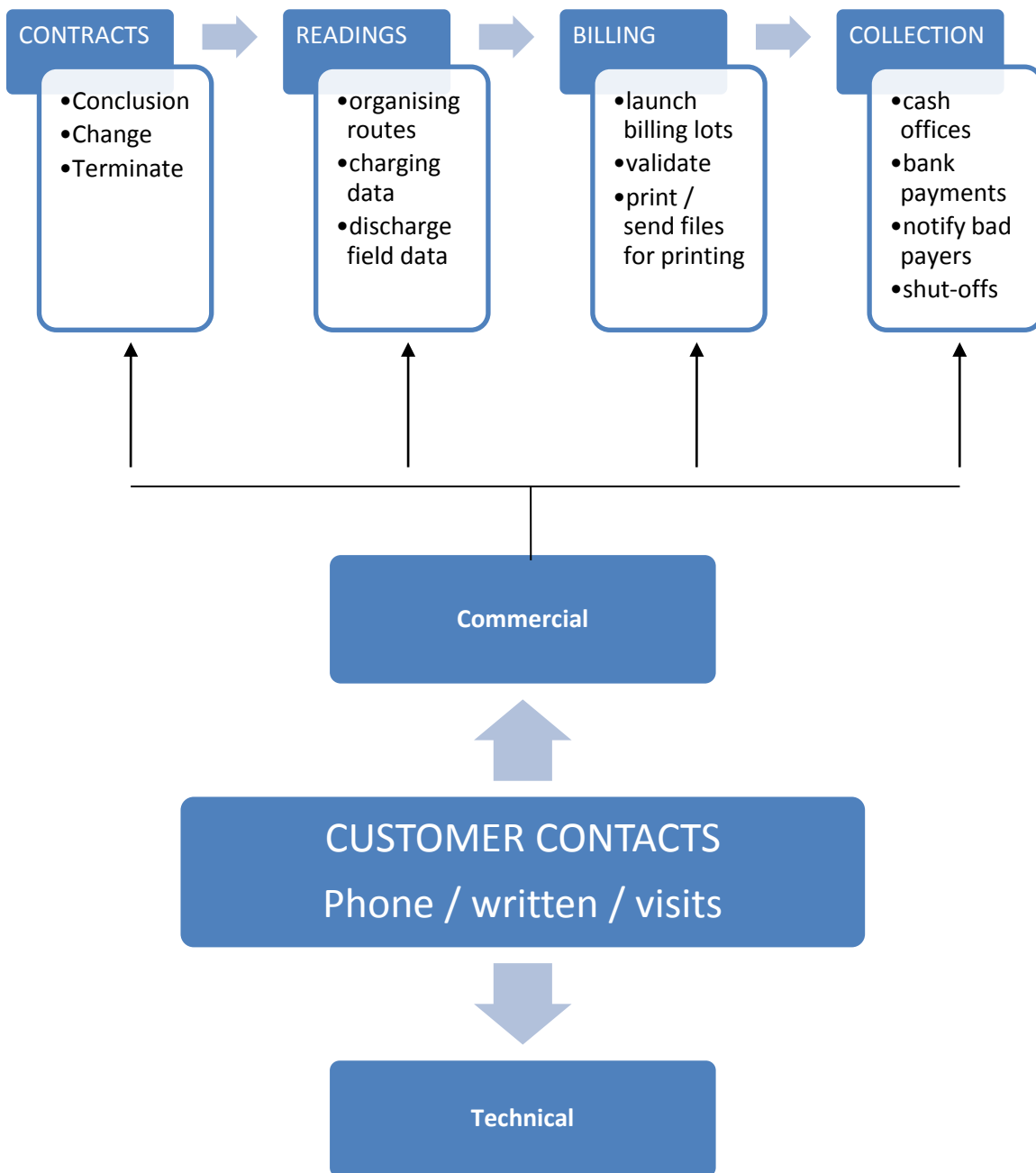


Figure 2: Integrated customer management system diagram

As customer management is integrated also with other systems within an organization, the links between this system (CRM - Customer Relationship Management) and other components of an ERP system (Enterprise Resource Planning) are shown in the diagram below:

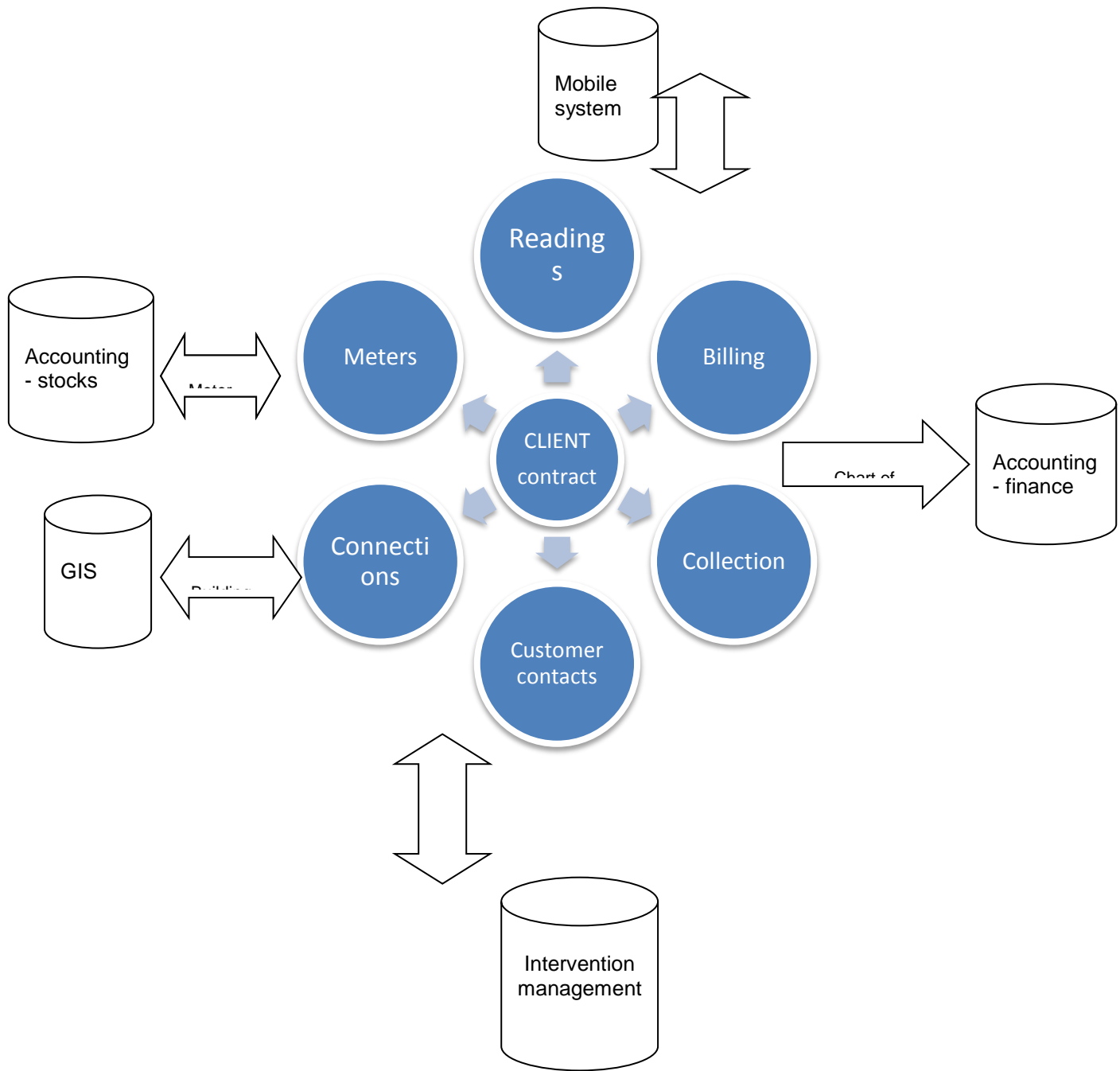


Figure 3: ERP integration diagram

4. LOGISTICS INFORMATION SYSTEMS

4.1. CURRENT SITUATION AUDIT

4.1.1. THE KEY ELEMENT OF A LOGISTICS INFORMATION SYSTEM: THE CODING OF ITEMS AND CATEGORIES

4.1.1.1. Classification of items

i) Coding of items

This is the key element of the logistics information system (procurement and inventory). ACC has a coding system which is not tailored to its needs. It is conducted as follows: when a product (spare part, equipment) enters the warehouse, if it is new (has never been codified before) or if it has another price, it is assigned a new item Code (automatically by the accounting system).

Here is an example from the inventory file (8 different codes for the same item)

Table 2: File with different inventories – codes for the same item

Category code	Classification code	Name	UM	Quantity	Unit price	Amount	Date of receipt	Year of receipt
2115	2115010018	TYRES 240 *508	PCS.	4	2,080.00Lei	8,320.00Lei	01-07-09	2009
2115	2115010212	TYRES 240*508	PCS.	44	1,750.00Lei	77,000.00Lei	30-05-08	2008
2115	2115010027	TYRES 240*508	PCS.	2	1,750.00Lei	3,500.00Lei	01-07-09	2009
2115	2115010184	TYRES 240/508	PCS.	39	1,495.83Lei	58,337.37Lei	30-12-06	2006
2115	2115010220	TYRES 240/508	PCS.	26	2,080.00Lei	54,080.00Lei	27-02-09	2009
2115	2115010176	TYRES 240/508	PCS.	9	1,313.33Lei	11,819.97Lei	30-11-06	2006
2115	2115010194	TYRES 240/508	PCS.	2	1,697.50Lei	3,395.00Lei	30-11-07	2007
2115	2115800116	TYRES 240-508	PCS.	6	1,666.67Lei	10,000.02Lei	01-04-10	2010

This measure was taken to allow the tracking of items according to the FIFO principle: ensuring the management of exits according to input data. The existence of several codes for the same item presents several difficulties:

- The impossibility to implement an effective inventory management policy (with alert levels);
- The impossibility to draft management reports (described in the recommendations);
- Organisation issues and administrative costs:
 - Management of warehouse sheets (several sheets for the same product);
 - Layout issues, very long inventory (thousands of references to verify)

In addition, the visit to the central warehouse has shown us clearly that due to the difficulty of monitoring the FIFO, the exits are not performed properly (depending on the date of entry in stock).

Moreover, the services and works have no codes assigned. There is thus no way to draft procurement management reports (acc. to recommendations).

Units of measurement and name of items

Units of measurement:

Following the analysis of items in stock (as there is no other item database), we found that the units of measurement are not standardized.

1. The same unit is represented several times (input error):

Table 3: Identical units of measurement represented in different ways

Unit of measurement
1 □BUC
BUC
BUC.
BUC.S
BUC/
BUCĂȚI
BUCC
BUK

In addition, the units of measurements are sometimes in Russian.

2. Units of measurement for the same physical property must be grouped (e.g. gram / kg / tonne → kilogram). This renders the drafting of automatic management reports impossible.

Names:

The example below shows clearly that manual input can be dangerous:

Table 4: Manual input of items

Category code	Classification code	Name	Unit of meas.	Quantity	Unit price	Amount	Date of receipt	Year of receipt
2115	2115010018	TYRES 240 *508	PCS.	4	2,080.00Lei	8,320.00Lei	01-07-09	2009
2115	2115010212	TYRES 240*508	PCS.	44	1,750.00Lei	77,000.00Lei	30-05-08	2008
2115	2115010027	TYRES 240*508	PCS.	2	1,750.00Lei	3,500.00Lei	01-07-09	2009
2115	2115010184	TYRES 240/508	PCS.	39	1,495.83Lei	58,337.37Lei	30-12-06	2006
2115	2115010220	TYRES 240/508	PCS.	26	2,080.00Lei	54,080.00Lei	27-02-09	2009
2115	2115010176	TYRES 240/508	PCS.	9	1,313.33Lei	11,819.97Lei	30-11-06	2006
2115	2115010194	TYRES 240/508	PCS.	2	1,697.50Lei	3,395.00Lei	30-11-07	2007
2115	2115800116	TYRES 240-508	PCS	6	1,666.67Lei	10,000.02Lei	01-04-10	2010

In addition, certain items have been entered both in Russian and Romanian. Names are recopied from the invoice issued by the supplier, which is dangerous, because each supplier has its own vocabulary, its specificity, regionalisms, etc.

4.1.1.2. Item categories

The absence of categories related to the stock and procurement management activity poses problems. The only existing category is the accounting category:

Table 5: Product categories

Category code	Product category
1212	Installation machinery
2111	Received materials and raw materials
2113	Fuel
2114	Packaging and packaging materials
2115	Spare parts
2116	Other materials
2131	Short term low value objects in stock
2132	Short term low value objects in operation
2521	Tyres at the warehouse
2524	Batteries at the warehouse

To facilitate the reporting of inventory management, the network component family should be more detailed.

In addition, there are errors in entering the items in these accounting categories.

4.1.2. PROCUREMENT MANAGEMENT

4.1.2.1. Tender and contract management

In Moldova there is a law governing public procurement: Law 96 (see excerpts in **Appendix 1**). However, it was considered that ACC is not qualified as contracting authority, which would have had the obligation to conduct its procurement in accordance with this law.

This law applies to contracts that exceed the following limits (net of VAT):

- a) public procurement contracts for goods: 20 000 lei;
- b) public procurement contracts for works and services: 25 000 lei;

As these values are extremely low, ACC has more flexibility in its procurement than if it had been subject to this law, in terms of anticipation of needs and development of procedures. However, the audit report of the Court of Auditors published in September 2011 states that this legal framework allows the qualification of ACC as contracting authority and mentions several times a lack of efficiency in procurement management.

As regards the procurement procedures, ACC has its own regulation (**Regulation on the organization and carrying out of tenders to purchase goods, works and services within SA "Apa-Canal Chisinau"** -2010).

These tenders are published on ACC website and a committee established by the Resolution of the Chairman of ACC Board is entrusted with the analysis of tenders. The monitoring of tenders, of bid opening dates and of other deadlines is not performed in a computer application.

Following this analysis, the contracts are signed, but are not recorded in a computer system. There is a table for the monitoring of contracts signed, but it is very limited

because it does not specify the type of procedure having preceded the signing of this contract, the deadline and other information that can be used to:

- Issue activity reports
- Anticipate the expiry of contracts and the initiation of a new procedure as soon as possible.

In addition, there are relatively few multi-annual framework contracts that enable:

- Operational flexibility
- A decrease in administrative costs
- Appropriate payment terms, logistics conditions, in exchange for a commitment to purchase over a long period from a supplier

4.1.2.2. Procurement application management

Regarding this topic, there are many internal documents which within ACC are called orders and whose format differs from the appendix to the Procurement Procedure PSAA 30 01.

- Annual equipment order (example: head of department of the pumping station)
- Monthly equipment order
- Weekly equipment order – Production base

There is thus a lack of standardization and it can be seen that for some of these procurement applications, the benchmarks are in the warehouse, so the beneficiary receives a request for release of the goods and then only the difference is ordered. Obviously, since there is no coding, the supply service depends heavily on the technical description by the applicant, which may be incomplete or erroneous. Hence, the risks to order products that are not suitable for the needs (and which will remain in the warehouse after their reception).

In addition, these procurement applications cover all categories of potential purchases and the number of copies must be multiplied by the number of categories where there is a different buyer.

4.1.2.3. Order management

The order form is the main element for organising purchases and formalising an application. In trade, an order is a written intention to start a commercial transaction for goods or special services.

Within ACC there is no order form with the respective sheet and appendix for the distribution of this order to the warehouse keepers (when the grouped products arrive, they must be able to quickly contact the beneficiaries and to notify the proper delivery of their products).

4.1.2.4. Performance and report monitoring

There are no reports for the management and monitoring of procurement performance.

4.1.3. STOCK MANAGEMENT

4.1.3.1. Management of physical flows of products

The ordered products are received by the warehouse keepers, then placed on shelves or outside the warehouse. It is worth noting that there is no racking plan: coding system of alleys, shelves, levels for each shelf. In addition, many parts are stored outside in the summer sun and winter cold, and some of them already bear the traces of these storage conditions. The risk of theft is also present.



In the central warehouse there is a forklift and a hoist for the loading/unloading of trucks.

The warehouse (indoors) storage conditions are not the best (lack of ventilation and lighting), storage on shelves, without pallets (for quick unloading). Finally, labelling is not standard.



Figure 4: Images of storage conditions

When an operational department needs parts, it transfers them in a sub-warehouse before use (acc. to the next chapter). However, these warehouses:

- are not under the control of the procurement Department
- are in an equally complicated physical and management condition

In addition, following the analysis of ACC stocks, we counted:

- 7 warehouses managed by the Procurement Department
- 131 warehouses managed by various ACC departments

4.1.3.2. Management of information flows

i) Management of physical flows and transactions

Here is a diagram regarding the transactions of existing items:

- **Cash order:** following the acceptance of products and required documents (invoice, certificate of quality), this acceptance movement is recorded by the central warehouse accountant and is filled-in in two copies in the information system and the tax invoice is attached (see Appendix 3). First, the report is printed in a readable format. However, some fields are missing: the name of the warehouse keeper receiving the products (except signature), the quantities originally ordered, and most importantly, the order number (but this problem comes from the organization of the procurement process). Then, this input is manually entered on a warehouse sheet.
- **Shipping invoice:** this warehouse exit document (see Appendix 2) is the mere report of a transaction recorded in the accounting system. It should be noted that the format is very readable, but inconsistent with the existing documents (cash order, etc.). The transfer flow of products to sub-warehouses is difficult and implies administrative costs because it requires the SAA signature on another document, "Release instruction", which is found at the headquarters (to ensure the control of these exits). In addition, in case of emergency, the approval is retrospective.
- **Delivery order:** these transfer documents are also signed by the head of the Procurement Department.
- **Liquidation:** it is the exit document of parts. There is no connection between these stock exits and the interventions on the network.

Two important aspects must be remarked:

- all these documents are registered in the accounting system by the warehouse accountants and not by the warehouse keepers.
- the transactions or documents accompanying them are doubled: an application which is filled in following an approval and then, another transaction document. This leads to two problems:
 - The risk of qualitative and quantitative difference between the products shown on these two documents (even if the verification is done manually)
 - Cumbersome administrative operations, and thus hidden costs

ii) The existing information system

At this point, the accounting system basis is an accounting management application: IRLEX. This program is in Russian, unprotected, and has a user interface of MS DOS type which is obsolete and generates administrative costs. This application is used by accountants to enter transactions.

The common wish of the Computerization Department and the Supply Department to

improve the situation led to the creation of an information system for the management of warehouses, which is actually:

- an interface of Oracle type for a better follow-up of the existing stocks and transactions
- an interface allowing the generation of documents presented below (e.g. shipping invoice)



Figure 5: Shipping invoice interface - Print screen

At this point, this interface could be extended to manage reports, transactions and to easily view existing stocks.

4.1.3.3. Management of stocks and re-supplies

This activity exists, but is very limited and is performed manually. In order to support operation, the Procurement Department created a document to monitor the stock level, filled in by the central warehouse manager (Appendix 3). This table makes it possible to follow the evolution of chlorine, fuel and flocculent stocks.

In terms of network components, they cover steel, cast iron and HDPE pipe stocks. There is no monitoring of fitting parts, valves, etc. Therefore, depending on stock levels, the customer can place re-supply orders, but in order for this re-supply to be effective, the following requirements should be met:

- The items should be coded
- In addition to quantities in stock, the alert stock levels (min / max.) must be indicated
- Orders in progress (not to place a new order which doubles the ordered amount)

4.1.3.4. The absence of management reports; rapid findings

In this chapter, the finding is fast because currently, there are no analysis and management reports. Some proposals are made in the recommendations. A quick analysis of the stock file generates a very fast perspective on the categories of parts stored, their speed of rotation (very poor), and their age.

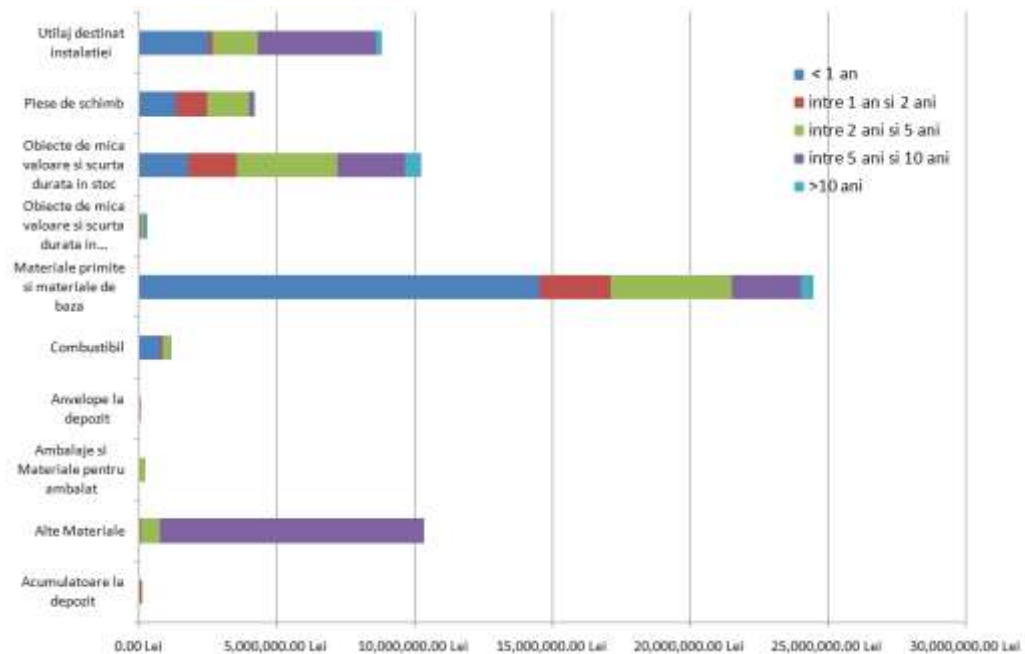


Figure 6: Stock age

In addition, the warehouses managed by Supply department (6 warehouses, for 131 uncontrolled small warehouses) is relatively high, amounting to:

Procurement amount	Total
YES	26,674,035.11 Lei
NO	33,055,656.30 Lei
Total	59,729,691.40 Lei

4.2. RECOMMENDATIONS

4.2.1. DESIGNATION OF ITEMS - CREATING AN ENCRYPTION OF THE ITEMS

Whatever the information and data management system used, it will not work without a successful encryption of the items and categories. This applies in the areas: maintenance, operation, especially in at the logistics level (procurement, inventory). To carry out this project, several steps must be followed:

4.2.1.1. Creating a project team

A project manager is required to work with the ACC Purchasing Department, because this entity will be the first beneficiary of the project, before the operating service (inventory visibility, gaining time during transactions), and financial direction.

Then, an individual is required who shall will be responsible for encrypting the items to be input, which should already be part of this working group (which must include a maximum of information), and a team of technical experts, where the knowledge of the warehouseman are limited.

4.2.1.2. Identifying the procurement categories

In order to have a functional logistics system, the best choice is to leave out in the first stage the services and works and to focus on items stored.

Then the categories of existing products must be inventoried, categorized and encrypted by successive repetitions and a sufficient level must be established (depending on the management and reporting choices of ACC):

1. Domains

Table 6: Example of list of domains

code_domeniu	nom_domeniu
10000000	Network domain
20000000	Plant domain
30000000	General expenses - Provision of services - buildings
40000000	sub-contracting
50000000	Information and telecommunications

2. Families (the below example is for domain 10000000)

Table 7: Example of list of families

code_domeniu	code_familie	nom_familie
10000000	11000000	connection, valves, hydrants, springs
10000000	11500000	cast iron pipe and cast iron parts
10000000	12000000	plastic pipe and plastic parts
10000000	12500000	steel pipe and steel parts
10000000	13000000	concrete pipe and concrete parts
10000000	13500000	lead pipe and jointure materials
10000000	14000000	copper pipe and copper parts, jointure materials
10000000	14500000	adjustment
10000000	15000000	network protection
10000000	15500000	mounting parts and drinking water repairs
10000000	16000000	meter
10000000	17000000	other materials for mounting and repairs

3. Sub-families (the below example is for family 11000000)

Table 8: Example of list of sub-families

code_familie	code_subfamilie	nom_subfamilie
11000000	11010000	connection
11000000	11020000	valves, hydrants (including accessories)
11500000	11510000	cast iron pipe and cast iron parts for drinking water
11500000	11520000	cast iron pipe and cast iron parts for sewerage
11500000	11530000	cast iron street parts

4. Categories (the below example is for sub-family 11010000)

Table 9: Example of list of categories

code_subfamilie	code_categorie	nom_categorie
11010000	11010100	cocks
11010000	11010200	connection collar
11010000	11010300	manoeuvre and protection box
11010000	11010400	meter support

5. Sub-categories (the below example is for category 11010100)

Table 10: Example of list of sub-categories

code_categorie	code_subcategorie	nom_subcategorie
11010100	11010101	lateral connection cock
11010100	11010102	vertical connection cock
11010100	11010103	cock before meter (concession)
11010100	11010104	cock after meter (line)
11010100	11010105	other cocks and accessories

It is not necessary to descend too low. In general, non-industrial activities should result in a nomenclature of the categories of this type, of 4 or 5 levels:

1	Network name
1 10	connection, valves, hydrants, springs
1 10 10	connection
1 10 10 10	cocks
1 10 10 10 1	lateral connection cock
1 10 10 10 2	vertical connection cock
1 10 10 10 3	cock before meter (concession)
1 10 10 10 4	cock after meter (line)
1 10 10 10 5	other cocks and accessories
1 10 10 20	connection collar
1 10 10 20 1	fully equipped connection collar - lateral cock
1 10 10 20 2	fully equipped connection collar - vertical cock
1 10 10 20 3	connection collar with flanges
1 10 10 20 4	stainless steel collar bracelet
1 10 10 20 5	collar base
1 10 10 20 6	base tightness gasket
1 10 10 20 7	electroweldable connection collar

1 10 10 20 8

plastic connection collar mechanical joining

Table 11: Example of code table

4.2.1.3. Identification of technical attributes and creation of codes

Attributes for each final level will be (in the example above, sub-categories), the technical properties of parts/materials which allow their differentiation. An example: For cocks before the meter:

- A1: Type
- A2: Cock diameter
- A3: Cock thread
- A4: Type of thread (if any)
- A5: Output connection diameter
- A6: Type of closure
- A7: Exit pipe sizes

Table 12:
Example of attributes

DEN_SCURT	A1	A2	A3	A4	A5	A6	A7
Cock before meter	pe-fi	15			3/4"	1/4 run	pe d 25
Cock before meter		15	3/4"	fe	3/4"	1/4 run	
Cock before meter		15	3/4"	fe		1/4 run	pe d 25
Cock before meter		20	1"	fe	1"	1/4 run	
Cock before meter		30	1 1/2"	fe	1 1/2"	1/4 run	
Cock before meter	pe-fi	20			1"	1/4 run	pe d 25
Cock before meter	pe-fi	30			1 1/2"	1/4 run	pe d 40
Cock before meter	pe-fi echer	15			3/4"	1/4 run	pe d 25

This generates the following unique codes for this family (by linking the different columns):

Table 13: Example of unique codes

COD_categorie	UM	CODE	NAME
11010103	Pcs	100001	Cock before meter on-fi 15 3/4" 1/4 run on d 25
11010103	Pcs	100002	Cock before meter 15 3/4" fe 3/4" 1/4 run
11010103	Pcs	100003	Cock before meter 15 3/4" fe 1/4 run pe d 25
11010103	Pcs	100004	Cock before meter 20 1" fe 1" 1/4 run
11010103	Pcs	100005	Cock before meter 30 1 1/2" fe 1 1/2" 1/4 run
11010103	Pcs	100006	Cock before meter on-fi 20 1" 1/4 run on d 25
11010103	Pcs	100007	Cock before meter on-fi 30 1 1/2" 1/4 run on d 40
11010103	Pcs	100008	Cock before meter on-fi echer 15 3/4" 1/4 run on d 25

Here is the most complex example. The pipes, valves, meters only have 3 or 4 parameters or attributes (if the subcategory is accurate enough).

This system has the advantages of avoiding non-standardized names which depend on the operator encoding these products and of allowing an internal standard.

4.2.1.4. Preparation of the information system and anticipation of the FIFO management problem with the Accounting Department

1. First of all, the management system must be blocked: New entry → New code. In order to do this, the accounting system must be able to handle for the same code different levels of input and must be able to manage the outputs automatically, depending on these levels.
2. Then, a dictionary must be created between the codes existing in the warehouse and the unique code:

Table 14: Example of code dictionary

Codetable code	Name	Unit of measurement	Unique code	Unique name	Category code	Category name	Date of receipt
2115010018	TIRES 240 *508	PCS	4	TIRE 240 *508		Truck tires	01-07-09
2115010212	TIRES 240*508	PCS	44	TIRE 240 *508		Truck tires	30-05-08
2115010027	TIRES 240*508	PCS	2	TIRE 240 *508		Truck tires	01-07-09
2115010184	TIRES 240/508	PCS	39	TIRE 240 *508		Truck tires	30-12-06
2115010220	TIRES 240/508	PCS	26	TIRE 240 *508		Truck tires	27-02-09
2115010176	TIRES 240/508	PCS	9	TIRE 240 *508		Truck tires	30-11-06
2115010194	TIRES 240/508	PCS	2	TIRE 240 *508		Truck tires	30-11-07
2115800116	TIRES 240-508	PCS	6	TIRE 240 *508		Truck tires	01-04-10

To advance rapidly, the simplest way is to have a very simple application, showing the existing code (or which selects them according to their names) and allows choosing a category, then

automatically the values for each attribute. The benefit (other than the time gain) is that it allows avoiding double codes (verification of the system).

Here ACC could develop the existing interface application for the management of warehouses to perform these works (this allows everyone to work from their location).

Thus, gradually, this will allow knowing each stock for this code (and progressively output statistics). It is best to start with the strategic parts for the ACC.

3. If conditions 1 and 2 are not met, upon receipt of the products (or best at the issue of the order), the codes are:
 - a. Selected, if they exist already
 - b. Created and used (upon receipt or listed on the order ticket).

4.2.1.5. Big-Bang

Progressive, if stock rotation is good, most stocks will have a unique code, but the parts without rotation will still remain, which will appear with an old code, and will appear correctly only with the use of this dictionary. Therefore the recommendations related to warehouse management must be followed in parallel (below). When the ACC is prepared and when the dictionary is ready the switch and abandonment of these old codes must be operated. This requires an important synchronization work with accounting, operational service and warehouse keepers (for warehouse sheets). After this switching, the management of information flows will be much easier.

4.2.2. PROCUREMENT MANAGEMENT

4.2.2.1. Management of tenders and contracts

The recommendations under this chapter are few because they depend a lot on the legislative changes which will occur in Moldova and on how the law will be applied. In terms of information systems, the ACC must implement a database with all tenders in progress or completed, with the name of the tenderers, of the successful tenderer and with the contract award criteria. For ongoing tenders, the database (which may be an Excel table) must include steps (including the running times of these stages). This allows:

- A better transparency and a more efficient communication with the control authorities and with the auditors,
- An increased efficiency for tenders in progress (what stage the procedure is in, when does it close etc.)
- Storage of information which may be useful in the future (for example in case, of failure by the provider to comply with an existent contract, so as to make sure that other potential providers are contacted).

The database of the existing contracts may be developed by introducing the dates of expiry and the connection with the Tenders which allowed the conclusion of these contracts. Additionally, if this Excel file is transferred into an application, alerts for the expiry of the contracts may easily be

created (based on the date) and if at the level of the order a register is kept with the related framework agreement, the value used from the contract could also be monitored (a 3-year contract may expire in one year if the procurement speed exceeds the foreseen speed).

4.2.2.2. Management of procurement applications

In the first instance, a new procurement request ticket must be reedited to specify as follows:

- The product category (and the request for the beneficiary to issue only a request per category, to regroup them better depending on the buyer)
- The date on which the product is needed (and thus giving up all these monthly, weekly "orders", etc.).
- The recipient reviewed the warehouse stock before issuing the request
- The estimated price
- Approval circuit (which can be either standard: issuer → head of service → manager or by value)

In **Annex 5** you will find the proposal of a procurement request form.

4.2.2.3. Order management: creating an order ticket

In **Annex 6** you will find a proposal of order ticket, adaptable based on the ACC needs. It contains:

- The ACC identification data
- The provider's identification data
- The financial identification data (investment/ functional / stocks)
- Contractual data (if it is an order based on a framework contract)
- Identification of ordered products
- Payment (advance, PO x days after registration of the invoice, etc.)
- Transport (included, and if yes, the address of the warehouse) and the provided date of delivery

This order is codified in a register in which the receipt confirmations are registered. In general, to ensure transmission, the best way is by fax (because confirmation is obtained immediately).

Other documents may be drafted: annex of the order which indicated the number of the procurement request, the beneficiaries and the contact persons (for when the order arrives in the warehouse). For control purposes, if it is only an order in a framework agreement, the documents summarizes the analysis of the offers received.

Thus, the providers are compelled under the contract to deliver products with a copy of this order, and with other compulsory documents.

Many reports must be created to improve the performance of the Supply Service procurement:

1. Volume of activities:
 - a. The number of ongoing, completed tender procedures and the type thereof
 - b. The number of valid contract, the number of concluded contracts (total / year, and depending on the buyer)
 - c. The number of received procurement applications
 - d. The number of issued orders (total, and depending on buyer, category of procurement)
 - e. Rate of contractual coverage:
 - i. The number of issued orders in a framework agreement / the number of total orders,
 - ii. The values of the issued orders in a framework agreement / the total value of the orders,
2. Analysis of the portfolios
3. Register of orders in progress (in the deadline and with delay)

4.2.3. STOCK MANAGEMENT

4.2.3.1.

Physical flows of product management

Various measures must be taken in order to have an efficient management of inventories and of supplies:

i) Reducing the number of warehouses and the connection with the Supply service

How many warehouses should depend first on the Supply Service which must take responsibility for the management of the parts and of the equipment until their distribution to the operational teams? Why?

1. Often the products are in a warehouse. When a person from the operation department, does not find it → joining of stocks, which generates savings and operational effectiveness
2. One entity can impose working methods (labelling, rack plan, alert management, documents, control), security procedures, training warehouse keepers

Therefore, the following aspects are required:

- Cleaning the sub-warehouses:
 - o Sending used parts to scrap iron
 - o Redirecting parts or materials

At the same time, depending on the strategic location in Chişinău (for optimisation of the flows), the Supply Service must have several warehouses and must implement a transport service between these warehouses. A number of 2 or 3 warehouses for network parts seem reasonable, considering the size of the locality. This allows regrouping warehouse keepers and a better regrouping of the paid leaves.

To conclude, the operational departments must not have as an objective the management of the warehouses. They must send their teams to the warehouses and find what they need there.

ii) Better organisation in the warehouses

The warehouse keepers must ensure a good organisation of the warehouses, under the control of the Supply Service:

- Racking plan
- Reception area in the warehouse (where the operational teams must enter without physical access to the parts) with cart systems, to prepare internal orders

4.2.3.2. Information flow management

First of all, one of the objectives of the information system must be increasing the accountability:

- of the warehouse keepers. They must be able to record themselves the transactions, instead of the accountants (they are liable in case of issues). The latter will have more time for the periodical inventory.
- of the beneficiaries (operational and administrative entities)

i) Management of receipts

Regarding this transaction, the first thing is the movement of stocks with the order. Following the replacement of the order ticket (see recommendations on procurements), the warehouse keepers are able to learn the orders in progress (initially sent to the warehouse keepers via email from the Supply Service, then, in a "Pending orders" field). This allows anticipating deliveries, relaunching the Supply Service in case of delay, etc.

Then, one can share a file in a public folder (in the server) with these orders in progress. Upon reception, warehouse keeper enter this information at, any time, the Supply Service is aware of the orders in progress (in the deadline and delayed). For direct procurements it may provide for the warehouse keeper to submit to the beneficiary via email the distribution sheet and to announce the latter to collect its products.

A major progress would be the registration by the warehouse keeper of the transactions in the interface developed by the IT department (and with an automated interface in the accounting system).

ii) Management of transfers

In terms of the stock movements, it may include several steps managed by a computer interface:

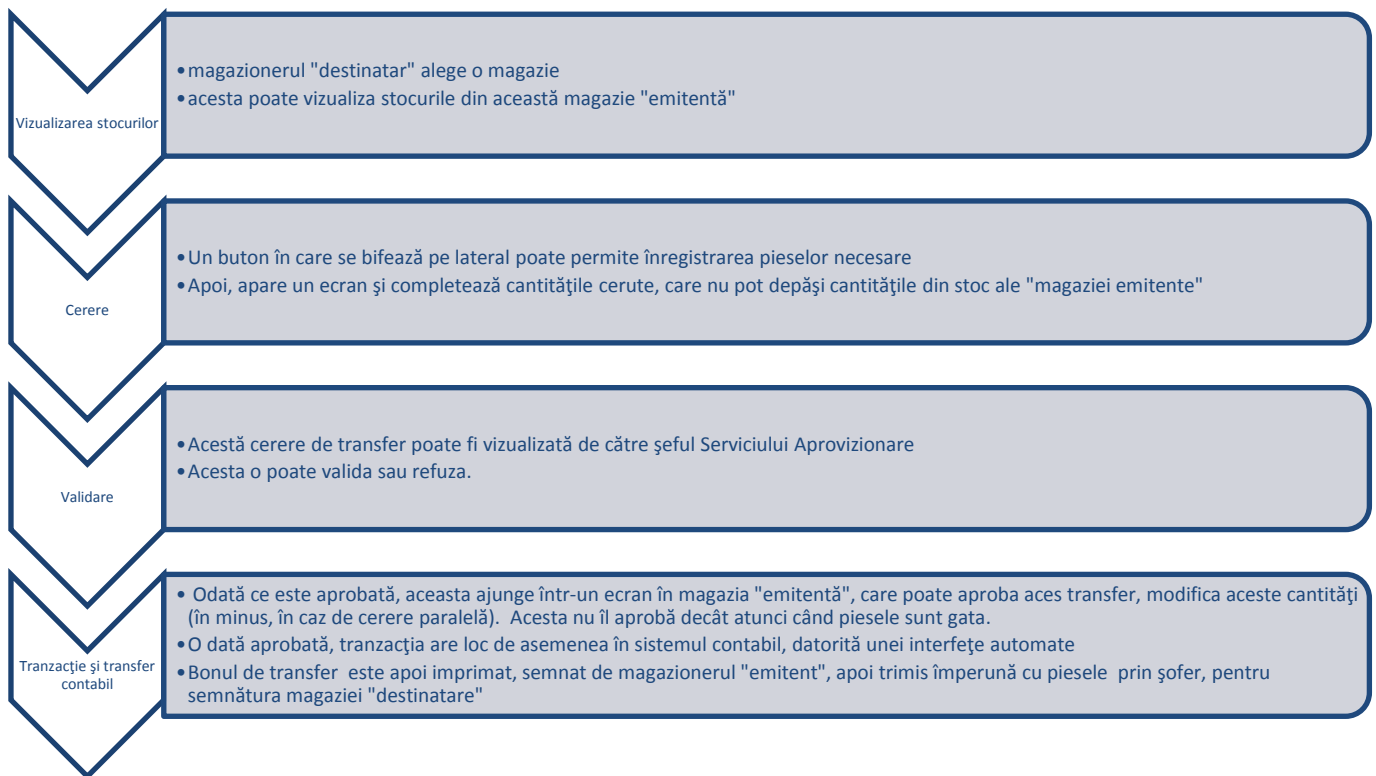


Figure 7: Transfer Flow Management Chart

It allows keeping the control stage already created, but the administrative costs decrease very much (electronic approval) and there is just one document instead of two, as is currently the case.

iii) Management of outputs

As far as the outputs of spare parts are concerned, a similar system can be established:

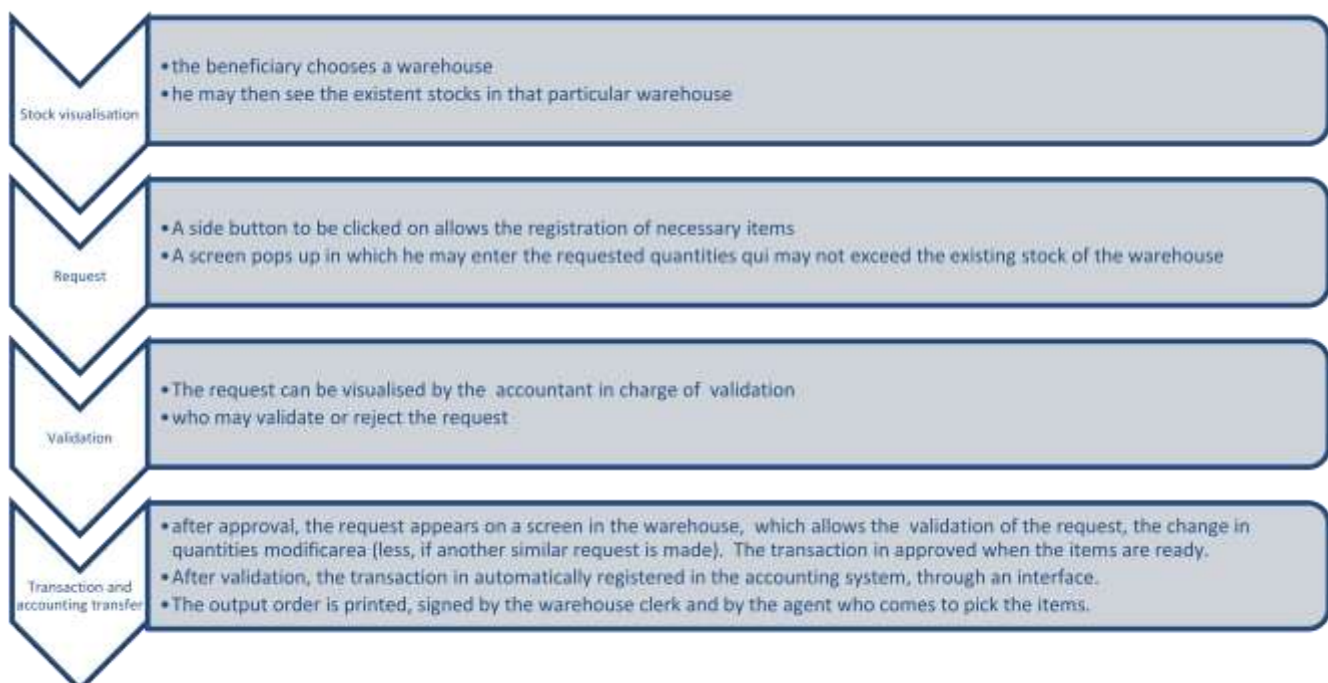


Figure 8: Outputs Flow Management Chart

Similarly to the previous situation, it allows keeping the control stage already created, but the administrative costs decrease very much (electronic approval) and there is just one document instead of two, as is currently the case.

Since the topic related to the output of parts is very sensitive, its allocation should be carried out correctly. The ticket should contain information relating to:

- The intervention (code, address)
- The person who will come to the warehouse (driver, head of the team) + vehicle
- Accounting information. Cost centre, activity code
- Street or place for the use of the parts (construction site or office for consumables)

In time for a better control and optimised administrative costs, have also provided a link to applications for:

- Management of meters (and provision of the management of serial numbers)
- Management of interventions
- Management of personal protective equipment

iv) Management on the alert levels

i) How are these alert levels defined?

In terms of the resupply levels, there is a lot of literature. However, the criteria for defining a minimum and maximum stock are very simple:

- The value of the parts and of the equipment and the financial possibilities of ACC
- Terms of supply
- Strategic size, risk management (parts for repair of arteries, meters, etc.)
- Volume, space necessary for parts and equipment
- Statistics of exits and planning of needs



The chart above shows clearly that the alert level must be established to make sure the stock is sufficient to cover the deadline for delivery of the supplier, depending on the exits from the warehouses.

Setting a minimum stock and a stock maximum has the double advantage of oscillating between 2 levels which prevent the occurrence of a disturbance in the stock, and at the same reducing the immobilization of stocks (a maximum stored amount should not be exceeded)

A simple management rule may be:

- The central warehouse:

-
- For import products: minimum = 2-3 months of operation, maximum = 4-6 months
 - For products from Moldova. minimum = 15 days, maximum = 1 month
 - For other warehouses (supplied from the central warehouse): minimum = 1 week, maximum = 2 weeks

For these sizes, it is better to keep a small margin, because the following reactivity time should be taken into account:

- Reaching an alert level
- The launching by the warehouse keeper of a resupply request
- Approval of this application
- The issue of the order if there is a contract, if not, a market study
- Approval of the order
- Administrative processing by the supplier
- Preparing the order

The main difficulty of this aspect consists in:

- Good communication with the operational entities of the ACC for a better control of future exits of spare parts (seasonal increase, decrease), age, the entry of new items
- A good control of the statistics (generally, the history of exits and the monitoring thereof are a clear indication of the trends).
- Permanent reassessment (quarterly reassessment of the alert levels is a minimum requirement)

ii) What categories of products must be monitored?

The perimeter monitored in the resupply of the items depends solely on the ACC decisions. However, an expansion shall be necessary of the range of items managed to other items important for operation (valves, connection parts, materials, spare parts for repairs), then to protection equipment (helmets, footwear, etc.), then to hygiene materials (soap etc.).

Also, absolute levels of security can be created below which it is forbidden to descend, in particular for strategic parts (parts for large diameter arteries).

4.2.3.3. Creating management reports

Stock reports are very numerous and can be configured depending on the applicants:

i) Warehouse keeper and supply management

- Reports on the speed of rotation of the stocks (in months): Current stock/ annual exits
- Stock reports on the basis of time elapsed from date of receipt (date of receipt): Depending on the warehouse, product category
- management of stock levels:
 - current stock = 0
 - current stock < minimum stock

-
- current stock < (minimum stock + maximum stock) / 2
 - current stock > maximum stock
 - exits per month and depending on the beneficiary (to see trends, seasonal changes)
 - stock level (in value), depending on the warehouse, evolution on a time horizon
 - stock levels per category of products

ii) **Management control**

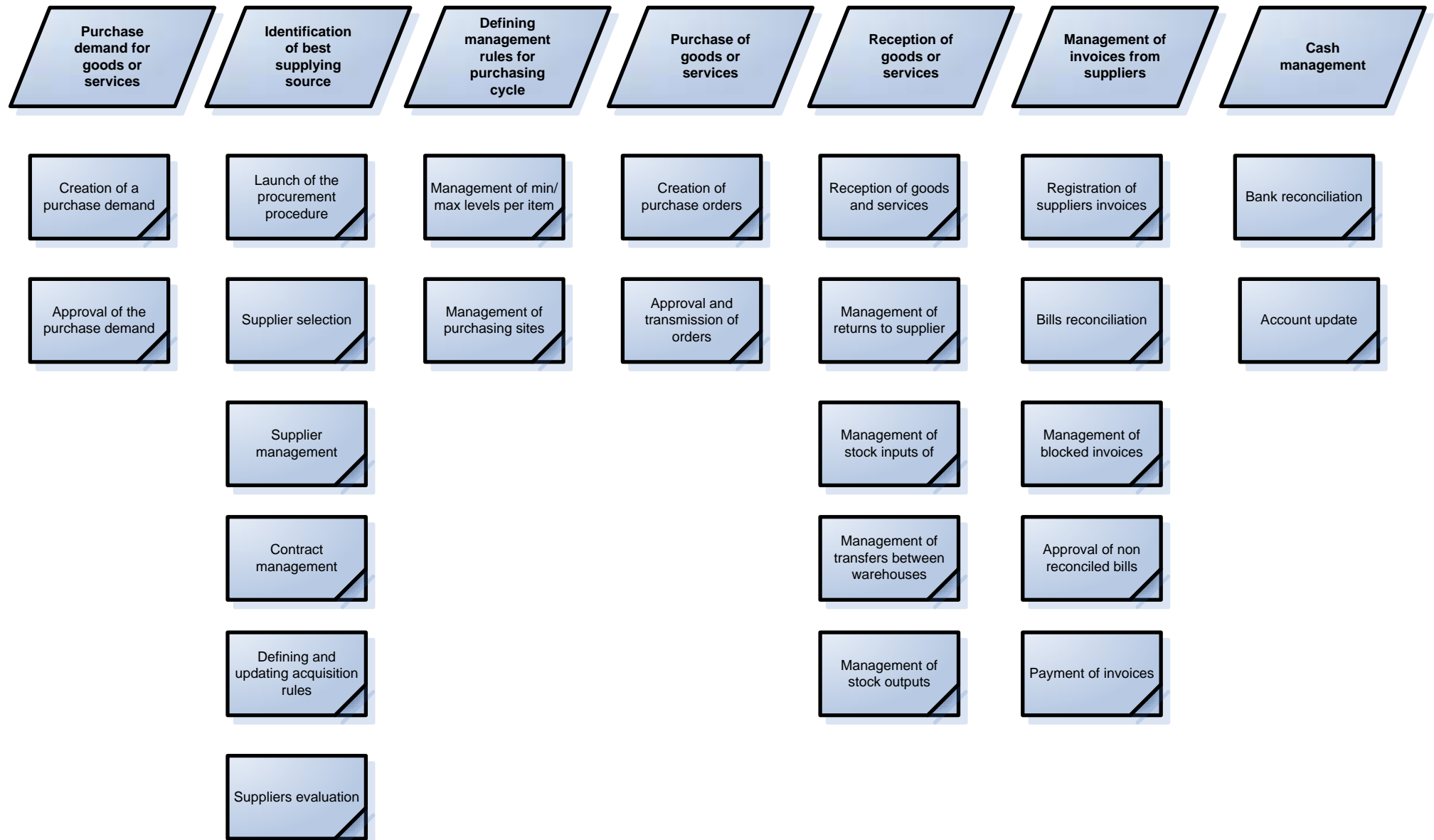
- The history of exits depending on the beneficiary, intervention code, etc.

4.2.4. IMPLEMENTATION OF AN INTEGRATED SYSTEM

There are more integrated solutions on the market covering various accounting and logistics modules. The advantages are considerable (detail below), but failures in implementing them are numerous, because organizations must prepare their processes and data for this type of instruments. For that reason, it is important that the recommendations expressed in the other chapters be followed.

4.2.4.1. The general diagram of the processes into an integrated system - advantages

The general diagram is presented in the figure below.



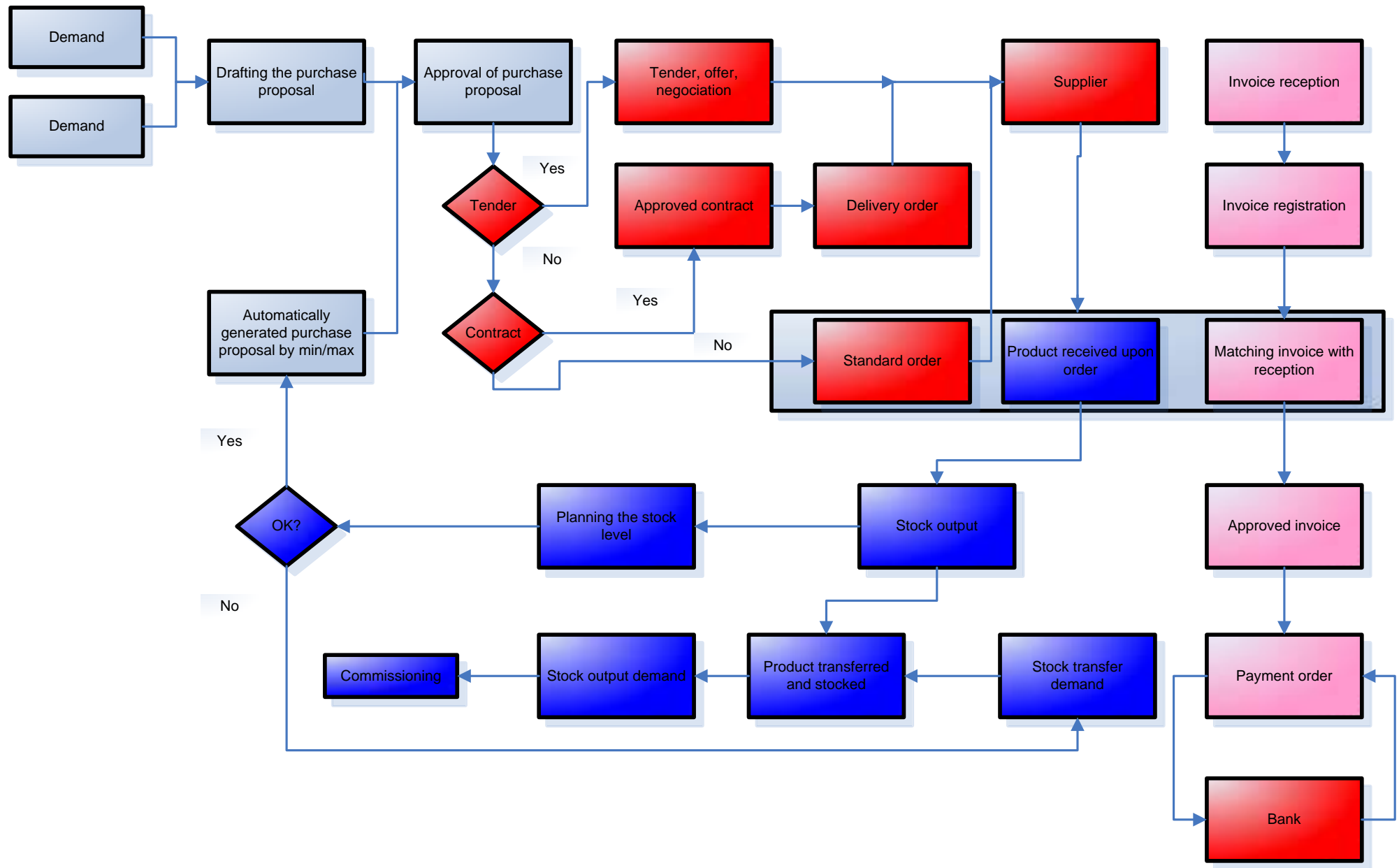


Figure 9: Diagram of supply processes

The modules function in an integrated way, between acquisitions, stocks and accounting modules. Further you will find the functioning of the modules and the advantages of their use and administration.

Numerous advantages can be identified in the implementation of such a system at the level of the supply service within the ACC.

- Decrease of the administrative costs (0 paper, quick approval)
- Formalization and standardization of the documents (procurement applications, orders)
- Monitoring of the issue and of the approval of documents
- Automatic connection with the accounting modules, the commitments are made from the launching of the procurement application
- The formalization of the separation of responsibilities is automatic (example: a buyer can issue a procurement application or can operate a reception in the accounting system).

4.2.4.2. What are the expectations concerning the stock and procurement management modules within the ACC?

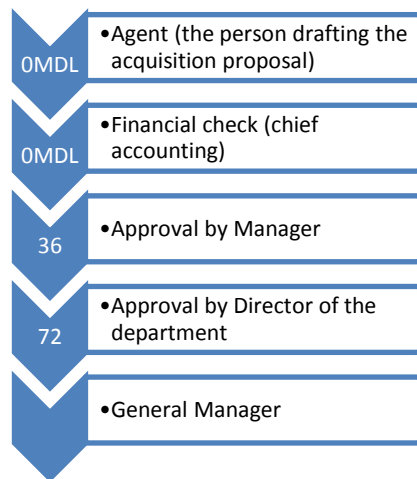
i) Stock management

The first advantage lies in the integration into calculations of the needs from min./max. and the procurements service (through a procurement application generated automatically). The only advantage is the integration of data in the accounting system and the viewing by the warehouse keepers of the orders in progress, which are selected and for which the only the non-delivered quantities may be received.

Access to information is immediately, the spare part is located directly in the premises of the warehouse, and the operational advantage for the ACC may be that of interfacing such with such module with a bar code reader system.

ii) Management of procurement applications

In general, outside the module for the management of the tenders, contracts and orders, there is a module whose use interface is user friendly, being a web interface. The users who have access to this module can have access to a catalogue with all the positions of the products/services (open contracts or registered supplier offers).



The buyers may register therein supplier catalogues, data/technical sheets, etc., which facilitate the search of the desired items. Also, files may be attached to the applications (assembly plans, tender book, etc.).

- Once the choice is made, the procurement application is automatically launched and the budget is verified; the application is subject to an approval process which is carried out within the application. This approval diagram may be the same (Applicant → Chief Accountant → Director) or it may vary with the value of the application (according to the diagram). Such approvals are supplied generally very quickly because the persons responsible receiving a notification by email.

iii) Management of suppliers, tenders and bids

Procurement management modules manage the tenders without problems. They must be clearly configured based on the internal regulations of the ACC or law 96 if it shall be enforced in the future. Firstly, the management of the suppliers (creation, updating, inactivation thereof) is carried out by an entity other than the Supply Service (to avoid any risk of manipulating the system), in general, by the Accounting Department.

The management of the tenders allows constant knowledge of all tenders ongoing, and of their stage (analysis of the bids, etc.) and the management of such procedures as being projects. An alert system by email can be implemented to warn the members of the boards with regard to the expiry of the deadline. Analysis of the bids (introduction of the schedule of bids), and the choice of the successful tenderer also made the ERP.

iv) Management of the orders and of the contracts

Open contracts (or firm contracts), are entered into the ERP together with all the payment conditions, the delivery period, etc., as well as the annexes with all prices. Once introduced by the buyer, the contract (and the orders) will be approved according to an approval diagrams (different from that of the procurement applications).

The reports related to the contracts are very numerous (according to the recommendations related to the acquisitions) and alarms can be installed to warn the buyers (and their management) by email with regard to the expiry of these contracts

(depending on the date or depending on the value of the delivery requests sent with regard to this contract). Thus, even with a very strict law on public procurement, it is possible to anticipate the deadlines and to launch the tenders in a timely manner in order to never remain without an ongoing contract. As regards the issue of the orders, they can be carried out almost automatically by the buyers if it concerns a delivery request (link between the procurement application and the open contract is made because of the item code). Thus, all the buyer has to do is run a process, then to launch these delivery applications for approval by the management. In addition, the performance of the suppliers is very easily verifiable: delays in delivery, registration of non-compliances. The buyers can receive alerts concerning the non-received orders whose term of delivery expired. In addition, the beneficiaries who issued procurement applications may monitor their applications transformed into orders.

Important Control Points:

- No order can be registered without the approval of the procurement application
- No tender can be registered without specifying the type of tender or carrying out a short analysis of the bids
- No contract can be registered without validation of a successful tender
- No receipt can be carried out without a correlation with the non-received order
- No invoice can be registered without a correlation with an receipt

v) **Management of receipts**

The control points are specified above. The receipts can be carried out by:

- Warehouse keepers for storable products
- Beneficiaries (who issued the procurement application) for the work/ services and non-storable products (directly after receipt)

5. FINANCIAL- ACCOUNTING INFORMATION SYSTEM

5.1. THE CURRENT SITUATION

5.1.1. THE GENERAL FRAMEWORK

The accounting records are held according to the National Accounting Standards approved by the Ministry of Finance of the Republic of Moldova and the accounting policies approved by the General Manager of the ACC.

The information system for accounting records (IRLEX) is of the type MS DOs and has been implemented by a company which in the meantime went bankrupt. Currently, all developments and the maintenance of the system are insured internally by the IT service.

Even if the system was developed successfully by the team from the IT Service, because the transfer of data between certain modules is carried out on-line (e.g. stocks and the general accounting), there is a great risk concerning the safety of the data.

There are separate developments for the record keeping of cash desk operations and banking operations, salaries, staff records, for which the transfer of data it is not automatically carried out in the general accounting, being necessary to input the data twice.

Communication is faulty between the Accounting Service and the Analysis - Prices Service, in which the organization of the analytical records of costs and the chart of accounts do not provide the necessary data for an analysis on items of expenditure.

The activity of the Accounting Service is described rather briefly (attributes, duties and responsibilities) in a Regulation of the Accounting and Finance Department approved by the economic manager. The accounting records policy is approved by the Director General in Order 100 of September 2011. This document describes the activities of the company, the rules on registration and assessment of the assets within the ACC and the chart of accounts grouped per basic activities and ancillary activities, per direct and indirect consumptions.

Accounting account symbol	Analytical account	name	Analytical code name
811-1-1		Direct production consumptions - aqueduct - water catching	
	01		Direct material consumptions
	02		Workers salary
	06		Wear of fixed assets
	07		Electricity
811-1-3		Direct production consumptions - aqueduct - water distribution	
811-2-1		Direct production consumption - sewerage - waste water pumping	
811-6-1	01	Direct production consumption - thermal energy - thermal energy production	Workers salary

Accounting account symbol	Analytical account	name	Analytical code name
812-01	1100	Direct production consumption - auxiliary activities	Self-transport service
812-02	1400		Technical- sanitary installations sector
812-19	3401		Drinking water laboratory
812-23	2900		Technical Department
813-1		Indirect production consumptions - aqueduct	
813-2		Indirect production consumption - sewerage	
813-3		Indirect production consumption - auxiliary activities	
813-6		Indirect production consumption - thermal energy	

Table: Analytical accounts example

We notice that it is not in compliance with one codification rule i.e. for a type of expense or for a department depending on the organisational structure, that because the fact that the costs and works accounting is recorded separately, in parallel with the general accounting module, so the operating expenses work is doubled.

There is no detailed procedure regarding the accounting records per each category of assets (assets, available, debts, capitals, etc.) which must describe the module of the accounting system, the time of the record, thus having a complete picture of the processing stages and of the circuit of documents, but also the deadline for the closing of the month.

5.1.2. DEFICIENCIES FOUND

The deficiencies found in relation to the accounting computer system can be grouped into 3 categories:

- deficiencies found in the mode of operation;
- deficiencies on the reports generated by the system and the export of data;
- deficiencies concerning the access profiles of the users.

In MS DOs the screens in the operation menu are not user friendly and do not ensure all required hints on the correct and rapid operation of the movements of stocks or fixed assets.

The MS DOS system cannot allow the creation of access profiles with limited rights, to view the data or reports. There is a series of important tasks which are carried out manually (collection of data, interpretation of results, carrying out economic analyses etc.).

5.1.2.1. Deficiencies found during stocks management

Stock management does not ensure automatic evaluation of the stocks through the FIFO method - method laid down in the accounting political.

In relation to the deficiencies found in the code table of items (see point 4.1.1.1) we could add the following:

- the operation of exits from management as a result of consumption is done at the end of the month, on the basis of a centralizer without a detailed pointing out of the types of activities for which the materials in question were used. In addition to generating employment in intervals at the end of the month for accountants from the sector managements, the time consumption on certain categories of work cannot be highlighted in a timely manner and especially, resupply alerts cannot be issued but after the records from the end of the month;
- At the time of the operation of an exit from records (transfer or consumption), the accountant does not see on the screen if the existing stock is sufficiently compared to the amount exited, so as to generate an alert message for the negative stock;
- regarding the documents/ report on the receipt of the stocks at the time procurement from the supplier - the collection order does not have a column with information related to the invoiced quantities charged and the received quantities, so any potential differences cannot be highlighted upon the receipt.
- The accounting policy of the company does not provided for the lodging of provisions for depreciated stocks or old stocks - obsolete physically and technologically. An age report on existing supplies in stock is missing.

5.1.2.2. Deficiencies found during the management of fixed funds (fixed assets).

The module operates separately from the general accounting and is rather rigid, and it does not provide all necessary information nor in terms of accounting information, neither from a technical standpoint.

In terms of deficiencies we mention:

- the lack of information on the historical cost of procurement and of the reassessment and updating carried out during the life of use;
- it does not allow storage of some technical information of the kind length of networks;
- it does not allow the extraction of data and their grouping based on certain characteristics;
- there are no detailed records for each investment project until the commissioning and registration as fixed asset, other than at a global level, on a synthetic accounting account (ct.1211-1213).

5.1.2.3. The deficiencies found in relation to the management of the suppliers

The records regarding the debts are detailed according to the kind of services provided, having the following analytical accounts:

5211 Short-term debt concerning the assets procured - suppliers of materials

5212 Short-term debts concerning thermal energy and electricity

5213 Short-term debts concerning capital repairs

5214 Short-term debts concerning the provision of other services

5215 Short-term debts concerning capital constructions - providers of fixed assets.

In terms of shortcomings, we could mention the fact that there is no analytical account for foreign suppliers for which records must be kept in foreign currency and an assessment must be made at the end of the period and registration of the differences in the currency exchange must be carried out.

Also, even if there were reports on the balance of suppliers and the breakdown of the debts on age, there is no important report which is required by the management i.e. a debt payment schedule, in order to plan the payment to the suppliers better and for an optimal use of the available funds. This is also due to the fact that upon the input of the fiscal invoices received the registration of the information concerning the due date for payment under the contract is not provided.

There is no report of the type Supplier X Sheet covering all invoices and payments on a certain period, regardless of the debt account, so as to indicate the overall debt to a supplier.

5.1.2.4. Deficiencies found in the records concerning the available funds

The chart of accounts shows the bank accounts in local currency and in foreign currency opened at various banks, but the records regarding the banking operations are kept in parallel in Excel, and the drafting of the cash flow is not automated.

Records concerning revenues from customers - the records are kept in the Customer Records System - the transfer of data is not carried out automatically in the accounting system.

5.1.2.5. Deficiencies noticed in the salary module

The information system for calculating the salaries is separated from the rest of the accounting system and ensures the automatic calculation of the salaries and of the withholdings, but with periodic intervention of the programmers, at least once a month.

5.1.2.6. Deficiencies found at the general accounting module (ledger)

The system collects the data from the other modules either automatically, either through diaries introduced in a centralized manner in order to obtain reports required by the National Accounting Standards: The ledger and the trial balance. These reports cannot be exported to excel, but only in text format, which are difficult to process in financial analyses.

The current system cannot be adapted to the International Financial Reporting Standards (IFRS) and to a potential change of the chart of accounts.

The relation to the costs and works accounting, there is a module called "SINECOST" for the records of the costs of the main activities (water, channel etc.) and ancillary activities, but does not allow the export of information in excel and cannot group the expenditure on items of expenditure, resulting in difficulties when carrying out the analyses.

The system does not permit the introduction in parallel of the annual plan for each activity or section, to allow checking at any moment the degree of achievement of the economic indicators.

5.2. RECOMMENDATIONS:

5.2.1. SHORT TERM SOLUTIONS - WITH A MINIMUM FINANCIAL EFFORT

Since the replacing of the present system with a high-performance integrated ERP system implies both a financial effort, and a considerable effort of the implementation team, we recommend as immediate solution the development of the present system i.e.:

- improving the mode of operation: adding to the operating menu fields with useful information for the operator (accountant) so as to facilitate the introduction of the data and to eliminate errors. (example: under stocks, at the time of the operation)

of an exist the existent stock must appear, because one cannot remove from management a quantity greater than the existing one);

- The adjustment of the chart of accounts and the creation of analytical accounts of the degree II and III, enabling records of the costs both based on their function (direct and indirect expenditure), and based on their nature, i.e. based on their economic contents;

Table 15: The proposal of codification of the chart of accounts

synthetic account after its function (according to SNC)	analytical account based on the nature of the expenditure	cost centre (sector of the organizational chart)	activity code
XXXX -	XXXX -	XXXX -	XX X

- There is an opportunity for the Computerization Service to transpose the programme in the Oracle operating system, already having some experience with the management system from the commercial service. Therefore different profiles will be created for access to the database and switching to a newer version of the Oracle databases.
- Creating the reports necessary for management for optimum use of the available funds, such as the debt payment schedule for debts to suppliers, the supplier sheet;
- Creating extraction possibilities for information which have a high degree of parametrization, especially from the records module of capital goods (fixed assets). According to the types of reports selected various filters may be used for selection based on issuing units (ex. Supplier) or recipient (User), period or date of receipt, the partner or the group of partners, the unit of measurement in which the quantities are transformed, the attributes of the products (fixed assets from the water networks group), the type accounting products, origin thereof, etc. ;
- developing a fixed asset module and a sub-module for records and follow-up of the investments in the process, the types of projects and budgets allocated;
- creating the possibility of transferring the data or the reports to Excel format to use them in the analysis of the efficiency of the activity and compliance with the budget allotted, calculation of the economical financial indicators.
- organizing training courses for accountants to develop operation knowledge (including Excel), so as to limit the intervention of the programmers.

5.2.2. LONG-TERM SOLUTIONS

After the financial recovery of the company, it is recommended to replace the current system with a newly integrated accounting records system which does not allow changes

to the data and partial or total destruction by unauthorized access, to ensure integrity and flexibility, ability to adapt quickly to changes in legislation or the analysis needs of the management.

5.2.2.1. General functionalities and benefits of the integrated system

i) General functionalities

Regardless of the size, the structure of the property or the complexity of the fields of activity in which it acts, the computer module for Financial and accounting management should provide a series of functionality to allow detailed settlement of the following aspects:

- automation of the registration of financial and accounting information taken from primary documents;
- achievement of full financial and accounting records, at a synthetic and analytical level;
- operative monitoring of the accounting and financial records of the organization, with emphasis on the receipts and payments at document level;
- automatic generation of the operations specific to costs and works accounting, such as the collection of expenditure per cost centres and integration operations between costs and works accounting and financial accounting;
- simulation of month closing operations at any moment.
- automatic takeover by a specific import mechanism, of the data from other computer applications;
- automatic printing of documents issued in accordance with the regulations in force on their informational content;
- ensuring privacy, protection and security against unauthorised access to data, this security being provided at user level, sub-component level and operation level (view, add, modify, erasure);
- ensuring the rescue procedure for making security copies of the data and of the programmes;
- automatic printing of the Information and synthesis documents required by the legislation in force.

ii) Benefits:

implementation of an integrated computer system will have the following **benefits**:

- it will provide the management in a timely manner with the information needed for making decisions;
- it will provide all users with access to the information necessary to carry out the work tasks;

- standardization of the internal reporting system providing relevant information to the end-user;
- by flexibility, it can adapt easily to the new requirement, as well as to some new versions of the systems involved;
- consolidating the data and defining a single sources of information to assist the decisions;
- instruments for rapid access to information;
- providing a basis for reporting and multidimensional analysing of the data;
- covering the legal requirements for statutory reporting in accordance with the national accounting rules - SNC and international - IAS;
- monitoring and forecasting the cash-flow in order to minimize bank loans and to reduce costs in the company;
- providing a single and integrated reporting and budget platforms and reducing the time to build and review the revenue and expenditure budgets;
- financial - budget planning, funds control;
- thorough control of the financial activities.

The system must be provided with safety levels concerning the access to data and approval hierarchies and must allow the organization based on needs and the shaping of activity processes in line with generally accepted practices in the specific field of activity.

From a financial - accounting point of view, the product must ensure both the organization of financial accounting as well as that of costs and works accounting. Current transactions must allow instant monitoring from the place of their registration, but also at central level, based on the allocation of responsibilities with permission to access the operations precisely defined and specified in the process diagrams.

5.2.2.2. The structural elements of the integrated accounting system

From the point of view of its components, the structure of the computer system is intended to cover the financial - accounting flow completely, starting with the management of the primary documents issued or received, continuing with collection and payment operations, with compensation possibilities of the amounts as compared to certain partners and finally, giving the possibility of obtaining the analytical and synthetic trial balance, and editing analysis reports. Modular architecture, built on a high-performance technology, allows simple collection of data and introducing the information once the system.

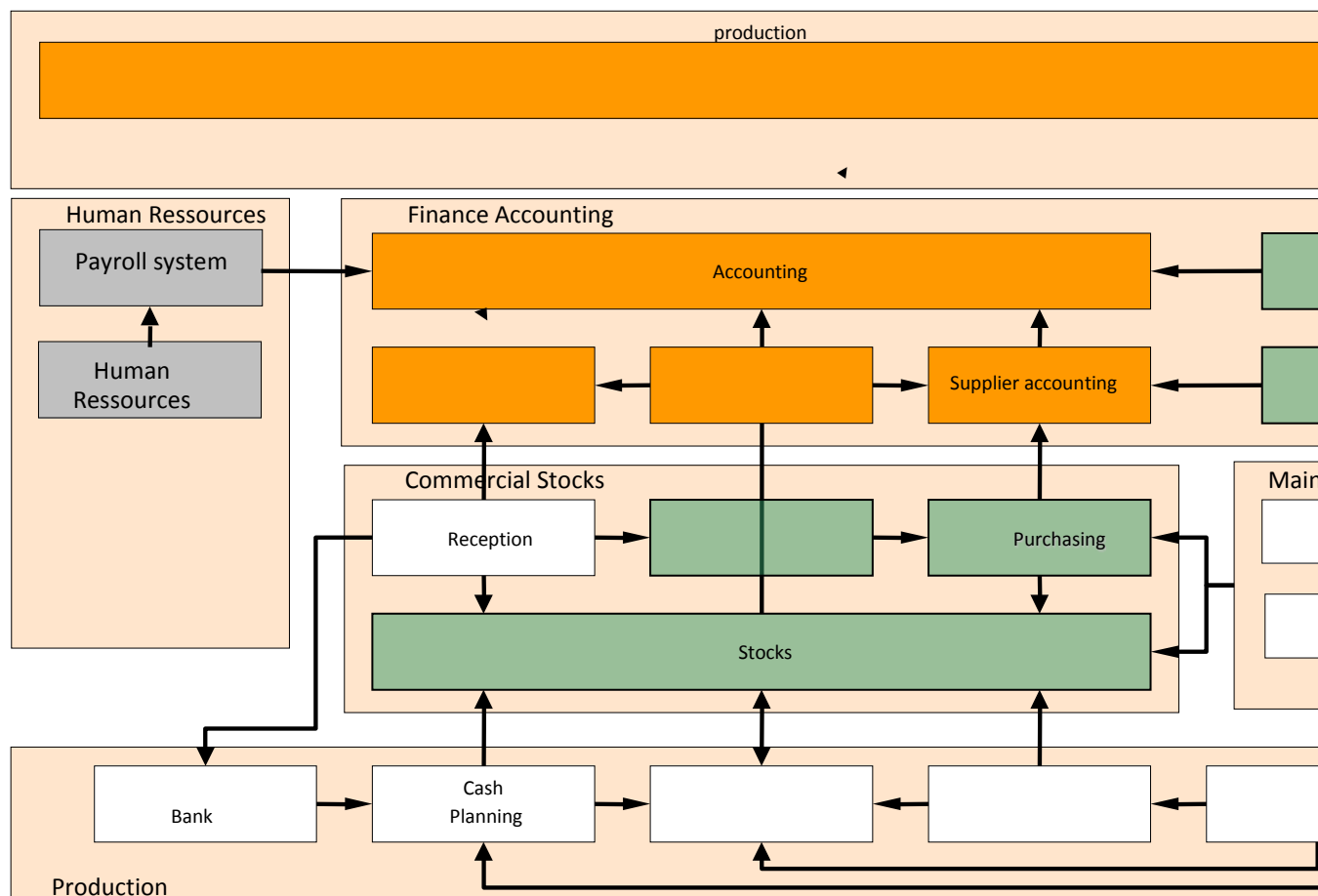


Figure 10: Architecture of an integrated accounting system

i) General Accounting Module (GL) - specific functionalities:

- defining the accounting plan and the chart of accounts (flex fields);
- the introduction of accounting notes directly into the system or by import into other systems;
- the possibility of defining hierarchically structured budgets and following the changes as compared to the current transactions;
- the automated takeover of the accounting information from other modules;

- handling accounting information - consolidations, archiving, conversions;
- period and financial exercises closing operations;
- the possibility of distributing the expenditures based on the formulas defined by the beneficiary.
- accounting reporting based on multiple national and international standards (SNC, IAS);
- records of the provisions by category, and the possibility of reassessment of the accounts receivable and debts in foreign currencies, at the end of the financial year;
- highlighting the tax influences and processing the accounting information for easy calculation of the tax duties to the state.

ii) The suppliers accounting module - specific functionalities:

- construction and maintenance of the database of suppliers;
- takeover of the invoices of all types.
- takeover of the invoices - comparing with product orders, approval;
- defining the payment documents and the banks with which operations are carried out;
- payment of suppliers;
- carrying out other types of payments;
- reconciliation of the suppliers balances, suppliers sheet, due payments;
- reconciliation of the accounts balances in banks.

iii) The customer accounting module - specific functionalities:

- construction and maintenance of the database of customers;
- automatic generation of the invoices, including printing them;
- summarized import of the invoices in the invoice system;
- recording revenue from customers;
- the achievement of the electronic connections with the banks;
- automatic generation of documents for the information of customers on their debts to the company;
- follow-up of the situation of the customers - balances, due payments, history of receipts;

- takeover of the invoices - comparing with product orders, approval;
- defining the payment documents and the banks with which operations are carried out;
- carrying out other types of transactions;
- reconciliation of the customer balances;
- reconciliation of the accounts balances in banks;

iv) Module which manages the relationship with the bank (Cash Management):

Includes automatic management of the payment and of the collection operations carried out in the society;

- registration into the system of bank statements
- reconciliation of bank statements
- reconciling of cash operations between the other modules (suppliers, customer, general accounting);
- definition of cash flow estimates;
- reports of reconciliation and estimation of cash flows.

v) Fixed assets module

It allows complex characterization of all fixed assets of the company, recording operations carried out in relation thereto, and analysis of the amortization rates by various methods (linear, accelerated or regressive).

In terms of functionality, the application will have automatic procedures which will provide the user with the following advantages:

- developing reports relating to fixed asset transactions carried out with partners and the attributes which characterize a fixed asset (monthly rate of depreciation, inventory value, amortized value, the degree of wear etc.), generated based on various criteria;
- integration with the general accounting module within the computerized system of the company, through automated generation at the entry into records of a fixed asset, of associated accounts, in accordance with the group of classification. The integration aspect is also reflected by the automatic recording of all accounting transactions relating to fixed assets (entry into records, changes in value of the type reassessment or modernization, exit from records, monthly amortization, etc.) and ongoing investment documents;
- registration of costs/expenditures per investment project. A very important indicator which must be calculated in any time is the actual cost of the project. It

is necessary that the invoices or the lines in the invoices of the suppliers to allow allocation to the defined projects;

- automatic transfer of the amounts allocated to the investment project by the module for the management of tangible and intangible fixed assets, upon completion and commissioning.
- ensuring a link between the operational and financial information.
- reducing the risk of loss from record of fixed assets;
- programming certain types of fixed assets for maintenance, to reduce the risk of failure and to extend their life.
- records of the fixed assets per cost centres /activities/staff/location;
- records of the history of the movements of fixed assets between cost centres /activities/staff/location;
- records of all modernizations and reassessment per each fixed asset - transfer to excel;
- reporting of the amortization forecast for future period per cost centre and total;
- provision of the "Inventory list" used in the annual inventory of the assets per cost centres, departments, sections, locations and total;
- reporting on the inventory results and their registration in accounting per cost centres and total;
- providing reports on "Fixed asset sheet" covering all history of the fixed asset, modernization, reassessment, depreciation, etc.
- reporting on the list of fixed assets scrapped, preserved and sold per cost centres and total;
- reporting concerning pledged, mortgaged, assigned, leased, and rented fixed assets per cost centres and total;
- issue of an analytical and synthetic accounting note per cost centres and per total and exports to general accounting;

vi) Financial analysis module - functionalities.

- automatic connection with the general accounting module;
- achieving standard financial reports;
- various reports (financial and accounting);
- loading budgets for use in reports of the type current versus budget.
- reporting budgeted - achieved choices on each accounting period per cost centres and total per company;

- financial modelling - sizes of the financial analysis, accounts mapping of GL per lines of reporting;
- aggregation of data per financial reporting periods;
- analysis of current financial, historical and forecast data;
- loading data from the calculation sheets;
- analyses and reports - balance sheet, profit and loss account, cash flow, exception analysis, analysis of choices, costs per activities;
- multiple graphical representation of the data examined;
- providing access to data and reports for users depending on their rights of access;
- data analysis at various levels of detail - detailing functions (drill down);
- budgeting functions - making budgets at various organisational levels and the aggregation thereof, creating versions of budget, built-in functions to create budgets of the type: copying, multiplication, division.

6. GEOGRAPHICAL INFORMATION SYSTEM (GIS)

6.1. CURRENT PHASE OF THE PROJECT

6.1.1. DIGITALIZATION OF THE NETWORK

A number of 8 operators have digitized until the 17th of November 2011 almost 2500 km of network (water and sewage) on the application provided by the Town Hall of Chisinau RINEDAC. Due to the quality of the documents provided on paper (boards), it should be said that the design of the network will be quite rough.

In terms of issues which may arise in the operation of the GIS, we list:

- The pipelines route is rough;
- There are pipelines without material or without diameter because the boards were illegible;
- Insulated pipelines (the route being deleted from the boards) without connections;
- Clogged valves or clogged shafts but appearing on the map.
- The boards contain only the shaft valves, not the buried valves.

Also there is the matter related to the property of the network. In the town of Chisinau there is a large section of the network which does not belong to the Apa Canal Chisinau company. Therefore the operational teams should not intervene on this network. This situation must be clarified by the Apa Canal company as soon as possible after the implementation of the new GIS system to intervene only where it has a contractual obligation.

At the beginning of the project, SEURECA sized the network digitalization teams based on information provided by Apa Canal: 2700 km of network are in the inventory of the accounting records. The boards show much more kilometres since networks which do not belong to the Apa Canal society are included, without indicating who owns them. In November, almost 2500 km were already digitalized, but only half of the city.

Under these conditions, the entire network cannot be digitalized (which can reach 4000 or 5000 km) until the 31st of July 2012 and the task of completing the GIS will rest with the Apa Canal Chisinau company.

6.1.2. THE COMPLETION OF THE NEW DATABASE STRUCTURE

The new database structure which will be used in the ArcCis is almost completed. This structure is very complex in comparison with what is currently in place at RINEDAC. A proposal was made concerning mandatory fields in the first phase of the project to obtain as quickly as possible essential information for the entire network.

In the GIS only information strictly related to the network and to the production installations has to be introduced without introducing information from other sources, in order to avoid double input and mistakes. For example: information related to consumers or the volumes consumed must not be introduced in the GIS, this information being much better maintained in the commercial application. In order to access such information from the GIS application, an interface between the two applications must be provided for, linking the connection between the GIS and the ID of the building in the commercial application. Because in some cases, the ACC has several contracts in a single apartment building, it is very important to enable users to view the total consumptions of this apartment building. But, in a first phase, before adjusting the interface with the commercial application, it is however recommended to introduce directly into the ArcGIS sensitive buildings (hospitals and educational institutions) to warn them in case of water outages.

6.1.3. MANDATORY AND NON-MANDATORY FIELDS

To help in making decisions concerning this issue, the following phases must be envisaged:

PHASE 1 / MIGRATION OF THE RINEDAC DATA into the ArcGIS: no mandatory field can be imposed because of the lack of data on the board.

PHASE 2 / DIGITALIZATION OF THE NETWORKS ON ArcGIS WITH BOARDS: same situation.

PHASE 3 / VERIFICATION ON THE FIELD: advantage has to be taken of these verifications in order to complete as much data as possible (material, diameter, approximately a year of commissioning, dismantled or in operation, etc...). Verification sheets must be very well prepared and conceived to enable their filling in by the teams on the field as best as possible.

6.2. THE GOALS TO BE ACHIEVED AT THE END OF THE JOINT ACC - SEURECA PROJECT

6.2.1. TRAINING THE ACC OPERATORS ON THE ARCGIS

6.2.1.1. ArcGIS operators

Two ArcEditor licenses will be acquired by SEURECA for the Apa Canal Chisinau company. The customer must designate two operators who will be trained by Serghei Brazhinenko during the month of March.

6.2.1.2. Databases administrators

For more safety, two database administrators must be trained, who will be able to understand the data tables, to create and to delete user, to organize data back-ups.

6.2.2. ARCGIS - AN USEFUL INSTRUMENT FOR THE OPERATIONAL TEAMS

The customer wants to expand access to the GIS. It is indeed very beneficial for the operational teams, but the following aspects must be considered:

- Currently, the operational teams (both the dispatcher and the sewerage do not have write down the nature of the interventions. ACC could start a small change of process from the implementation of ArcGIS, given the requirement of updating the information on the GIS. The teams should go on the field with an intervention sheet and an attached GIS plan where they must specify:
 - The network items on which the interventions shall be carried out (valve, pipe, joint, GS)
 - Technical description (diameter, location) of the item in order to fill in the database in case the information in the ArcGIS was incorrect or missing;
 - Nature of the intervention (repair of joint, collar, replacement of tube, etc...);
 - The exact location of the intervention (with a small diagram of the benchmarks).

EXAMPLE

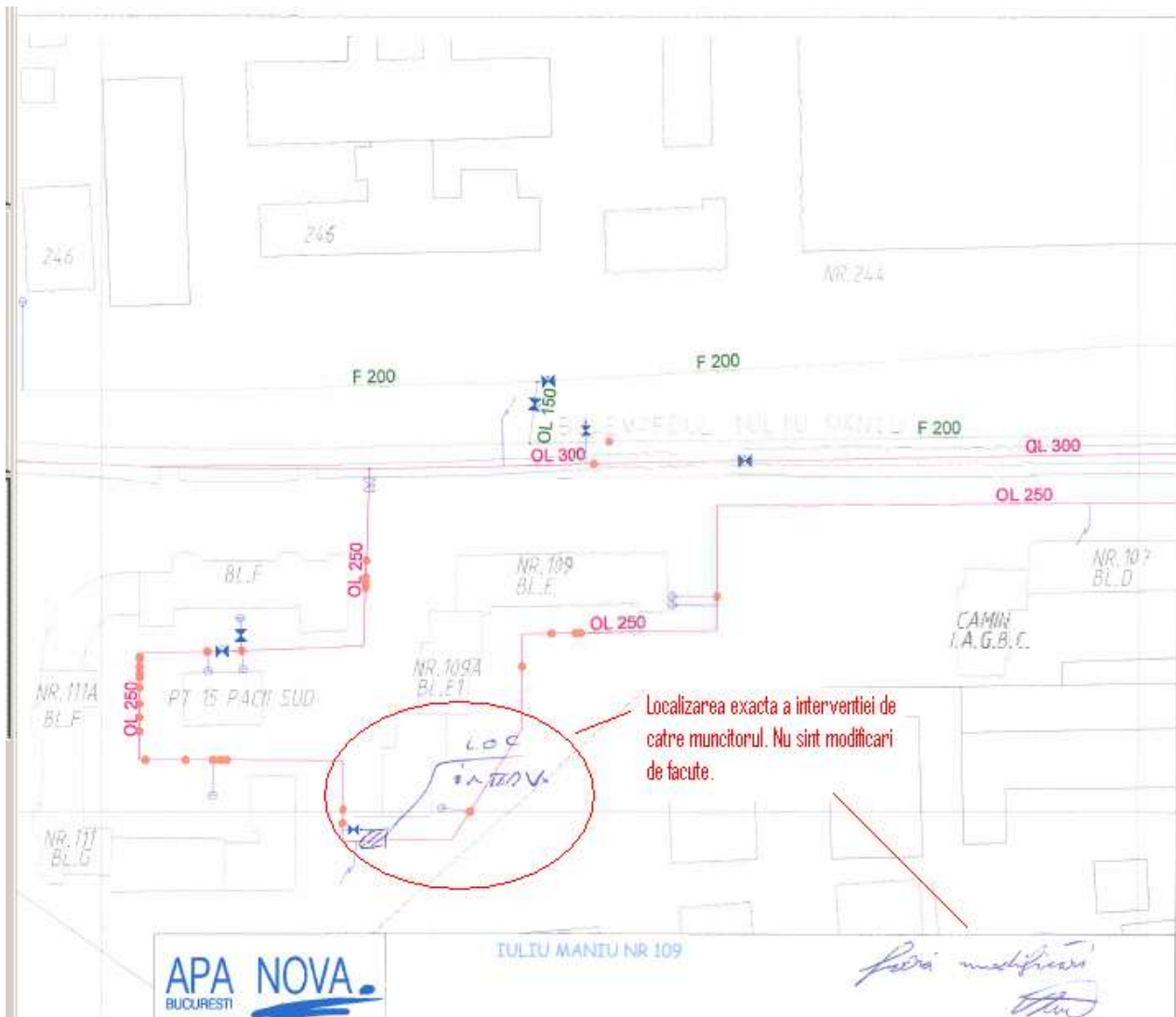


Figure 11: Intervention location diagram

- As previously indicated, a large part of the data made available in the ArcGIS will be incorrect or incomplete due to the quality of the information in the boards. Given this, the operational teams must be encouraged to rectify these errors systematically. For this purpose it is necessary for the teams to bring the GIS plan with them on the field, before the intervention. Also, the teams must be informed on the types of possible errors (even those related to the diameter and material), such as:
 - Distances from the buildings;
 - Shaft accessibility (clogged, in the underground, with a concrete slab etc...);
 - Manoeuvrability and accessibility of the valves

A distinction can be made between the rapidly perishable information (status of the shafts or of the valves) which could be maintained easier by means of a web application by the operational teams and "structural" information which relate to the existence and nature of the network, which network is better drawn by the GIS operators.

Only with the help of the operational teams the GIS can be updated and corrected. If this condition is not complied with, the tool will no longer be useable.

Updating is done easily in a first phase by direct collection from GIS (paper) and transmission to the GIS operators for a correction in the system (according to the sample intervention sheet attached)

- SEURECA shall develop together with the Apa Canal company an application accessible online to draw a water and sewerage network without requiring additional ArcEditor license purchasing. It is very important for this application to be developed with IT specialised from ACC, which shall provide its maintenance after the departure of SEURECA.
- ArcGIS allows an easy development of web applications which shall allow the operational sectors to plan, centralize and report their activities. For example, damages fixed in a day can be recorded, by manual selection of the respective section and by recording the nature of the intervention. These data shall be used subsequently for the issue of reports to decide which sections must be replaced because of the large number of interventions.

For this purpose, the operational supervisors of ACC must consider their need in this field, in order for them to be taken into account when developing this application.

6.2.3. RECOMMENDATIONS FOR THE DIGITIZATION OF NETWORKS NOT SHOWING ON DRAWINGS

There are water networks in villages surrounding the city of Chisinau, that should be operated by ACC, but which are not shown on any drawing.

ACC has expressed its wish to provide the human and material resources needed for the digitization of these networks in ArcGIS.

In Bucharest, the standard network (pipeline) detection is 8 meters / minute on average (taking into account the problems encountered in the field: network obstacles such as green areas, buildings, private property, etc.) with a team of two people. In optimal conditions, 300 meters can be detected in 15 minutes. The best equipment is Radio Detection 8000 (7000 €), which has also GPS positioning for accurate setting out.

The equipment used to detect sealed valves is FM880B from SebaKMT (1500 €). The condition is to have a cap on the valve (small or large) and the detection teams must be careful to distinguish between water caps and gas lids.

6.3. RECOMMENDED INTERFACES

The diagram of GIS interfaces with other applications is shown below:

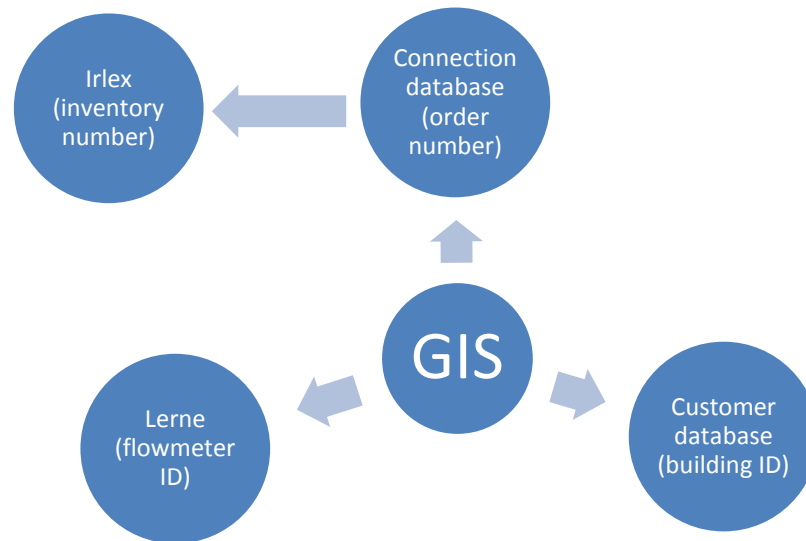


Figure 12: GIS – other system interfaces

6.3.1. GIS - COMMERCIAL APPLICATION INTERFACE

- By means of the connection ID, the customers may be notified regarding the planned and unplanned water outage;
- There is a possibility to view consumption during the day / night by area and the consumption during the week or week-end;
- There is a possibility to view the efficiency of sectors;
- The place of failure or clogging can be easily located in case of a customer's complaint;
- In case of replacement, the technical data of the connecting pipe and connector are updated in both applications (diameter, length).

6.3.2. GIS - WATER AND SEWERAGE INTERVENTION APPLICATION INTERFACE WITH IRLEX

- The location of intervention is located directly on the GIS;
- Easy printing of the area subject to the complaint with the existing networks;
- The operation teams mention the area of intervention to solve the problem notified by the customer;

- The number of intervention and their price can be easily calculated by pipe section. This is useful in taking the decisions to replace the pipe sections.

6.3.3. GIS - PUMPING STATION AND NETWORK PRESSURE MONITORING APPLICATION INTERFACE

- Viewing high / low pressure areas
- Rapid identification of affected areas in case of pumping station malfunction

7. CONCLUSIONS

The report described the findings on the current configuration of information systems supporting the main processes within ACC and formulated recommendations regarding:

- The implementation of an integrated information management system
- Developments and changes in existing applications and their integration, either as palliative solution if ACC does not purchase an integrated system, or as a transitional solution that will facilitate the systematisation of information and will prepare the transition to an integrated system
- Changes in processes to improve their performance

This final chapter will present some general aspects on the implementation of an ERP system, and recommendations on the management of internal application development projects.

7.1. IMPLEMENTATION OF AN INTEGRATION SYSTEM OF ERP TYPE

7.1.1. WHAT IS ERP?

ERP (Enterprise Resource Planning) is:

- A software package: developed by an editor general enough to be chosen by many customers, containing a standard core and a parametric section.
- A management application: allowing the automation of the company's administrative transactions: Sales, Procurement, Stocks, Production, Payments, etc.
- An integrated product: all modules have access to shared resources, especially to the same database. This puts an end to the interfacing, synchronization problems and duplicate inputs.

ACC can decide strategically (financial resources, the implementation team present in Moldova on behalf of the supplier, etc.) to implement two solutions: one covering the accounting and logistics, and another covering the business (customer management processes: contracts, reading, invoicing, collection, customer relations). The ERP integrates both the inter-organizational processes (customer relationship management, supplier relationship management) and business intelligence (BI) processes and knowledge management (KM) processes.

7.1.2. WHAT ARE THE SUCCESS KEY FACTORS FOR ACC TO IMPLEMENT AN ERP?

- Preparation of own database: the coding implementation example (see chapter 4.1.1.) is perfectly applicable in this case. No ERP works without this type of data structure.
- Preparation of processes: if there is an administrative difficulty or failure before implementing an ERP, this will be found in the integrated solution, often at a higher dimension.
- Preparation of teams: there are two levels to be considered:
 - The key users to be part of the implementation team (middle management) must know the processes very well and be promoters of change among the teams they represent
 - The end users must have a sufficient level of training in the use of computers and be able to adapt to using a computer system. Example: the implementation of such solutions in warehouses - if the warehouse keepers have never used a computer and did not understand the logic of an integrated process, the tool, although efficient, will soon have many erroneous data that may render it unusable.
- Knowing its own needs and determining their evolution according to the progress of ACC
- Detailed risk analysis for ACC before launching such a project:
 - Risks related to the mobilization of actors: the continuous mobilization of project teams towards the achievement of objectives, project management by proximity management, the ability to mobilize domestic resources
 - Risks related to the scale and complexity of the project: the number of affected users, site diversity, entities with different cultures and operating modes, responsiveness of decision-making processes, taking into account local inconsistencies...
 - Risks related to the achievement of performance objectives: tool/need gap, instrument rejected by users, heterogeneous operating modes/expectations...
 - Social risks: the feeling of controlled activity, productivity research, reduction of target staff, etc.
- Detailed preparation of the initial tender book: the risk consists in the fact that, following the submission of bid by the supplier, upon the analysis of variation, various omitted details double the project cost or the solution implementation duration.

7.1.3. GENERAL CONFIGURATION OF AN INTEGRATED SYSTEM

The previous chapters presented various subsystems of an integrated system (CRM, logistics systems, financial accounting systems, GIS), with their components and connections.

The global diagram of an integrated system can be found below. The connections between components are very important because they facilitate unidirectional or bidirectional communication of information between different modules; they were mentioned in the diagram, because, although currently not present, they should be introduced in the current systems.

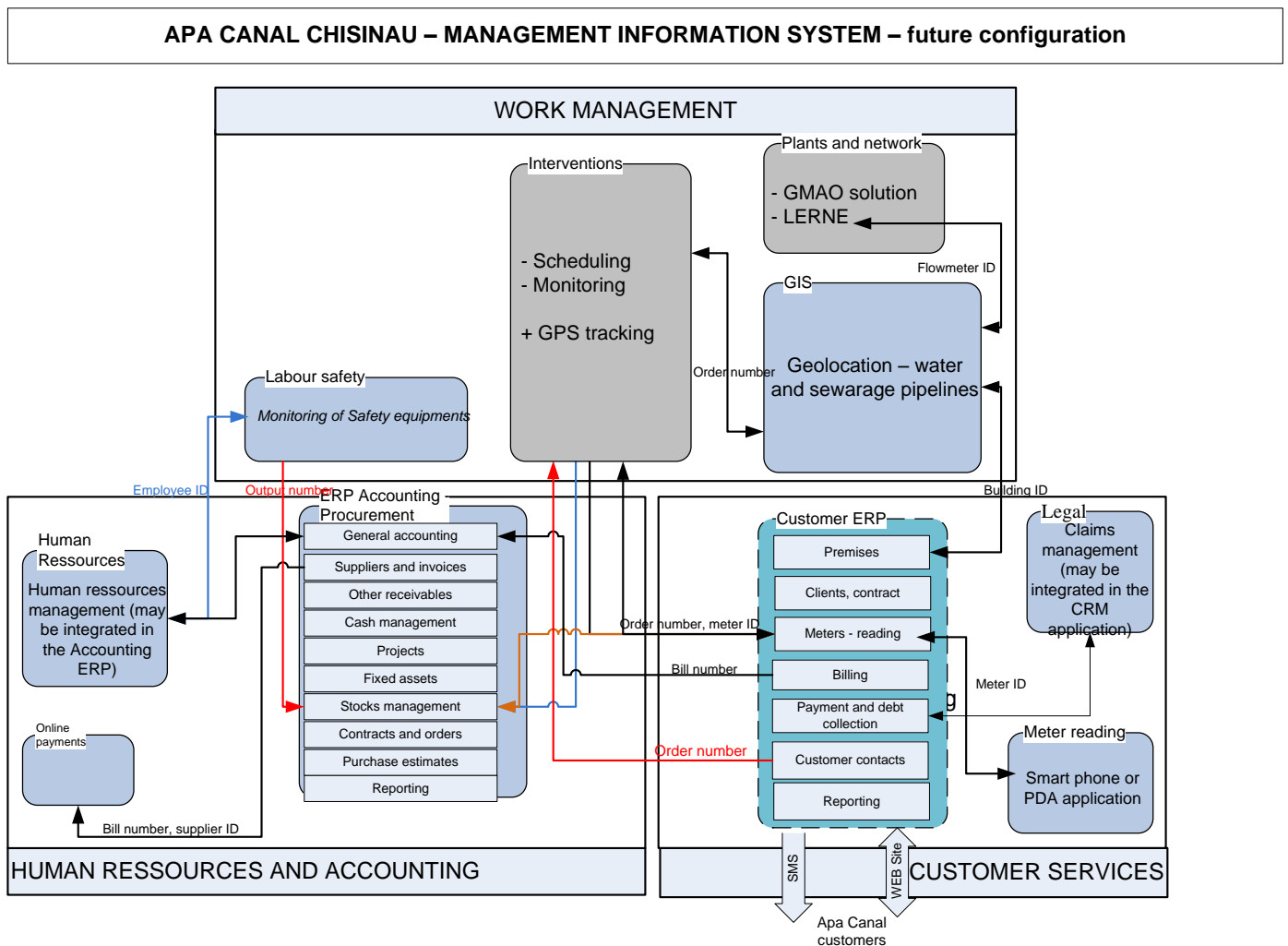


Figure 13: ERP integrated system template

7.1.4. COST ESTIMATION FOR THE IMPLEMENTATION OF AN INTEGRATED SYSTEM

The implementation costs must take into consideration the implementation scope (the whole ERP system, in this case), the number of users and the number of customers or premises which are often used by vendors in order to evaluate the price of the licences.

The implementation costs must also consider the following aspects: implementation of standard features of the system, configurations and specific developments of functions which are not covered by the standard system, the migration of data, the training of the key users and of professional internal IT team.

Hardware infrastructure is also to be considered and it will depend on the specific requirements of the solution to be chosen, as well as the existing infrastructure which may be partially used or upgraded.

Software maintenance is to be paid after the implementation (annual fees).

The estimation below represents a maximum amount which would be budgeted for the implementation of worldwide known ERP solutions. Apa Canal could of course consider other less costly solutions (we estimate, for example, that implementation of Romanian softwares, used by other utility companies in Romania would be at least 50% cheaper). A public procurement procedure would certainly contribute to lowering prices, in a competition environment.

If Apa Canal decides to purchase an ERP solution, we strongly recommend that:

- A detailed tender book should be drafted, containing both business and IT requirements
- The business requirements should be detailed for each process; the further requirements, during implementation, will be considered as change requests by the supplier and will be paid separately.
- Key users from the main business areas should contribute to the drafting of the functional specifications, as future beneficiaries of the system; the tender book should be validated by management
- A tender procedure should be launched after determining the allocated budget and drafting the tender book
- The evaluation of offers should be based not only on price, but also (and mostly) on the software performance and how well the software suits the needs of the company
- The evaluation should not be based on the sole written offers from suppliers; it is advisable to organise individual demonstrations, by each competitor, of the fulfilment of requirements, based on a common test scenario.
- A special attention should be paid to the real nature of the software, as vendors may present accounting softwares as integrated ERPs, although they only perform accounting and finance functions and are not developed to cover also the specific customer management processes in a utility company: contracts,

metering, meter reading, billing (on different types of billing schemes), collection and management of customer contacts.

- The company implementing the software must have specialized consultants, with experience in previous similar implementation of the product
- The company must be able to provide proximity technical support.

ITEM	COST (euros, VAT excluded)
Licences (software, database)	300.000
Implementation	800.000
Hardware	200.000
TOTAL amount of investment	1.300.000
Maintenance (annual)	60.000

Table 16: Estimated costs of ERP implementation

7.1.5. ACTION PLAN - PRELIMINARY ACTIONS PREPARING THE IMPLEMENTATION OF AN ERP SYSTEM

In the previous chapters of the report, we have mentioned that several actions are necessary in order to prepare the passage to an integrated ERP system.

The table below presents in a centralized form the types of preliminary actions to be performed, in terms of data preparation and organisational measures.

PROCESS	DOMAIN	ACTION
Customer services	Data preparation	Check if customer information is complete
		Check if meter information is accurate
		Review reading routes
		Define a new list of customer demands
	Organisation	Prepare a process-oriented organisation
		Define specific tasks for each service (meter reading, billing, payments and debt collection, customer service)
		Define allocation of personnel for each service
		Define kpi for each service / process
		Train customer service personnel to respond to any demand
Logistics	Data preparation	Creation of project team for codification
		Identify the types of acquisitions
		Identify technical characteristics and create codes
		Apply FIFO principle

		Create a dictionary for existing codes and new codes
		Create procurement request tickets and order tickets
		Define minimum stock and alert levels
	Organisation	Reduce the number of warehouses and attach them to the Purchase Department
		Clean the sub-warehouses, by disposal of used parts, redirecting materials
		Organise transport service between warehouses
Accounting	Data preparation	Train warehouse clerk for editing transactions in the system
		Adjust the chart of accounts by creating 2nd and 3rd degree analytical accounts
		Create analytics for external suppliers
	Introduce payment delay when registering bills from suppliers	
	Create Excel reports	
Organisation	Organize training sessions for accountants to develop operation knowledge	
GIS interface	Data preparation	Create building ID (if not existing) to link customers in the CRM to connections in GIS
		Link customers to the building ID
	Organisation	Create GIS update teams
		Formalise procedure for GIS updating (field information must be communicated to the team in charge of updating the system)

Table 17: Action plan

7.2. INTERNAL DEVELOPMENTS

In case ACC does not purchase an integrated system, there is the possibility of continuing internal development. To avoid some drawbacks of the existing systems, a series of recommendations are made on the development priority axes and the management of related internal projects.

7.2.1. DEVELOPMENT AXES

- Transition of financial and accounting management systems to Oracle and interfacing with the commercial system

The current working method in the financial department is hampered by the lack of an appropriate tool and the lack of automated interfaces with the systems providing input data.

The transition of the current system to Oracle and the automatic interfacing with systems providing input data (e.g. commercial system) solve these problems, provided that the project implies also the development of components useful for the financial and accounting management which currently do not exist.

- Development of additional components regarding logistics management

Chapter 4.2 contains detailed recommendations regarding the development of the system used for the monitoring of stocks and procurement contracts.

- The creation of a single system for the registration and monitoring of customer requests and its integration in the commercial system

More details can be found in Chapter 3.2.6.

- Completing the ongoing project regarding the reading using mobile phones and interfacing with the commercial system

See the recommendations in Chapter 3.2.4.

- GIS interfacing with the other applications and development of additional web applications

See the recommendations in Chapters 6.2 and 6.3.

7.2.2. RECOMMENDATIONS ON THE MANAGEMENT OF INTERNAL PROJECTS

- The project must focus on the process instead of organisational structures

In order to be effective, a computer application must manage a process on the whole and communicate with other systems / modules of the same system dealing with downstream and upstream processes.

If the applications are developed only for use in a particular department, there are at least three major risks:

- They will not ensure visibility on the process as a whole, when the process involves several entities; therefore, the process will not be monitored and there will be only a record of the actions taken by a department
- The same information will be entered in multiple applications
- The increase of the interfacing effort of various applications, compared to the initial effort to design a single application to manage the process as a whole.

The implementation of this recommendation would be easier if the ACC organizational structure would be process-oriented. This is not always the case and a proof is the structure of the Customer Relationship Department: there are no separate services with the responsibility of a single process, such as reading meters, invoicing, collection and debt recovery, handling customer requests. The diagram of the integrated customer relationship management system presented in Chapter 3.2.7 can also be an organisational diagram of this department.

- Clearly determine the project objectives and responsibilities

It is recommended that the launch of the project be formalized by a document signed by a top management person (who is also the project sponsor) mentioning: the project objectives, the main features of the application, the services / departments to use the

application, the persons who will participate in the project (project team), the project coordinator on behalf of the users and the project coordinator on behalf of the Computerization Department.

It is important to identify and co-opt in the project also persons who will not use the application directly, but who use other system components or other applications that will be interfaced with the application subject to the project.

- Deliverables and acceptance

The end of each project stage should be marked by a deliverable: documents defining specifications, development technical documentation, test scenarios and test results, commissioning plan, end-user training plan and acceptance minutes.

Below there is a diagram of the main stages of an IT project, specifying the deliverables for each phase.

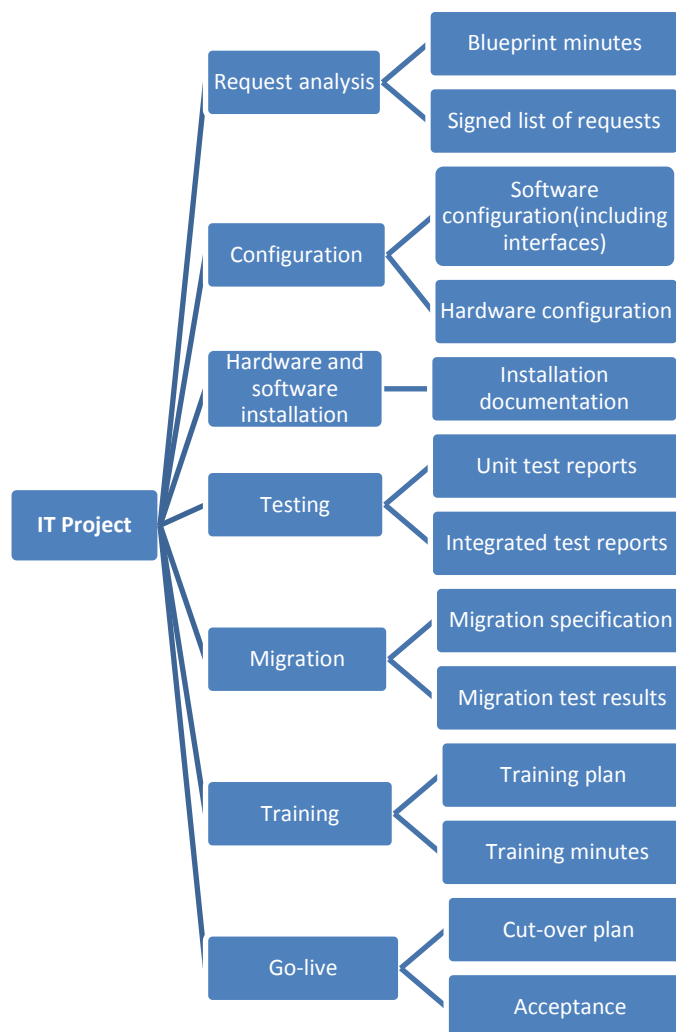


Figure 14: IT project – stages and deliverables