

The Strategies of Land Information Management System

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Key words: Cadastre, Digital Cadastre, GSDI, Land Management, Security of Land Tenure, Access to Land.

SUMMARY

Egyptian Survey Authority, ESA, is the authority which responsible to establish and maintain the Egyptian cadastre. It was for almost 100 years working as State authority, where its most demands were completely settled by the State. On the 1st of July 2001 ESA gained a sort of autonomy as an executive authority in the public sector and became a self financed organization/no profits, but the demands remained as they were. ESA started to look for its opportunists to increase its revenues. Based on the statistics done at that time ESA found that the main two revenue sources are, first, the Real State Transactions Requests "RETR", second, the Egyptian Information Society "EIS" needs, which is the cadastral digital data. At that time ESA was not able to fulfill the Egyptian Information Society "EIS" needs although it has a digital and analogue cadastral data, but it covers only 75 % of the rural area and in analogue form. Most of the urban areas were either had old maps or no maps at all, and those data were in different formats. Also ESA found that, not all RETR are paid, and even those requests which paid for are not completed, after investigation ESA found that the lack of completing all paid requests is due to the complicated procedures and unrealistic strategies.

ESA found that, the only way to stand is to modify its strategies to cope with the new situation, by creating a new market policies and using the information technology tools (ITT).

In the frame of international technical cooperation ESA used a proper System Development Methodology and succeeded to implement a land information management system "LIMS" based on the new strategies and policies. The complicated procedures and unrealistic regulations strategies have been identified as some of it are related to ESA which is about to be solved, and some other is related to Real Estate Publicity Department "REPD" which is partially solved and very soon it will be solved completely. This in turn will accelerate and improve ESA RETR services, increase ESA revenues and improve the relation between ESA and its customers.

These strategies have produced also some other good impacts, such as the data base of the new system that is designed to enable implementation of the National Geospatial Data Infrastructure "NGSDI", which in turn will improve the security of land tenure and affect positively the land information management system in Egypt, through including not only cadastral data, but also will contain a Geodetic and Topographic data.

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1. INTRODUCTION

The Egyptian Survey Authority “ESA” is the Egyptian organization which According to the Egyptian constitution is responsible to produce, maintain and distribute current and accurate geographic data (cadastre, topographic and geodetic), that describing the Egyptian landmass, the cultural features thereon and its ownership. And provide this Data to the governmental authorities and private sector end-users. Here are some of the main demands (functions) of ESA,

- Produce, maintain and distribute the National atlas, small, medium and large- scale base maps depicting the Egyptian landmass and the cultural features thereon.
- Produce, maintain and distribute the National Cartographic data base in support of the development of geographic information systems by the Governmental agencies.
- Produce, Maintain and distribute the cadastral maps and survey books which describing the ownership of the agricultural and urban lands in support the program of National land registration.

2. CADASTRAL HISTORY IN EGYPT

Cadastre is a record of position, form, area, and culture, manner of exploitation and owner of each individual parcel. It is used for technical, economic and statistical purposes and for creation of land registers, as well as the basis for the land taxation. In order for the land cadastre to serve its purpose, it must be continually kept in accordance with the actual situation and renewed as necessary.

In Egypt, according to Egyptian laws, only one organization is responsible to do cadastral surveying, ownership investigations, and all other cadastral activities, except one activity that is legalization the land rights, which is the responsibility of "REPD" under ministry of justice.

Egypt has almost 52510 sq km suitable/ used land consisting of about 10502 sq km for cities and towns, and 42008 sq km as agricultural (irrigated) land including the built up areas and newly developed areas outside the present limits beside the desert areas. About 80 % of the rural area, have been surveyed, without considering towns and built up areas

The cadastral system in Egypt is separating between rural and urban cadastral systems. The urban cadastral system just started few months ago, although many studies to start it have been done and a lot of resources were available in ESA, but because of Egyptian government stresses to finish first the rural cadastral it is not started earlier.

The RETR is one of the main surveying services in Egypt. It is carried out by legal and engineering survey procedures. Before 1947 registration process with its two parts (Legal + Technical/engineering survey) was one of the responsibilities of (ESA). After 1947 Notaries

and REPD was found as a part of ministry of justice to be responsible for the legal part of the registration. ESA became responsible only for engineering survey procedures. ESA with its provincial and local (district) bureau which are geographically spread across the country, is co-operating with the Real Estate Institutions, to handle the registration process, each in its corresponding region. General public, organizations and ministries are demanding numerous numbers of requests concerning real estate transactions.

For all of that, The Cadastral system had passed many developing/ progress steps, as it is explained shortly in next points: -

- In the period 1896 – 1907, for the taxation purpose, there was a trial to survey the whole aggregated lands in Egypt (about 5.2 Mill. Feddans – 1 Feddan = 4200 sq m) at that time, maps of scale 1:2500 and survey register were produced. But these maps were not considered as a base for legal Cadastre and over the next 25 years, no updating was done for them.
- In 1927 there was a proposal, as a base for setting up the real registries, to start re-surveying the agricultural land – considering Updating of cadastral data - in an estimated time of 15 years. In fact the work is not finalized up till now (only about 80 % of rural area as mentioned), ESA, as the body in charge of registration property, whether Real Estate or Land. And at that time, the registration was carried out in the form of undertaking legal and engineering survey (technical) procedures. A law came into force as of 1/1/1947, to start the legal Cadastre that based on deed registration, in the beginning, which was changed in 1964 to Title Registration.
- In 1/1/1947, through the promulgation of that law, the real estate registration authority became responsible for the legal part of the registration of documents, which concerns the Terrier (Tax File Name) and property, i.e. Ownership, whereby ESA became responsible for the cadastral data.
- Since the year 1947 - up to present - , work is carried out in an atmosphere of co-operation and understanding between the Institutions of the ESA and REPD, winding up processes and tasks concerned with document registration.
- In 1964, the Egyptian government decide to apply Title registration system instead of Dead registration, ESA started performing the new Cadastre with its engineering aspect as well as legal aspects to investigate the legal ownership of the related parcels.
- Starting from 1980, there is an extremely significant effort in ESA to establish the new Cadastre by applying new technology for surveying and mapping and also for registration. This effort represents in two projects in the lower and upper Egypt. It is obvious that a strong push to the digital map production and the creation of the surveying book and related records are going on through the indicated projects.

3. DEVELOPMENT OF ESA

- In 1980, ESA felt that there are many challenges to meet the demands and user requirements; these challenges are the result of more than 40 years of neglect and careless of managing and updating the geographic data. After 5 years ESA start asking the International Technical help (donors), In 1990 ESA received grants from USAID and GTZ. Through the two projects (USAID>Z Projects), ESA began a plan of technical modernization intended to revitalize the production elements.
- One of the main activities of the projects was a comprehensive blue print for the modernization, which is the Strategic Plan of ESA.
- In 1990, ESA gained a grant from ITC, the Netherlands, and developing a modern training project (TMS/ESA), the project hold an ambitious training program for the

development of managers and supervisors of the cadastral department at ESA, The project aims at providing institutional support and at strengthens technical management at ESA. The project is implemented through a comprehensive set of training courses.

- When ESA started achieving the strategic plan, it found that the challenges are greater than it was imagined, and asked again for international help, especially in the field of cadastre, in 1995, the governments of Egypt and Finland have explored possibilities to cooperate in the modernization of cadastral operations in Egypt.
- On 1st of July 2001, ESA is gained a kind of autonomy as an executive authority in the public sector, so, it must be a cost recovery/no profits organization, and will operate as an independent organization, but the demands still as it is, So, ESA should be organized as a large private enterprise, using the instruments of marketing and financial accounting, workflow management, quality control and activity based costing that are the appropriate management tools could support ESA to be cost recovery organization.
- In February 2002, based on the agreement between Egypt and Finland, the project called Cadastral Information Management (ECIM) started. It is planned to last for three years. And extended later for another one and half year, after its results had been reviewed and accepted by Egyptian and Finnish sides.
- ECIM is being carried out with ESA as the partner agency. Its overall objectives are better security in land ownership and transaction and a more sustainable management of the nation's land resources. The project purpose is improvement of land information system for cadastral services and its link to land registration and land taxation.
- The project consulted by SWEDESURVEY, many thanks to the consultant who worked side by side with ESA staff and developed the first Land Information System "LIS" in ESA.
- To achieve these objectives, ECIM had to follow a systematic system development methodology

4. METHODOLOGY

Based on the overall objective and the purpose of the cooperation the ECIM and SWEDESURVEY staff had been identify the following questions, that when it is answered, the objective and purpose of the project will be achieved.

- Is the System just to Improve ESA's Services?
- Or just for Automization and Conversion?
- Or just to link Spatial and Non-Spatial Data?

Or for all, beside the following

- Processes & Activities Follow up and Monitoring
- Product Diversity, that could increase ESA's revenues
- Core of ESA Information System
- Core of any GIS Application
- Core of Egyptian Geo Spatial Data Infrastructure "EGSDI", for example National Real Estate Information System.
- Improve Data Accessibility and Data sharing
- Improve Updating Procedures through "RETR"
- Steering Staff

- The answers of these questions comes were yes for all, based on that the expected outputs from the project were
 - A system for data conversion (from different formats to unified format)
 - Monitoring system for land registration processes.
 - Automation, as much as possible, of office works in the cadastral sector with focus on land registration processes.
 - Building capacity of ESA personnel in the cadastral sector.
- In order to achieve those outputs, the ECIM and SWEDESURVEY staff had been worked together and together for almost two years, in the light of the system development methodology and the current situation of ESA, find out all needed analyses, processes, processes reengineering and enhancements....etc, end with the documents that could be used in system explanation and implementation.
- The system development methodology used contained 5 main phases, fig 1.

1. Objectives Study

The aims of this phase are

- Describe and establish problems and demands which motivate system changes
- State revenues and utility effects which may be realized through system changes
- State restrictions and risks which have to be considered

The result of this phase is consists of the Problem and Objective description, which is the basis for designing new routines and system functions during the next phase.

2. Demand Study

The aims of this phase are

- In the light of objectives and demands described in the Objective Study, design and describe in detail the user functions of the planned system as well as other demands on the system
- Choose technique and equipment , and roughly design an EDP solution
- Describe business changes and other consequences of the planned system.

The results of this phase consist of the demand description which is a compilation of "external demands, and basis for the choice of solution as well as for construction of the system.

3. System Study

The aims of this phase are

- Describe the logical system structure along with processing and data storage
- Construct the system and dimension the equipment
- Organize the operation and maintenance of the system
- Plan the implementation of the system

The result of this phase is a document that consists of system Description which service as a basis for constructing and installing the system

4. System Construction

The aims of this phase are

- Construct the EDP system in detail, programming and program test Create a database for the data storage of the system
- Produce material for information and education as well as educating staff involved
- Detailed planning of reorganization and implementation
- Perform a system test and test of acceptance

The results of that phase are a system which is fully completed and documented in preparation for the

5. System Implementation

The aims of this phase are

- Phase out the old system and transfer its stored information to the new system.
- Start up and "trim" the system.
- Hand over the system to the users, the computer centre and system maintenance.

The result of this phase is a well functioning system, the fact that the users, the computer central and those responsible for system maintenance have taken over the system, as well as the completion of the project.

Through applying this system development methodology, some issues have been studied, here there are some of those issues.

1. Land administration, management laws.
2. Title registration law
3. Urban registration related laws
4. Current data-sharing situation (Volume- regularity- types- specifications).
5. Land Market.
6. New methods to improve ESA performance.
7. The Way(s) to increase Participation/willing of the users in the Project.
8. New Technology to improve ESA IT infrastructure and to improve data sharing (Meta data, clearinghouses,
9. Increasing data accessibility, on-line services....etc.).
10. Introduce new departments in ESA organization structure.
11. Training needs.
12. Cost-Benefits impacts.
13. New approaches/concepts to start urban cadastre.

System Development Methodology

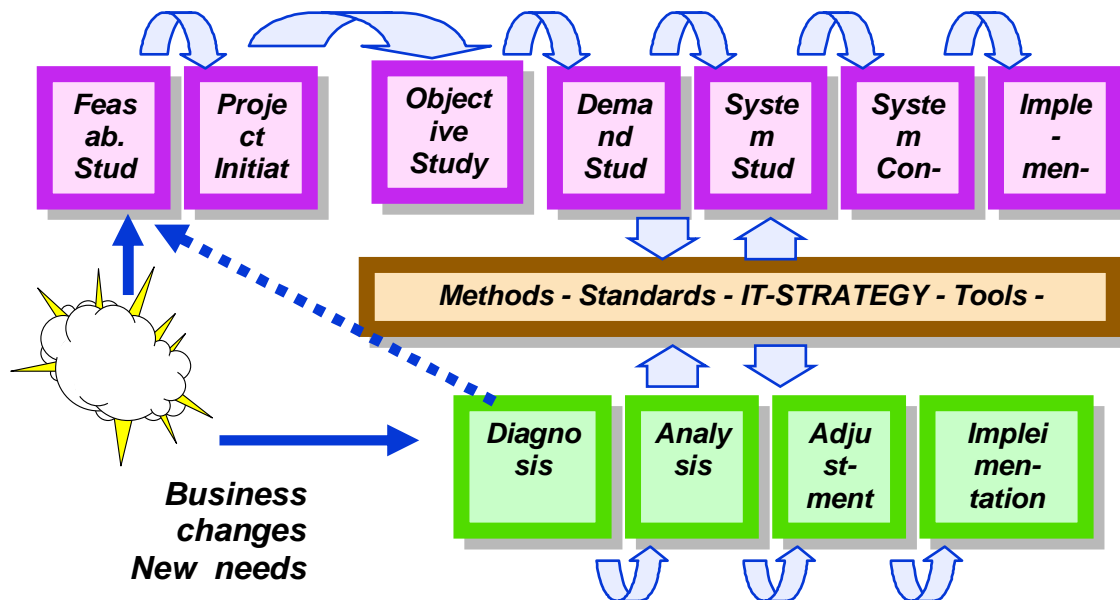


Fig.1 (ECIM objective study done by ECIM & Swede survey)

5. THE RESULTS OF SYSTEM DEVELOPMENT METHODOLOGY

- The objective study showed the current situation that related to IT infrastructure, data, and its related ESA workflows. Fig.2 shows also the current problem analysis, and how it could be solved. Table 1
- The objective study suggest also the solution of IT infrastructure for ESA, Fig.3
- The system study end with a suitable system arc texture that has been selected from different alternative Fig 4 shows this arc texture.
- The system study shows also, the internal and external Bottlenecks, which hinder the efforts of ESA to improve the processing of RETR. table.2
- The demand study produced the Technical Demand Specification, which contains the process description and its enhanced workflows, to be mechanized by the new system.
- The demand study assist to select the suitable Hard and Soft ware that shown in Fig.4, for the new system.
- The system study, formulates the ECIM current data and information structure, for establishment of the system, and how to unify it in one unified and integrated database.Fig.5

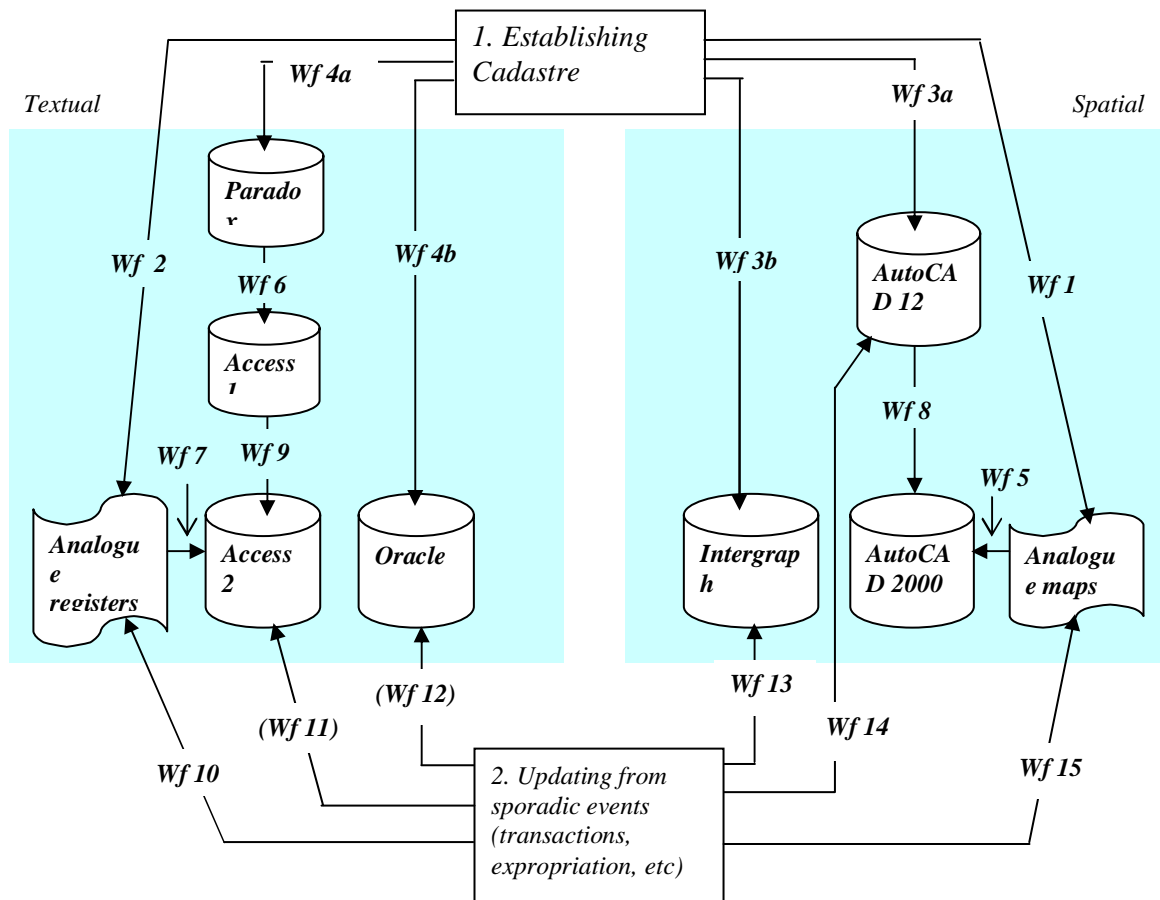


Fig.2

Problems	Reasons	Measures	Benefits
Ineffective cadastral information system	Complicated procedures and little use of IT. No clear and up-dated instructions.	IT environment and more efficient procedures. Produce clear instructions.	Effectiveness of cadastral work.
Different methods for establishing the cadastre and handling updating	Separate development projects with foreign support, lack of coordination by ESA.	Develop one unified system, taking the previous experiences into account.	One unified system is less costly to maintain than many different ones.
Important documents sometimes get lost or are duplicated, resulting in unclear information.	Insufficient facilities and rules for archiving original documents.	Introduce digital environment with sufficient security measures.	More efficient work in ESA and better working environment.
Monitoring of cadastral matters is difficult within ESA	Information is redundant and distributed in different offices	Digital environment. Organizational restructuring.	More efficient work. Facilitating management of ESA.

Table 1

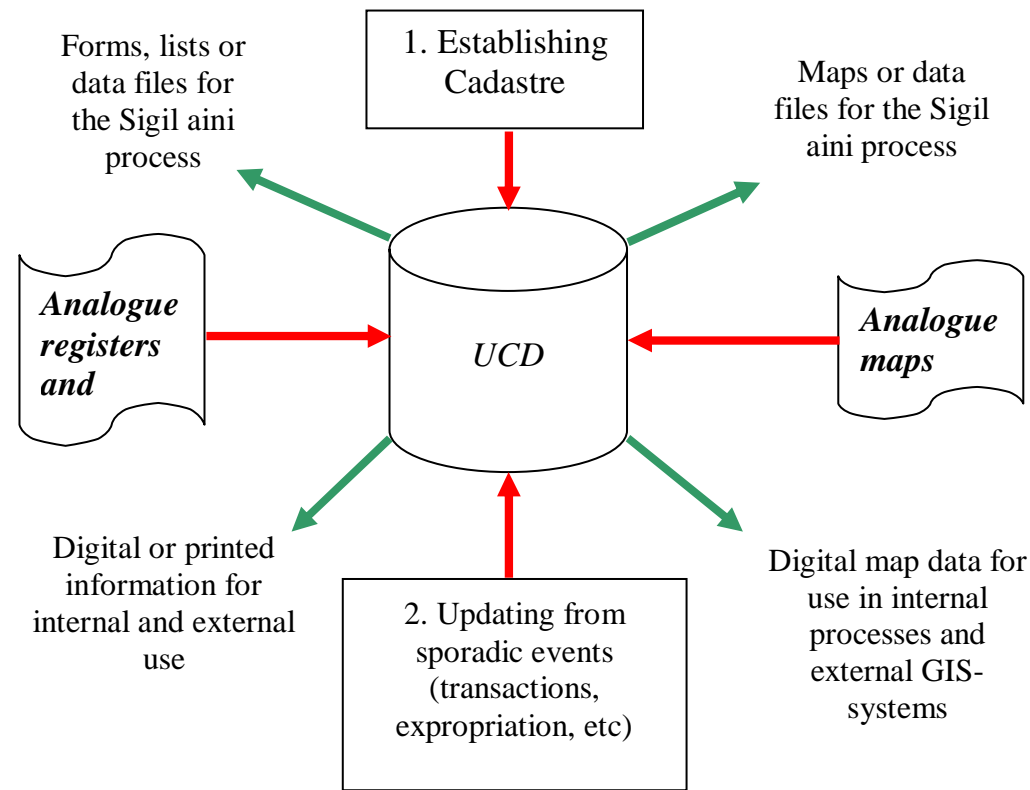


Fig.3

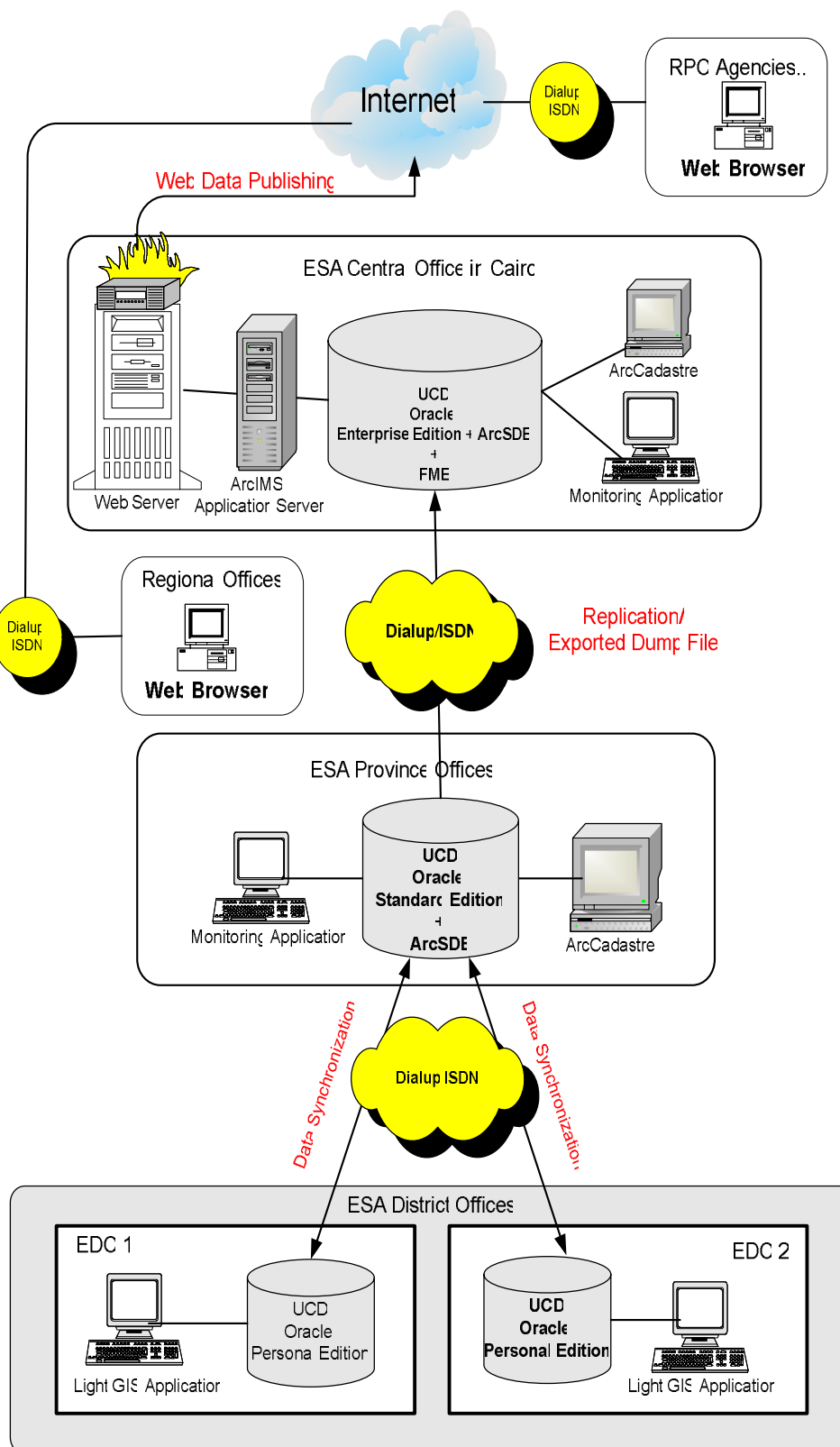


Fig.4

External Bottlenecks	Concerning receiving the request	<ul style="list-style-type: none"> • Missing or insufficient cadastral data in the received requests. • Accepting requests on temporary parcels. • Multiple parcels/ Multiple transactions within on request
	Concerning Cadastral Identification Form CIF, verification	<ul style="list-style-type: none"> • Missing mutually (ESA-REPD) agreed CIF design / content
	Concerning receiving the legalization information	<ul style="list-style-type: none"> • ESA is not informed concerning rejected requests. • Registration information isn't sent frequently basis
Internal Bottlenecks	Organizational structure	<ul style="list-style-type: none"> • Most of the workload is done in EDO. • Duplication in the job description • Difficulties to track the request between EPO and EDO.
	Working Instructions	<ul style="list-style-type: none"> • Missing instruction manuals • Unstable and unclear cost estimation procedures.
	Cadastral procedures	<ul style="list-style-type: none"> • violating Law by not creating 2 mutation forms in case of subdivision • updating all field surveys on the mutation forms • distributed surveying activities • information presented in CIF is only descriptive • Cadastral certificate is missing property layout.

Table 2 ESA Business Bottlenecks

ECIM data and information structure for establishment of the system

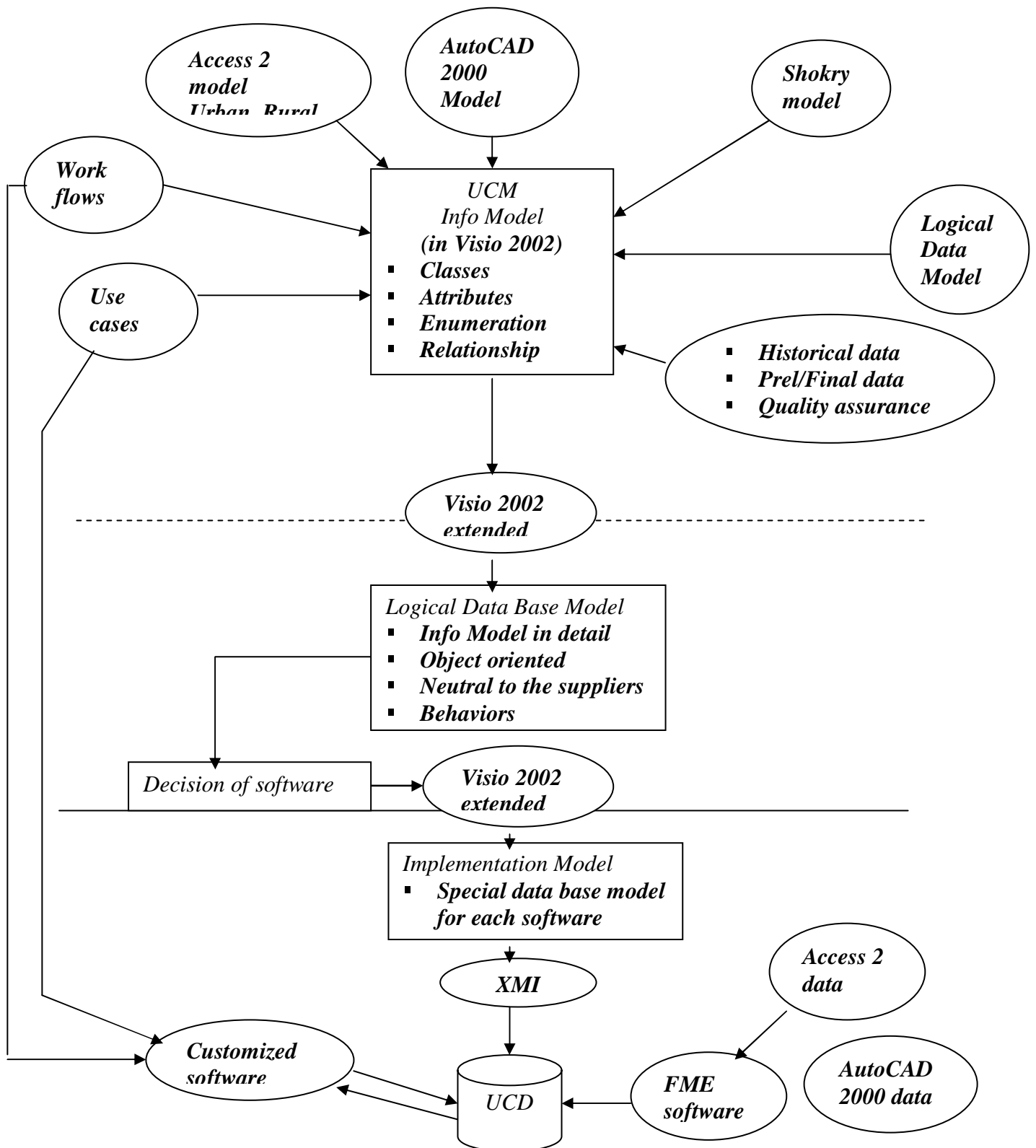


Fig.5

6. THE STRATEGIES OF LAND INFORMATION MANAGEMENT SYSTEM

- There is no doubt that there are no correct decisions without complete, reliable, correct, and up to date information. Which when attached with risk analysis, cost benefits analysis, market studies, and the politician issues, could assist the decision maker to easily to create and formulate the perfect strategies that cope with this kind of radical changes.
 - All these results mentioned above had been subject by subject submitted to ESA Head Quarters "EHQ", and have been discussed in details from different perspectives, and EHQ had been submitted to the politician levels.
 - As a result of all these efforts supported EHQ to create the new strategies and realistic procedures, regulations and instructions. As follows
1. **The overall strategy of ESA's Cadastral Department "ESACD" is to secure the land tenure and facilitate the ownership transformation requests from the Real Estate Publicity Department (REPD, the authority under the Ministry of Justice responsible for real estate registration).**
 - The analysis show that the RETR processes (one of the main ESA revenues) are very time consuming that because, not only, it is done in many several offices (some in the province offices and some other in the district offices), and wiped many activities, but also, the regulations and procedures are very complicated and sometimes are against each other. That was enough reasons to understand why the use cases done show that the un formal deeds are almost covering about 75 % of the agriculture. So, ESA to be able to secure the land tenure, had to reduce complicity of regulations and instructions, and enhance the procedures, and inform the REPD about these results, and discuss with it, the impacts of these changes on its regulations and instructions, in order to increase the willing of the publics to register their un formal deeds.
 2. **In Egypt, land tenure covers all real estate including land, and constructions above/under the land.**
 3. **Information and data about land shall contain all needed data to serve these strategies.**
 - After the land market and user needs have been searched, ESA found that, it has a lot of data categories, but in analogue formats, and also the market not only needs the basic cadastral data, but also, some topographic data. So, ESA decide not only accelerate data conversion, but also, to facilitate the connection between the new cadastral system and its topographic and geodetic databases.
 4. **The establishment of data and information about the land is regarded as national infrastructure, which should be subsidized by the State, but the updating and maintenance of these data and information is the**

responsibility of ESACD, through the cadastral daily services, and the updating and maintenance is a cost recovery, not a profit activity.

5. Land information management system is based on cadastral principles (land parcel, its unique identifier and its unambiguous location). This will minimize the duplication of efforts among different partners.

- As mentioned before, some of the EIS members has started since about 20 years, build up their own GIS applications, some of them resurvey its basic data, some other, scanned the ESA's cadastral data and add to it its own basic data, the results of some cases were not sufficient. Now ESA is able to provide the EIS exactly its needs of basic cadastral data in the needed digital format, that could avoid some other members to redo collection / or digitizing of these basic data. Also that will increase ESA revenues by selling these data.

6. Land information management system will enable one-window services to facilitate the daily cadastral services and access to land related data.

- In order to facilitate the publics end user services, instead of asking many offices and employees, ESA will implement a special new unit "customer front door unit" that could answer the most common questions about RETR, and achieve some easy activities related to it. That will make the services more quick and much easier, in turn, ESA revenues will be increased, and the willing of the users to register their land will be increased.

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