IDENTIFYING DEVELOPMENT PRIORITIES TO ENSURE EFFECTIVE IMPLEMENTATION OF GIS IN URBAN UPGRADING UNITS, CAIRO GOVERNORATE – A PARTICIPATORY APPROACH

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ABSTRACT

The research involves identifying the agents of change and contributors that enable upgrading the role of GIS in Cairo governorate Urban Upgrading Units (UUUs).

This leads to better geographic information recordkeeping, improved communication, better decision making, better knowledge sharing and cost saving resulting from greater efficiency.

A participatory approach was followed throughout the study in gathering the information as well as discussing the resolutions of issues and obstacles faced by the UUUs.

The first stage of the study is concerned with identifying the agents of change and contributors that will help in the process of bridging the gap between the current status of the UUUs and reaching the objectives.

The second is concerned with identifying priorities of application according to the rapid influence on improving the system, in addition to the analysis of these priorities and identifying the cofactors (agents of change), obstacles and contributors based on participatory approach involving the UUU staff, GIZ GIS representative and researchers.

KEY WORDS: Urban Upgrading Unit - Geographic Information Systems – Participatory Planning.

1- INTRODUCTION

Following the country's efforts to develop the informal settlements and building the capacities of the UUUs of the Greater Cairo region - specifically Cairo governorate UUUs[1]- this research was done through a participatory methodology to explore the elements of bridging the gap that enables an effective performance of GIS in Cairo governorate UUUs.

This is done through the determination of the current role of GIS in the UUUs as an effective tool to reach solid results that can be disseminated in order to improve the decision making process of the informal settlements development.

Hence, it became important to hold focus group meetings with the employees of the UUUs so as to stress on the role of GIS within the UUUs. Moreover, it was essential to study the current status of all the components of GIS in the units and hence, ded-ucing the effective role of GIS in them and the reasons behind the failure of applying such a role.

This was done through a participatory metho-dology (workshops and problem tree) with stake-holders in order to determine the agents of change and the development priorities in order to bridge the gap and improve the performance of GIS in the UUUs.

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2- OBJECTIVES

Determining the existing and effective roles of GIS in Cairo governorate Urban Upgrading Units and bridging the gap between them in order to improve the performance of GIS in the UUUs through a participatory approach.

3- METHODOLOGY

The methodology consists of two major stages illustrated in figure 1.
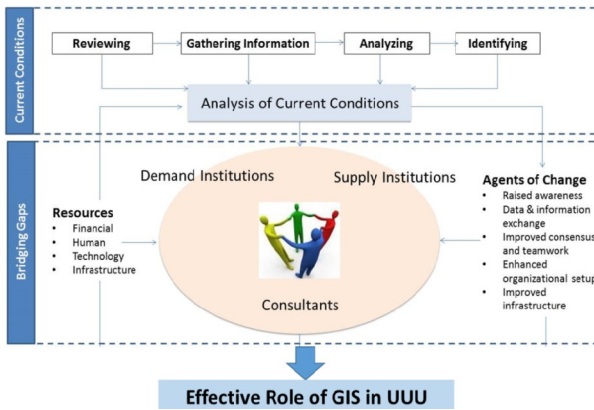

Fig. 1- The Methodology of the research, Source: Researchers

4- FINDINGS
4-1- First, Analysis of Current Conditions:

The current status in terms of the main GIS components is illustrated in Table 1.

Table 1- GIS current conditions

GIS Components	Cairo
Organizational Setup	GIS unit exists affiliating to the executive manager of the governorate UUU and performing relatively limited tasks[2] (refer to fig. 2)
Human Resources	Two GIS specialists in the governorate unit Two GIS trained personnel in Southern Area UUU No GIS trained personnel in the Eastern Area UUU No GIS trained personnel in the districts UUUs
Data	Databases of some urban upgrading areas based on the ikonos sattelite images provided by the GIZ[3]. Databases of other urban upgrading areas based on google sattelite images and data obtained from other governmental institutions and departments in the governorate Databases are verified and updated by field surveys (refer to fig 3).
Hardware and Software	GIZ provides the PCs and software (ArcGIS 9.1)[4], but the GIS specialists use unauthorized updated versions of the software (ArcGIS 10.1) and personal laptops to handle the new technology UUUs don't have plotters
Source: Researchers	

The following figure illustrates the administrative structure in Cairo; the role of GIS is allocated in the core of the UUU.
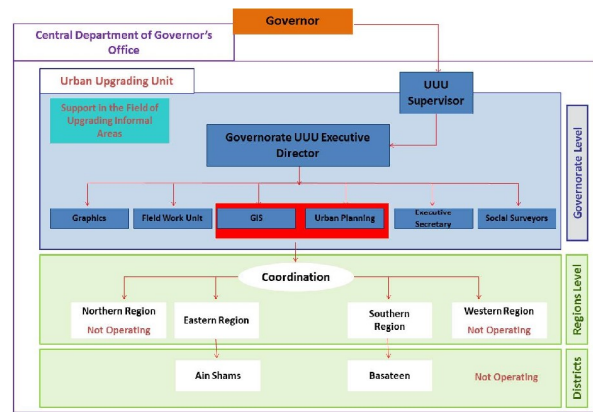

Fig. 2 - Cairo UUUs organizational setup, Source: Researchers

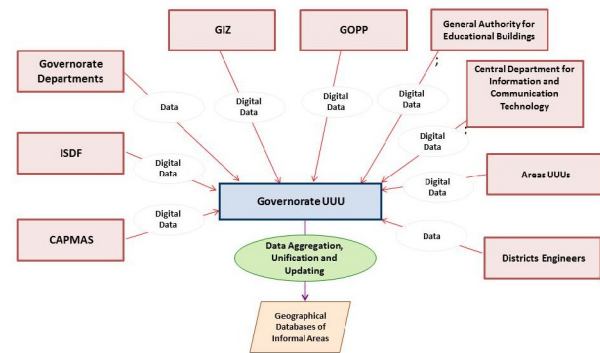A figure 3 illustrates the sources of data used in the GIS process in Cairo governorate UUU where GIS is applied.

Fig. 3 - Cairo UUU sources of data, Source: Researchers

Using interviews, questionnaires and observations on the level of UUU and relevant parties in the governorate, the information gathered regarding the data flow, work flow and organizational setup led to the following:

In Cairo Governorate, any requested task of work is done through various steps, the governor sends the task to the supervisor of the UUU, who forwards the requested tasks to the head of the unit, afterwards, the unit distributes the work according to each specialization, respectively[5].

The GIS specialist collects data from relevant departments by an official request with the help of researchers or field surveys. In addition, the specialist analyzes the work required, see fig.4,5.
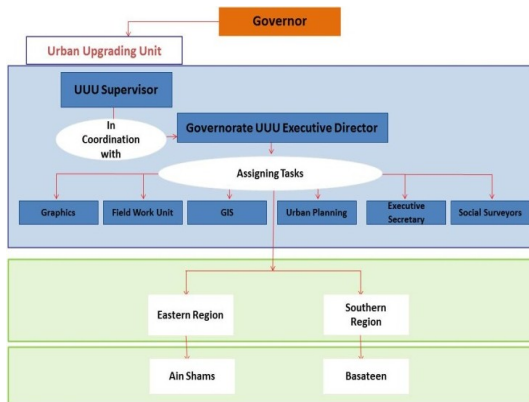
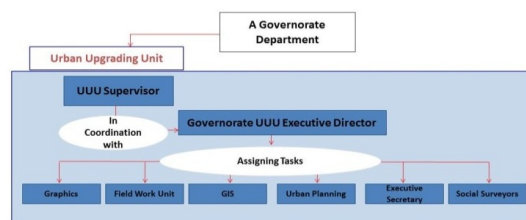**Fig. 4- GIS work flow in Cairo governorate UUU, Source: Researchers**

Fig. 5 - GIS work flow in Cairo governorate UUU (a governorate department request), Source: Researchers

The researchers observed the existing role of GIS, which is allocated in four cycles: Database Design, Data entry and management, Data Analysis and Output, Knowledge Sharing and Training.

Currently in Cairo governorate, the GIS role is limited to being a major or secondary input to some of the urban upgrading process stages[6]. Database design functions have no input in any stage of the urban upgrading process, the Database formation and design functions have some major inputs in the first stages of any upgrading initiative and no input in the other stages of the process.

Database analysis and output functions have no input in any stage of the urban upgrading process, the Database formation and design functions have some major inputs in first stages and no input in the other stages of the process. Information sharing is very limited to the level of other governmental departments and requires paper work and permissions. As deduced, the current GIS role is:

"Database preparation for the urban upgrading areas, performing necessary analysis and output in the form of maps and tables as visual tools for the decision makers"

Using the problem tree analysis and researchers observations, issues and shortcomings are deduced and illustrated in terms of the five main components of GIS (hardware, software, human resources,

organizational setup and data). The issues and obstacles were found as follows:
- Staff Deprived from incentives in the case of working in the UUU only.
- Trained qualifications efflux.
- Inaccuracy in implementation.
- Lack of utilization of the available potentials.
- The unavailability of integrated data.
- Slow procedures of accomplishment.
- Difficulty in the fulfillment of the tasks assigned to the GIS staff.
- Incapability of taking the right decisions.

4-2- Second, Identifying Agents of Change and Contributors (Bridiging Gaps)

Using the objective tree analysis, ways of overcoming issues and shortcomings (agents of change) are suggested in terms of the five main components of GIS (hardware, software, human resources, organizational setup and data). The agents of change were suggested as follows:
-Raising the output accuracy.
-Utilization of the available potentials.
-Facilitating procedures of accomplishment.
-Taking the right decisions.
-The availability of integrated data.
-The fulfillment of the tasks assigned to the GIS staff.
-Identification of job descriptions, working hours and incentives.
-Attraction of Trained Qualifications.

Using the correlation matrix analysis between the GIS functions and urban upgrading phases, the expected role of the GIS in the UUU is identified. In order to achieve the most efficient role of GIS through the whole urban upgrading process, each input is weighted according to its influence in each stage to ensure the integrity of the work flow.

The input of GIS functions is stronger in initial steps to unify data types and integrate the whole developed system. After the upgrading cycle moves towards a new initiative, the GIS will provide the database for the following new cycle. As deduced from the matrix as well as the analysis of the objective trees, the expected GIS role is:

"A tool for the observation, documentation and analysis of the Informal Areas Current Status, Monitoring the Updating, Monitoring the Development Plans and Post implementation evaluation to provide technical support to the decision makers."

The effective implementation of the proposed role of GIS leads to better geographic information recordkeeping, improved communication, better decision making, better knowledge sharing and cost saving resulting from greater efficiency.

Based on a participatory approach involving the UUU staff, GIZ GIS representative and researchers, priorities are identified according to the rapid influence on improving the system. The researchers conducted workshops to meet the stakeholders to prioritize the tasks, which are proposed in order to achieve the most efficient role of GIS in UUUs. The tasks were evaluated in terms of the following criteria

*Responding to stakeholders expectations.

*Available Resources

*Accomplishment Potentials

*Sustainability

*Comparing costs with results

*Time frame

Table 2 shows the scores given by the workshop participants of Cairo governorates. Each participant gave each component a score from 1 to 4. The higher the score, the more important this component is. The scores were summed up for each component according to each criterion.

Table 2- Cairo governorate priorities scores according to workshop participants- Source: Researchers

|		Administrative System Improvement	Hardware and Software	Providing Human Resources	Data & Information Integration
Responding to Stakeholders Expectations	participants	47	35	24	36
	GIS specialists	24	9	15	16
Available Resources	participants	29	40	38	29
	GIS specialists	9	18	20	14
Sustainability	participants	35	37	35	36
	GIS specialists	17	14	16	16
Comparing costs with results	participants	34	33	37	29
	GIS specialists	18	11	17	12
Comparing costs with results	participants	29	36	34	31
	GIS specialists	16	16	16	12
Time Frame	participants	19	42	35	31
	GIS specialists	9	21	15	15
Total score given by participants		193	223	203	192
Total score given by GIS specialists		93	71	79	70
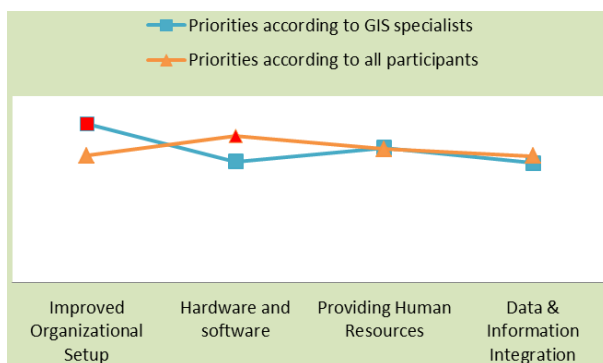
Fig. 6: Cairo governorate priorities according

Analysis of the priorities and identifying the cofactors (agents of change), obstacles and key performance indicators (KPIs) based on participatory approach involving the UUUs staff, GIZ GIS representative and researchers (please refer to Table 3).

5- CONCLUSION AND RECOMMENDATIONS
5-1 Conclusion
*In order to have an effective implementation of

GIS in urban upgrading, effective contribution of the key stakeholders and the activation of the agents of change determined through the study is essential.

*Effective implementation of cofactors (agents of change), overcoming obstacles and reinforcing key performance indicators (KPIs); better geographic information recordkeeping, improved communication, better decision making, better knowledge sharing and cost saving resulting from greater efficiency can be achieved.

5-2 Recommendations
*Reflecting the governorates' needs and priorities in a complete capacity development plan.
*Determination of UUUs needs from: well trained staff, software and hardware in order to reach effective performance from the UUUs.
*Preparation and implementation of an effective training program on the software and hardware that are expected to be needed for the UUUs to perform effectively in the field of GIS.
*Improvement of the organizational setup.

Table 3: Cofactors and limitations of development (agents of change) – Cairo governorate

GIS components	Action	Cofactors	Limiting Factors	Proposed Solutions	Contributors
Organizational setup	Administrative System Improvement	* The existence of an administrative entity in the governorate (UUU) that is capable of continuing efficiently and supportive to the following units. *The country's orientation towards informal areas development	*The unclear vision of the regions and districts UUUs roles. *Separation of the UUU from the administrative structure of the region or district *The overlap between the administrative tasks of the districts and the districts UUUs tasks	*Organize workshops for the districts chiefs and leads to intro-duce the role of the UUUs within the wider framework. *Establish a manual for the job descriptions in the districts UUUs, and revising the role of the main UUU within the frame-work of its current and future roles. *Preparation of the job tasks for the UUUs and the job description of their staff.	*Ministry of Local Development. *The job descriptions and roles of the UUUs and their staff are determined with the cooperation with the main UUU, which takes the governor's approval then addressing the Ministry of local development as shown in the following.
Human resources	Providing Human Resources	•The existence of cooperative qualified staff in the main UUU. •The existence of capacity develop-ment plans for the UUUs	*The unclear roles of the UUUs staff. *The poor distribution of human resources in the different departments. *The lack of incentives.	*Address the districts chiefs about the necessity of the separation between the UUUs job tasks and the tasks of the rest of the Housing departments. *Redistribute the human resources to suit the tasks of each department. *Integrate the UUUs into the administrative structure	*The deputy governor. *The cooperation and coordination between the deputy, the main UUU and the personnel affaires department of the governorate. *The main UUU determines the tasks, takes the governors approval and addresses the Ministry of Local Development as shown in the following
Data	Developing a Framework for Data and Information Exchange	*The existence of governmental initiatives to unify the definitions. *Basic geodatabase base existe-nce in the UUU and the informa-tion center. *Existence of tabular data in the services departments. *Donors interested in informal areas development.	*The lack of a unified satellite image distribu-ted on the different departments and organi-zations. *The lack of a unified database structure to deal with the special data of the informal areas. *Difficulties in data exchanging	*Provide satellite images through the donors or governmental support. *Provide Google Earth Pro license until the purchase of the satellite images. Design of a general and comprehensive geographical database for the UUUs through the coordination between the stakeholders. *Provide financial support through the responsible stakeholders. *Roles distribution *Construct a central database on the national level or the governorate level	*The cabinet provides the satellite images. *Periodical meetings are done by the UUU for the stakeholders as a part of the UUU's coordination role. *ISDF designs the databases of informal areas *The information and decision support center in coordination with the rest of the institutions related to data acquisition perform the construction of databases
Hardware and Software	Providing Hardware and Software	*The government orientation towards informal areas development. *The governorate contract with maintenance companies. *Donor agencies interested in informal areas development.	*The lack of a clause for purchasing hardware and maintenance. *The deficiency in dealing with the constantly developing sophisticated software. *The lack of a designated staff for the development of hardware and software. *The lack of periodical trainings that cope with the rapid development	*Review the annual budget to redistribute the maintenance allocations. *Provide human resources in all disciplines. *Optimize the current human resources. *Train the different disciplines according to their scope of work with the concentration on the management and leadership trainings (on the UUUs level).	*According to the consultants suggestions and the GIZ support and the recommen-dations introduced to the governor, Plan and follow-up department. *The governorate provides the specialized human resources accor-ding to the UUUs needs, they will be trained by the GIZ at the beginn-ing until the UUU deve-lops its own budget and become self-sufficient.

Source: Researchers

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