Web-Based Land Registration Management System: Iraq/Duhok Case Study

Abstract

In this era, technology is playing a central role in many areas of human life, but the classical hardcopy-based approaches are still being used for land registration. The Internet-based methods provide excellent facilities for overcoming the drawbacks of handwritten-based style and communication among different government sectors. Nowadays, Information and Communication Technology (ICT) is used to build professional electronic systems as a big step towards the electronic government (E-government) system. One of the most critical sections of the E-government is the E-Land-Registration (ELR). Duhok Land Directorate, together with its sub-directorates, works on a considerable amount of data to process. These directorates suffer from classical hardcopy-based approaches, so building an ELR system will reduce time consumption and paper waste. The improvement of the land registration system will also allow integration with the E-government system. The progress of the land registration will enable communication between the land registration staff on one side and the administration and financial directorates on the other. In this thesis, an efficient ELR system for Duhok land registration is proposed. The services of the database management system cover the Employee Registration Module, Estates Registration Module, Operation Type Module, Estate Owners Module, Estate Status Module, View Information Module, and Login Employee Module. HTML, CSS, PHP, MySQL, JavaScript, jQuery, Ajax, and Bootstrap tools were used for the design and implementation stages of the proposed ELR.

Keywords: E-government system, land registration, database, communication technology.

I. INTRODUCTION

The Land Administration Domain Model (LADM) can reach the Final Draft International Standard (FDIS): International Organization for Standardization (ISO) FDIS 19152 [1]. We can regard this as the last stage, that precedes the stage of growth as an International Standard (this is predicted in July 2012), coming after a standard development process which is for four years in ISO/TC211 (Geographic Information) and six years later to an arrangement in the commission of International Federation of Surveyors (FIG), but the honest thought of a standard such as this one was opened into 2002 FIG Congress in Washington D.C. [2]. The land title evidence has been registered as indefeasible Ownership. On the other hand, many citizens tend to suffer from fraud. Because of the rising number of fraud and the poorness of the registration system in the country, the current research has the objective of providing a solution to the mentioned issue [3].

Societal drivers, economic condition demolition, equality between the two genders, endemic identification, proper housing, property farming, food safety, global change in climate, and sensible governance have a significant impact on the design of land management style [4]. Likewise, the chances offered by high-tech progress conjointly affect the design methods as well [5]. LADM tries to regulate both; the info model presents a homogenous international terminology for actual estate administration [6]. As the world is customary, it will encourage the event of code applications and quicken the application of land administration systems that assist property aims and goals [7].

The LADM covers essential elements connected to the information of land administration and those about real estate, underwater, under the surface, and on the surface [8]. The quality is an abstract approach with three packages connected to certain parties (whether they are people or organizations); essential body Sub Directorates, rights, liabilities, and limitations (rights of property holding), individual Sub Directorates (parcels, and also the law related area of constructions and profit networks) with a sub-package for the measure, and illustration meaning geometry and topology [9].

Registration and management of land in Bangladesh are regarded as significant obstacles to the growth of the economy [10]. When the current system is burdened with vast paper records, information technologies (I.T.) can significantly ease the inherent delays and difficulties of the system [11].

Lack or shortage of real estate knowledge on customary lands restricts the progress and functioning of land strengthening [12]. The notion of Participatory Land Administration (PLA) progresses in the background of the growth of crowdsourced, volunteered, and participation-based models that provide new visions to neogeography and neo cadastre and fit-for-desire pro-poor land control [13]. In Ghana, the acquisition of real estate is not as smooth and easy as required [14]. It is confronted by many obstacles like unsafe real estate administration and control, poor land planning, and nonobservance in the real estate market, leading to deceit, clash, struggle, annoyance, and worry [15]. Even though there are distant lands in Ghana, there are also more problems in acquiring suitable land unless the proper procedure is adopted [16].

II. Literature Review

Polat and Alkan [17] reported a study that aimed to investigate the research and activities done by both private and public sectors and organizations until 2014. This research estimated Turkey's "Cadastre 2014" performance to identify its status in other states and to sum up the ongoing condition for "Cadastre 2034". The control and method of actions that are not contingent on the records in the cadastral technical assistance and the activities of liability of the responsibilities that are conditional to the files and are held by licensed topographical and cadastral directorates. This will lead to doing these two projects, as instances for both public and private organizations and sectors, work together beneath the authority and administration of the General Directorate of Land Registry and Cadastre (GDLRC) (TKGM in Turkish), 100% success confirmed in the application of principle two of cadastre 2014.

Gyamera et al. [18] addressed the most challenging aspects of acquiring suitable land in Ghana and suggested solving the upcoming conducts. Fairness of real estate, owning the real estate, land right, and the tenure system was explained in Ghana. The many processes in acquiring a parcel of land, right from buying up to title/deed registration, have been clarified. The place of getting land and how to get it without albatross for all kinds of socio-economic progress was also founded. Prefaces to the cadaster system, deed, and title registration were also explained and previewed in Ghana. The land enterprise in Ghana has a significant number of difficulties due to fast and hasty urbanization, big demand-driven inland market, and weak institutional framework.

Asiama et al. [19] produced a study that included gathering land data relating to farms in more than two weeks, employing a cell phone application and an orthophoto founded on PLA. The results showed that though PLA could assist land building, more thorough research is needed to integrate it into the formal land registration system. They suggested that the safety of the mechanisms have to be made small to limit fraud. The checking trail has to be held more and more to check things that are not normal in the systems. Moreover, control of outreach to the system has also to be limited regulated. Specified officers have to be permitted to do specific tasks in the system, and the inclusion of many officers is a brilliant way to avoid insider fraud.

Aydinoglu et al. [20] addressed administrating land information efficiently and regarded it as the main factor in attaining proper land administration that can succeed and sustain the land progress. To administrate land, each government owns a land plan and system of management. A Land Management System (LMS) makes a recognition, recording, and sharing of knowledge and data possible and in line with land plans and plans through efficiently employing technological knowledge. In this regard, LMSs are put to achieve the demands connected to the land, give tenure confirmation, and administer natural resources ascertainably.

Abdullah et al. [21] highlighted the controversy surrounding indivisibility and the notion of federalism in Malaysia's real estate management systems. The electronic real estate systems and fraud avoidance accounts in the country were also analyzed. While other jurisdictions had title assurance funds, it was not available in Malaysia. Thus, he suggested the tightening of security measures to prevent fraud. As we can see in the instanced mentioned above, the cases showing a few scams regarding registration in Malaysia is not outlining any cutback and decline. We can show that there is susceptibility to fraud in the system of Malaysian title registration.

III. THE DESIGN AND STRUCTURE OF THE PROPOSED EMLRS

A. The architecture of the EMLRS

The overall architecture of EMLRS is present in Figure 3.1. The infrastructure of a web application depends on this system for technical implementation. From down-up architecture, three main layers represent this system:

- Presentation layer: This layer consists of many tools, including the following and many others:
  - HTML.
  - JavaScript (includes: Ajax and jQuery).
  - CSS.
  - Bootstrap.

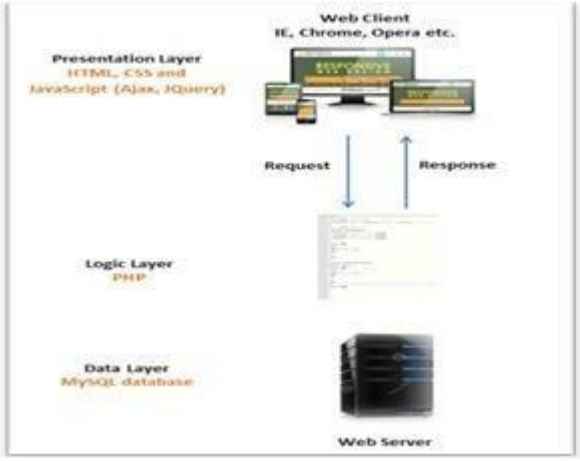


Fig. 1. Architecture of EMLRS

B. *The architecture of the EMLRS*

The proposed Duhok DLR has been designed to provide essential services at Duhok DLR and S.D.s. The proposed Duhok DLR consists of seven modules, Three directorates, and four S.D.s. The S.D.s are Akre, Barderash, Texan, and Umedeaya. University admin authorizes all Institutions admins that approve all Sub Directorates s admins to belong to their institutions. Also, Directorate's admin has the full authorization of all system modules. While the Sub Directorates admin has the authority of all Sub Directorates belong to his institution. Finally, the Sub Directorates admin has the power of just his Sub Directorates. Each module is designed to meet employee's requirements at Duhok DLR used friendly using: add, view, edit, delete, and print. The admins and designed modules are:

1. Employee Registration Module (ERM).
2. Estates Registration Module (EsRM).
3. Operation Type Module (OTM).
4. Estate Owners Module (EsOM).
5. Estate Status Module (ESM).
6. View Information Module (VIM).
7. Login Employee Module (LEM).

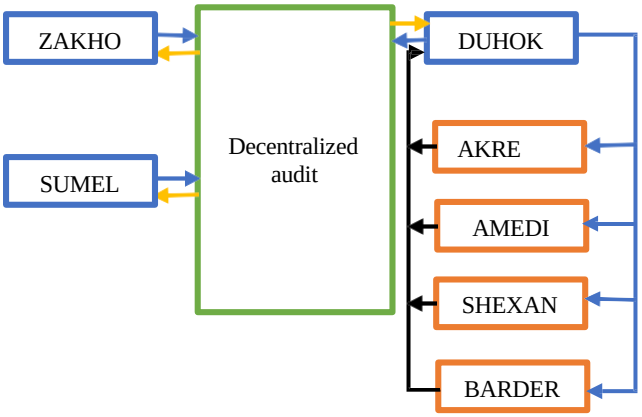


Fig. 2. Structure of modules connections for the proposed Duhok DLR.

1. *Operation Type Module (OTM)*

OTM module is affected by the EsOM module. This module keeps track of any acknowledgment about owners. There are two types of operation: change owner, do not change owners. The first one has no effects on the land but the owner. The sanctions have some impact on the acknowledgments in the reverse direction. They were adding all owners that have changed their shares within the same period. This module is designed to accept inserting the admissions and sanctions for each operation of Duhok DLR. Dataflow is shown in Fig. 3.

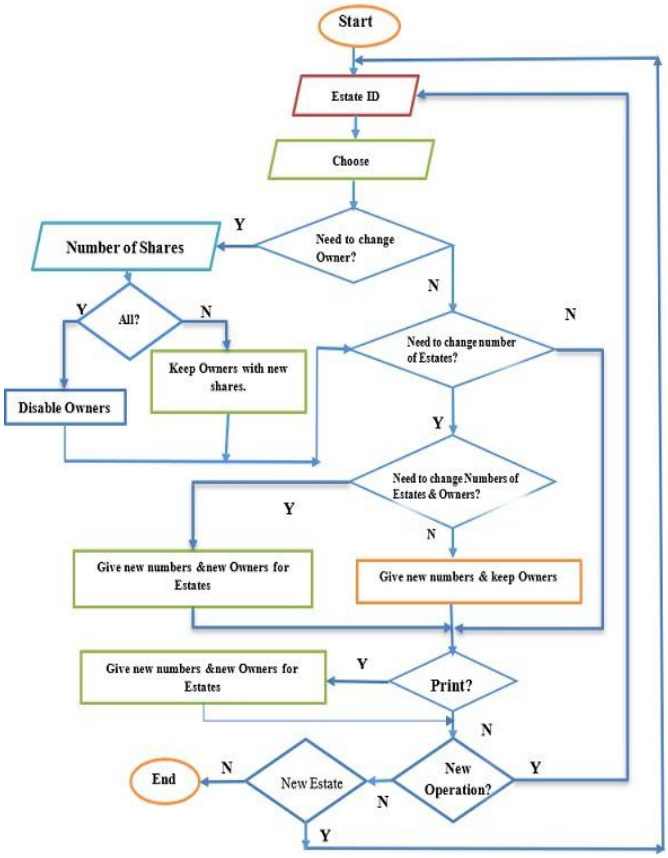


Fig. 3. Data flow diagram of the operation type module

2. *Estate Owners Module (EsOM)*

One of the essential primary points of the Directorate of Real Estate Registrations is to document the owner's properties. Whether the property belongs to one person, group of persons, state, companies, and government or non-government organization. The change includes the property owners and the ratio of the owner's shares. Fig. 4. illustrates the data flow of EsOM.

3. *Estate Owners Module (EsOM)*

The real estate modifications do not occur unless the real estate is free of obstacles such as mortgage and reservation. The operations of the contraindications are subject to a mortgage, lifting or reservation and raising them is very important, special procedures shall be applied by the Duhok DLR or its S.D. branches because it affects the rights of the dependents or the

detainees, any change needs special approvals. Fig. 5. shows the data flow diagram of this module.

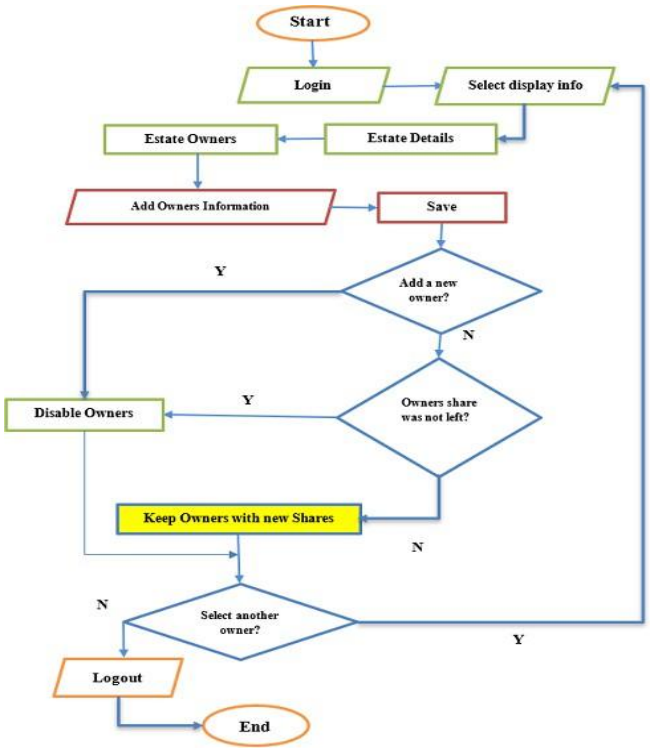
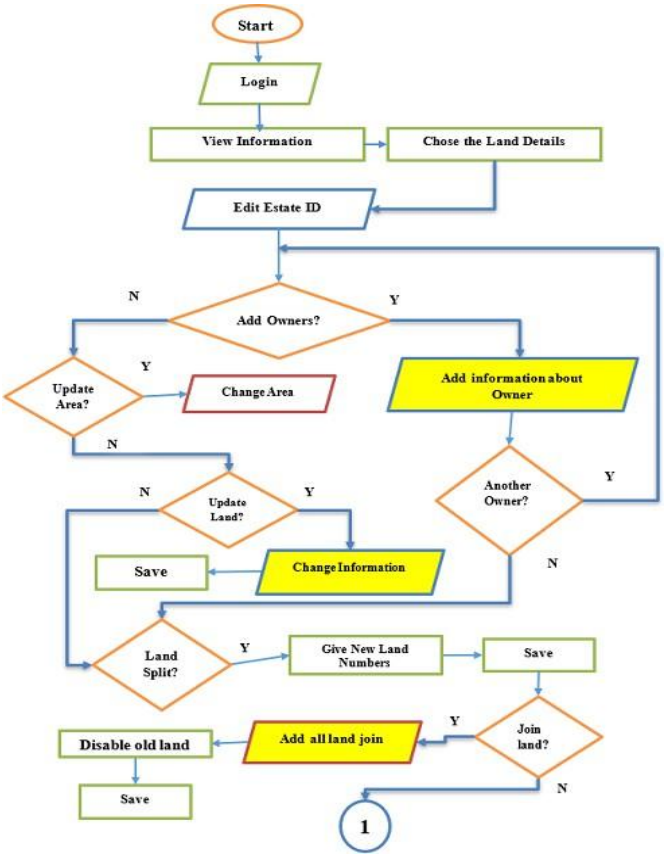


Fig. 4. Data flow diagram of EsOM



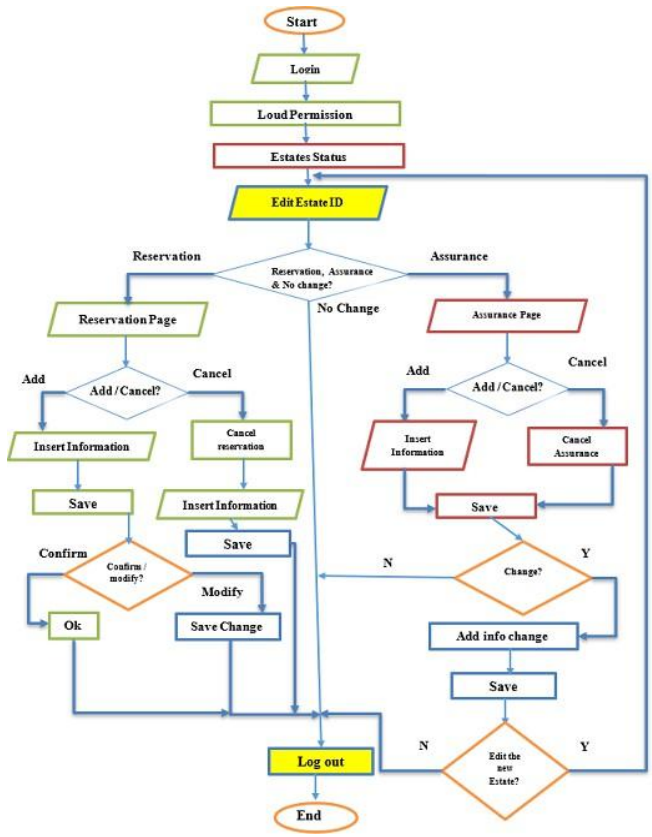


Fig. 5. Data flow diagram of ESM

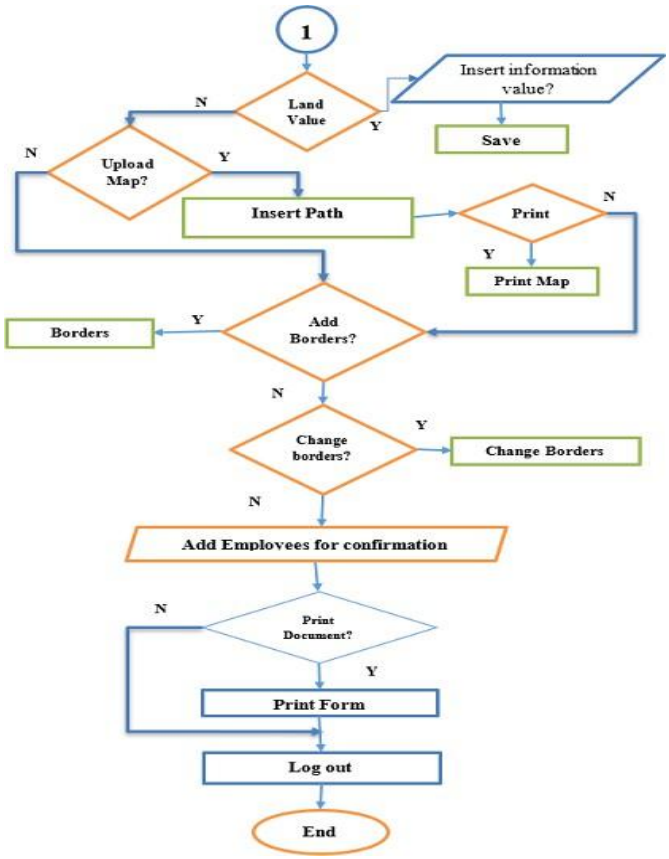


Fig. 6. Data flow diagram of VIM

IV. RESULTS AND DISCUSSION

This section deals with implementing E Duhok DLR system modules that have been mentioned in chapter three of two panels; Employee and Admin. The system is implemented in three directorates: Duhok DLR, Zakho DLR, and Sumel DLR. The purpose of this implementation is to show the strengths and weaknesses of the system. The performance covers all the modules: Login Employee, Employee Registration, Estates Registration, Operation Type, Estate Owners, Estate Status, and View Information. The results of evaluated according to the systematic samples.

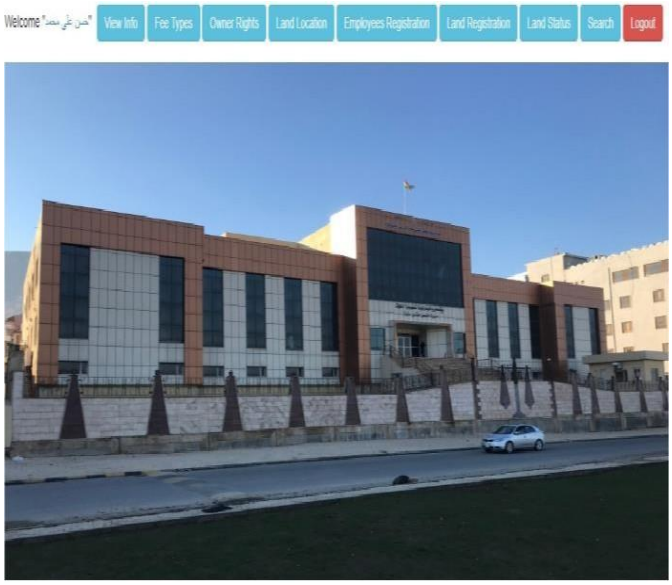


Fig. 7. Duhok DRL Home Page (after login)

A. Electronic Duhok DLR System

The homepage of the Electronic Duhok DLR System provides the ability to access three main directions: Duhok DLR System, Zakho DLR System, and Sumel DLR System. Fig. 7. illustrates the Electronic Duhok DLR System homepage. Both registered employees can access the homepage of the website. After the user inserts the correct username and password, he will access the Electronic Duhok DLR System, as shown in Fig. 7. Then the user can select any direction according to his privileges provided by the system automatically, depending on his position.

B. Land Report Document

The most crucial step for the document is the make report for a land. Then the primary identification of the real estate is to know its owner or owners. The report document contains all or most important information about the real estate such as; destination, number of the land, area, owners, and name and number of the folder. Fig. 8. represents components of the land report deed.

Duhok DLR is the essential directorate in Duhok governorate. When we are working at the record for 2017, we got these results:

- The maximum activity is in July and the minimum movement in Feb.
- The full Type of transaction is Sale, and the minimum is Ownership.
- The proportion of women-owned by the pieces is suitable as it reached 2293 compared to 3675 men in 2017.

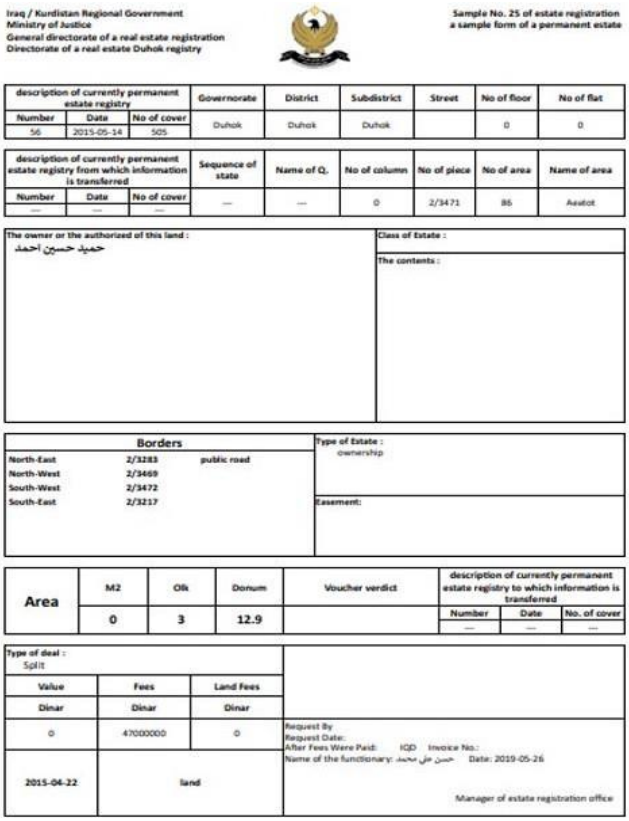
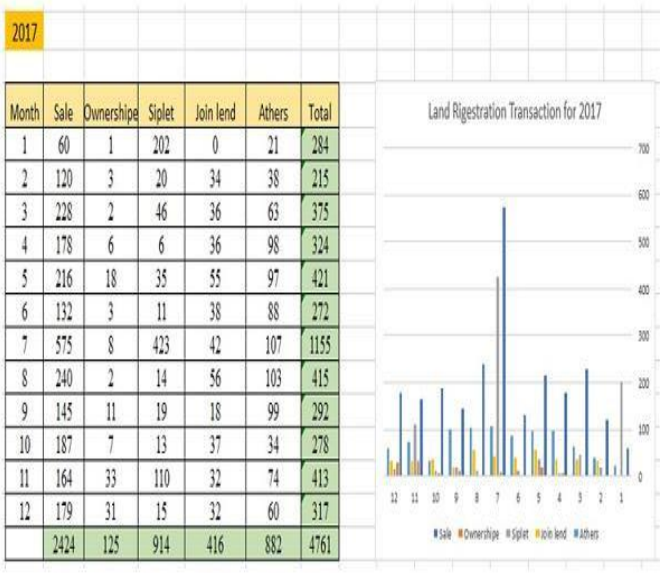


Fig. 8. Report land (deed)



Month	Sale	Ownership	Siplet	Join lend	Athers	Total
1	60	1	202	0	21	284
2	120	3	20	34	38	215
3	228	2	46	36	63	375
4	178	6	6	36	98	324
5	216	18	35	55	97	421
6	132	3	11	38	88	272
7	575	8	423	42	107	1155
8	240	2	14	56	103	415
9	145	11	19	18	99	292
10	187	7	13	37	34	278
11	164	33	110	32	74	413
12	179	31	15	32	60	317
	2424	125	914	416	882	4761

Fig. 9. Table and graph of types of transactions in 2017

Month	Female	male
1	66	133
2	43	105
3	130	244
4	82	207
5	94	221
6	478	623
7	449	593
8	190	305
9	37	82
10	197	263
11	317	547
12	210	352
	2293	3675

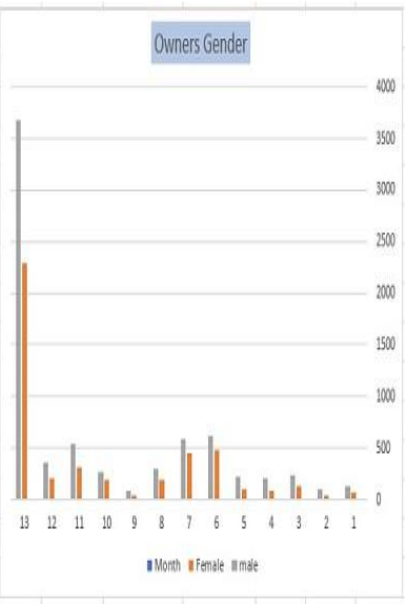


Fig. 10. Table and graph of types of owner's gender in 2017

V. CONCLUSION

In this paper, an efficient electronic DBMS for Iraq/Duhok land registration has been proposed, designed, and implemented to Duhok Land Registration Directory named Electronic Duhok DLR System. The proposed system improved the administration and financial mechanisms of all Duhok Directorates and converted their workflow from the current paper-based approach to an electronic-based one. The proposed method can combine all DLRs campuses, including all related sub-directorates, in one system to be managed electronically. The proposed Duhok DLR system improved the communication system between the DLR staff and the administration and financial Directorate and sub-directorates on another side remotely with complete flexibility. The communication style has done via the Internet. The Duhok DLR system has been designed economically: money-consumed, time-consumed, less-efforts, and more accurate. Hence, this system can be adapted to other directorates inside Iraq.

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