

## **Management system for displaced families in displacement camps**

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**Abstract.** Population stability is one of the biggest problems that countries suffer from it and the most influential in terms of the uneven distribution of the population over the geographical area of the country. There are many factors that work to bring about changes in the population distribution, including economic factors for individuals, social factors, as well as security factors. Security factors during the years of the war on terror in Iraq led to the displacement of many families from their residential areas to neighbouring areas. Many humanitarian and social organizations have worked to organize the lives of families in the form of temporary housing complexes or the so-called displacement camps in safe areas until they return to their areas. There are many problems (living difficulties) that these complexes suffer from, including: how to manage and organize the affairs of large numbers of families and how to deliver aid to them as well as ensuring its arrival as quickly and without logistical problems. In this research, a new administration system has been designed that transforms the traditional system in those camps into electronic system that organizes the management of these camps' affairs electronically, ensuring ease of communication between management personnel as well as communication with the IDPs, through the formation of a database that includes all information about the IDPs, such as Number of family members, genders, ages, etc., in addition to the methods of communication and notifications to receive dues or awareness messages via SMS messages.

**Keywords.** Camp Management, IDPs, Database, internally displaced person, Camps, Al-Jadda'a.

## 1. Introduction

The modern technological revolution has contributed to accomplishing and facilitating many of the requirements of our daily lives and managing them efficiently and with minimal effort. Where all government and private institutions have converted traditional paper transactions to electronic transactions and the introduction of communication techniques in the management of branches and departments of institutions. Communication technologies have contributed the largest part to the integration of these systems, as several state departments have begun to adopt service electronic systems such as electricity, municipality, and others. There are educational departments such as the University of Mosul, which have implemented electronic systems and achieved remarkable success. Displacement camps are a problem facing the government and all organizations because some of them lack a suitable life for the Iraqi citizen. The proposed system (the system for managing the affairs of displaced families in displacement camps) provides a comprehensive database for all residents in the camp and includes data on the name of the displaced, social status, age and number of residents in one tent. With the health status of all residents and many other information, the system also opens a secure private channel to communicate with the camp administration, and to know the latest news related to the weather in case of any disasters, security problems or instructions regarding schools inside the camp. The system also provides other features such as sending SMS messages to all individuals in the event of any urgent notification, as well as sending specific messages to an age group or specific areas within the camp, and making reports and statistics, inventory, and inquiry to the main store inside the camp, which is under the control of the camp administration. Part of the system provides the feature of specifying the materials that will be distributed to the displaced after making a warehouse inventory and making sure that the materials inside the warehouse are sufficiently present, as there are several materials for distribution, the most important of which are food and non-food items such as coolers and oil heaters. Supplies such as fuel and water, and there are cash distributions as well. There are two technical parts in the system, the first is the displaced person, who represents the customer, where a smart mobile phone will be used to communicate with the camp administration and read news, or a regular phone to receive text messages and notifications only, and the second part is the camp administration and is considered the server as it contains a comprehensive database related to the displaced and their information. The figure 1 illustrate the Jadda'a camps



**Figure 1: Al-Jadda'a camp.**

## **1.1 Problem of the Research**

As is the case, any of the traditional systems that work on managing administrative affairs in institutions, which are suffer from many problems, including slow completion of tasks and difficulty in dealing with large data and other matters. The cadres responsible for the camps also suffer from a number of problems, including the problem of the large numbers of displaced families, how to follow up their requirements, how to distribute entitlements to residents in them, as well as the difficulty of communication between the administration and the displaced, and how to inform them to receive the entitlements, as well as statistical matters and preparing daily reports on the status of inmates and sending them to higher authorities .

## **1.2 Objectives of the Research**

The proposed system aims at several main tasks that serve to solve all the traditional problems and obstacles of the IDPs, including:

- 1- Implementation and development of an integrated electronic system to accomplish all previously accomplished tasks in the camps by paper methods and with the least effort and material cost.
- 2- Complete all administrative requirements in a very short time.
- 3- Facilitating the process of communication between the administration and the IDPs by communicating via mobile phones.
- 4- Providing an integrated database on the IDPs and using it in preparing reports easily.
- 5- Managing the financial and logistical revenues of the camps and ensuring their distribution to the beneficiaries according to the specified times.

## **1.3 Data collection**

The system was designed and developed based on the previous administrative structure and according to four main units: the general data unit, the warehouse unit, the financial revenues, and material dues unit, as well as the media and awareness guidance unit. Each of these units has several tasks whose management process has been transformed according to the foundations of systems management using modern electronic methods, The importance of the research is clear at the present time, as there are large numbers of families still residing in the displacement camps and the inability to return at the present time to the areas of their former residents for living or security reasons and others. Therefore, the proposed system works to accomplish all administrative tasks with high accuracy, easily and quickly, and at the lowest material costs.

## 2. Literature Review

There are many systems that have been developed to facilitate the work of governmental, nongovernmental organizations and civil society in managing the affairs of displacement camps, and the following are a number of these works:

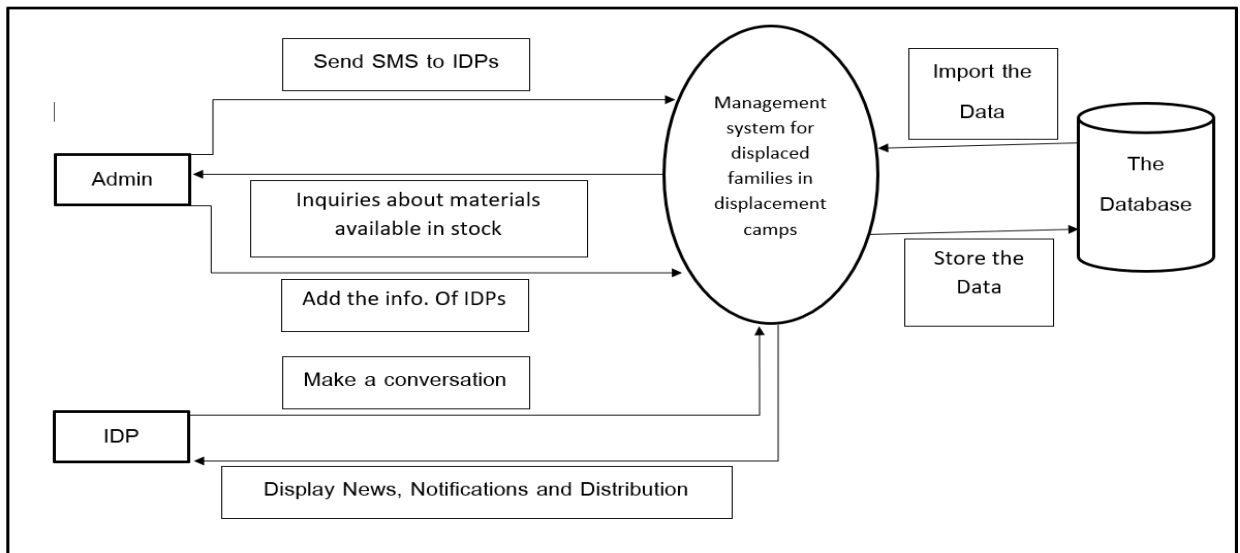
Including what the researcher in [1], which was called (Human Factors) in computing systems (which works to organize the work of health events through smart phones) of the displaced. The researcher in [2] has also developed an electronic system within the concept of e-learning which aims to develop education and eradicate illiteracy in Arbat camp in Sulaymaniyah Governorate in the Kurdistan Region this experience has shown success in developing the concept of education using smart phones, which will increasing future job opportunities for the IDPs. The International Organization for Migration (IOM) has also, over the past two years, implemented the Kobo Program in Al-Jada camp 5, located in Qayyarah district, south of the city of Mosul, which aims to educate the IDPs about COVID-19 disease [3]. An electronic program developed by [4] which works to follow up refugees throughout the duration of their asylum and help them communicate with government agencies. The Arab Red Crescent and Red Cross Organization has published research entitled "Using Technology to Help Refugees", which was developed by Techfuji.

A program was developed by [5], which was called (Antoura and the Letters), which works on smart phones, and aims to teach children living in the camps to read in Arabic, support and raise their morale and enhance their mental health. An electronic video conference system was implemented by TechSoup [6] to provide free lessons in the areas of language and personal skills for children affected by armed conflicts in the Middle East and North Africa, and it showed good results in enhancing information for some young people in refugee camps. The SchooleX organization [7] has also worked on designing a database within the concept of distance learning, which works to give lessons in an (online) form based on their needs and skills. The (Supported Instant Network) program was also designed by [8], which works to complete classrooms and includes the (Higher Education Without Borders) program, which facilitates distance university education for refugees through cooperation with universities. The technology company (Microsoft) [9] has presented the design of an electronic program that works on digital literacy and skills development called (Microsoft Teams), which aims to enable 25,000 refugee youth to develop their digital skills. The Institute of Global Health at the American University of Beirut has also designed a program called (My Sijili) [10], which works on keeping and archiving health records of sick refugees and collecting medical information in an electronic and secure manner. Another application developed by the World Health Organization [11], which was called (Doctor X), was applied in the displacement camps in Jordan, which prepares an electronic medical record for each refugee. This record is an informational reference to which the doctor can refer in the event of his treatment of refugees. UNICEF [12] has developed an advanced technical system that works to solve the problem of sewage disposal in the Zaatari refugee camp in Jordan. It relies on an electronic system based on a geographic data system that gives an alert to the centre in case the sewage tank is full, and

the system has proven successful. The World Food Organization has developed an application called (Share the Meal), which aims to introduce technology and digital tools in the field of donations and provide aid to the displaced by feeding children inside the camps. The system was developed and implemented by Google [13]. As well as the (biological inference) system, which was developed by the United Nations High Commissioner for Refugees [14], which works to unify the data of the displaced within a unified database to improve the accuracy and efficiency of records and avoid duplication in data collection and entry.

### 3. System Context Diagram

This diagram describes the structure of the system in general, in terms of input, as well as all the processes that take place within the system, as well as clarifying the flow of data between system processes, as well as describing the process of interaction of the displaced and the official with the system, and finally the final outputs from the system. external to the entire system, as shown in the figure 2.



**Figure 2: System Context Diagram.**

### 3.1 Use Case Diagram

This diagram shows the privileges of all system's users as well as the function of them. It also describes the interaction between the system and its users, as well as the operations carried out by the users of the system by describing a general idea of how the system deals with the external environment, as shown in the figure 3.

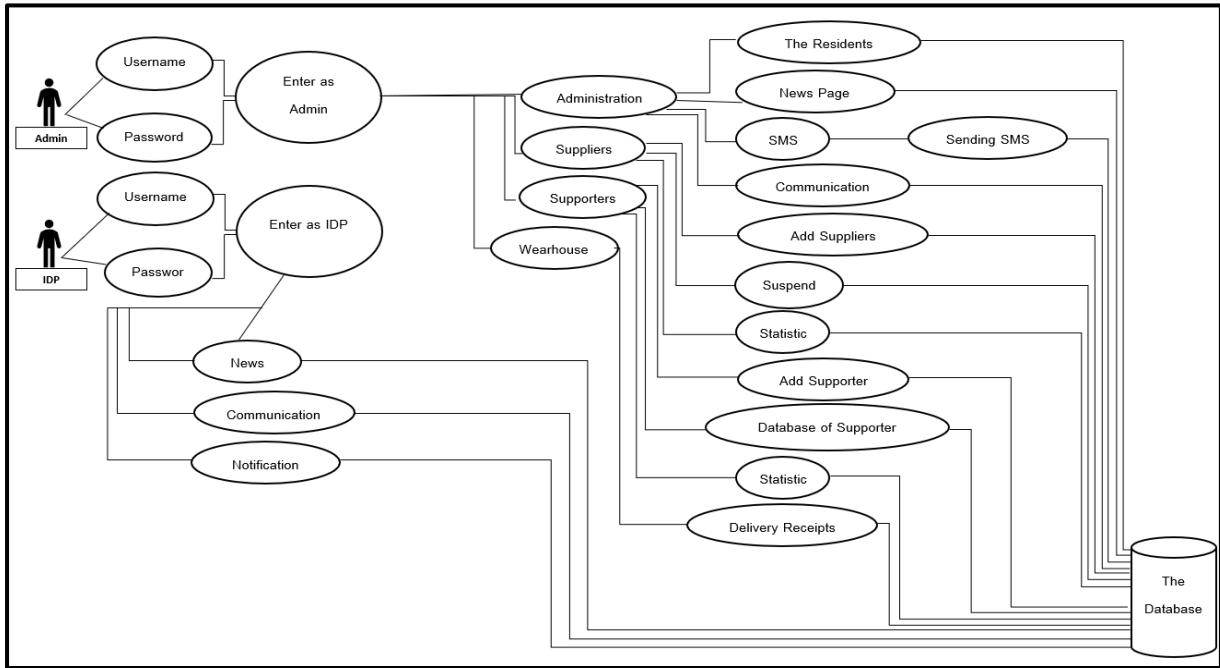


Figure 3: Use Case Diagram.

### 3.2 Database Schema

This diagram describes the main structure of the system's database, as it shows the mechanism of system data in the form of a diagram, by fragmenting it into tables based on the relationships that link the data and achieve the integrity of this data, the database can be considered the main structure under which the query language was created, This is the basis, This diagram is designed to illustrate the proposed system, as shown in Figure 4.

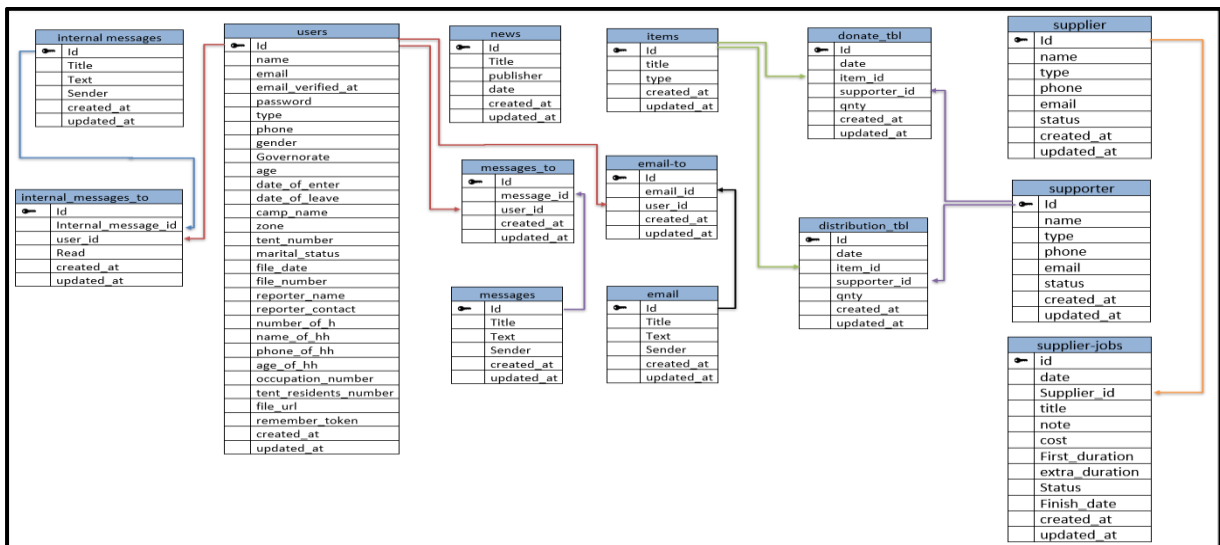


Figure 4: Database Schema.

### 3.2.1 USERS Database

This table includes all the data required for the IDPs and the administration in terms of the IDP's name, mother's name, date of birth, ID number, phone number, identification number, etc., and the way to enter the program by entering the username and password.

**Table 1: USERS Table**

Field Description	Field Type	Field Address
Primary key	Integer	Id
Name	Varchar(255)	Name
Email	Varchar(255)	Email
Email verification date	timestamp	email_verified_at
Password	Varchar(255)	Password
Validity	Varchar(255)	Type
Telephone number	Varchar(255)	Phone
Gender	Varchar(255)	gender

### 3.2.2 NEWS Database

This table contains the news to be published by the system administrator, which consists of (the news number, the title of the news, the publisher, the date of publication, creation, modification, and other details).

**Table 2: NEWS Tabl**

Field Description	Field Type	Field Address
Primary key	Integer	Id
The title of the news	Varchar(255)	Title
Publisher	Varchar(255)	Publisher
The date of news was published	Date	Date
Date of creation the record	Timestamp	created_at
Last modified date	Timestamp	updated_at

### 3.2.3 Internal Messages Database

This table contains the following fields (message number, news title, publisher, sender, date of creation and last modification), this information is used to send a notification to all the IDPs, and the advantage of this feature is that the IDP cannot reply to the message because it is a notification from the administration only.

**Table 3: Internal Messages Table**

Field Description	Field type	Field address
Primary key	Integer	Id
Title of Message	Varchar(255)	Title
Context	Varchar(255)	Text
Sender	Varchar(255)	Sender

### 3.2.4 Internal Messages-to Database

This table contains the following fields (message number, specifying the person to whom the message is to be sent, publisher, read, date of creation and last modification), and the difference between this table and the internal message table is the property of adding a specific person to whom the message can be sent.

**Table 4: Internal Messages\_to Table**

Field Description	field type	field address	
Primary key	integer	Id	1
Secondary key indicates notification	integer	message_id	2
A secondary key indicates the publisher	integer	user_id	3
Readable or not	integer	Read	4
Date of creation the record	timestamp	created_at	5
Last modified date	timestamp	updated_at	6

### 3.2.5 SMS Messages Database

This table includes the fields (message number, message title, publisher, and sender, etc.), which are used in the text message (SMS messages) sent to all mobile devices of the IDPs through telecom companies.

**Table 5: SMS Messages Table**

Field Description	Field type	Field address	
Primary key	Integer	Id	1
Title	Varchar(255)	Title	2
Message text	Varchar(255)	Text	3
Sender	Varchar(255)	Sender	4
Date of creation the record	Timestamp	created_at	5

Last modified date	Timestamp	updated_at	6
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### 3.2.6 SMS Messages-to Database

This table contains the fields (message number, the person to whom the message is to be sent, the publisher and others), as a text message is sent to one of the IDP only or to several IDPs through telecommunications companies.

**Table 6: SMS Messages\_to Table**

Field Description	Field Type	Field Address	
Primary key	Integer	Id	1
A secondary key indicates the message	Integer	message_id	2
A secondary key indicates the sender	Integer	user_id	3
Date of creation the record	Timestamp	created_at	4
Last modified date	Timestamp	updated_at	5

### 3.2.7 Suppliers Database

This table contains the following fields (provider number, name, category, phone number, etc.), this table includes information about the suppliers at the camp administration.

**Table 7: Suppliers Table**

Field Description	Field type	Field address	
Primary key	Integer	Id	1
Tame	Varchar(255)	Name	2
Type	Varchar(255)	Type	3
Telephone number	Varchar(255)	Phone	4
Email	Varchar(255)	Email	5
Status	Varchar(255)	Status	6
Date of creation the record	Timestamp	created_at	7
Last modified date	Timestamp	updated_at	8

### 3.2.8 Supporters Database

This table includes the following fields (supporter serial number, name, category, phone number, etc.), as it contains the full information of the camp's supporters and what contributions have been made to the IDPs from them in terms of food or living materials.

**Table 8: Supporters Table**

Field Description	Field Type	Field Address	
Primary key	Integer	Id	1
Name	Varchar(255)	Name	2
Type	Varchar(255)	type	3
Telephone number	Varchar(255)	phone	4
Email	Varchar(255)	email	5
Status	Varchar(255)	status	6
Date of creation the record	Timestamp	created_at	7
Last modified date	Timestamp	updated_at	8

### 3.2.9 Email Database

This table includes the following fields (serial number, Email address, content, sender, etc.), which is one of the characteristics through which correspondence between the administration and the IDPs via emails.

**Table 9: Email Table**

Field Description	Field Type	Field Address	
Primary key	Integer	Id	1
E-mail address	Varchar(255)	Title	2
Email content	Varchar(255)	Text	3
Sender	Varchar(255)	Sender	4
Date of creation the record	Timestamp	created_at	5
Last modified date	Timestamp	updated_at	6

#### 4. Architecture of System

The structure of the proposed system consists of three main parts, the first part: a computer used by the system administrator to work on adding and deleting the data of the IDPs, as well as preparing and printing reports, the second part: a cloud site used to host the system on the Internet (epizy), and the third part: which is represented by the client as A computer or a type of mobile device is used.

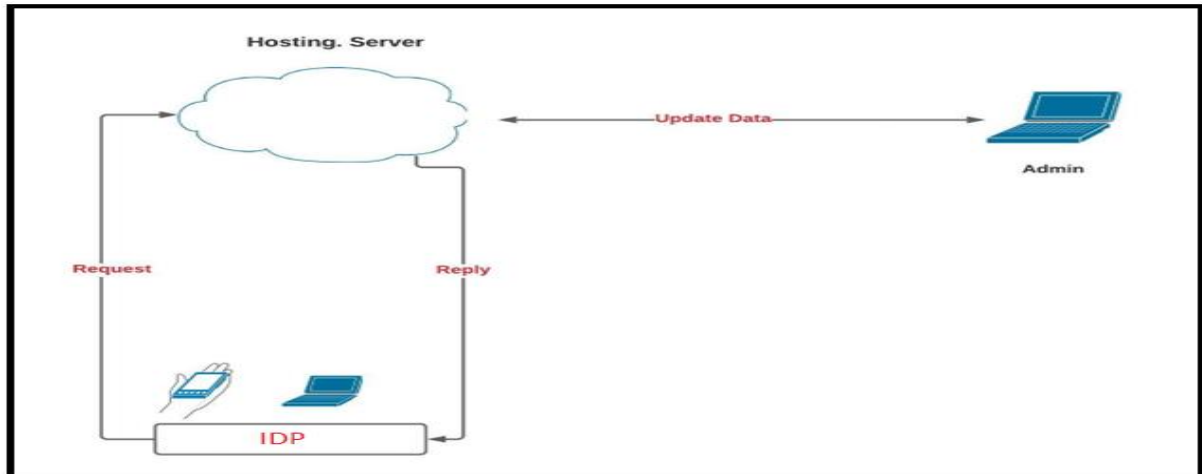


Figure 5: Architecture of System Schema

#### 5. The System Implementation Environment

This table include the devices on the side of the system administrator, which represents a computer device to manage the operations of the system such as deleting, creating and preparing reports, while the devices on the side of the IDP, represented by a smart device.

Table 10: System computer & IDP Cell-phone specifications Table

IDP Cell-phone	System Server	Specifications
Galaxy A20	LENOVO CORE i5	Device type
10 Android	Windows 7 64 bit	O. S
Octa Core	Intel(R) Core (TM) i5-3210M CPU @ 2.50 GHz	Processor
32GB RAM	4.00 GB	Memory
-	1T	H.D. D
-	15' inch	Screen
-	GeForce 512M Nvidia	Graphic

## 6. Sysadmin Interface

This interface managed by the system administrator. Through it, all information is dealt with, starting with adding a new displaced person, adding suppliers or supporters and the warehouse.



**Figure 6: sysadmin interface Schema**

## 7. Administration Page Button

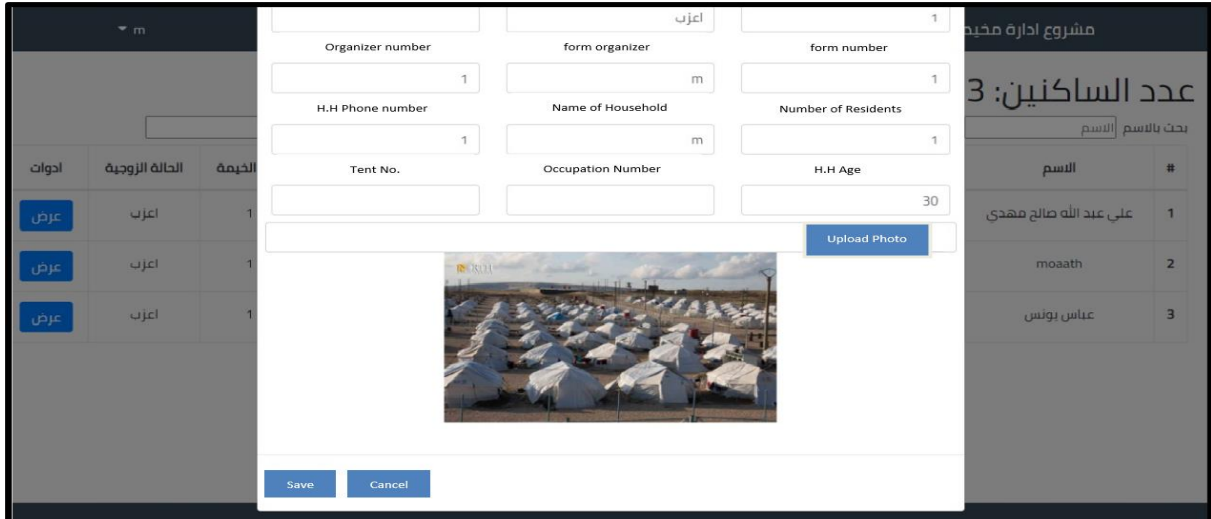
Through which several properties are selected like SMS: the administrator can send a SMS to single IDP or multiple IDPs throw the cell phone network without internet, NEWS: IDPs can read the daily news that administration publishes, Residents: in this feature the administration will add, remove, search for IDPs, Notification: this is for notify the IDPs for any important news and they should have internet to receive it, Communication: it's look like Email both sides can communicate with each other.



**Figure 7: Administration page button Schema**

## 7.1 Add Resident to Database

This interface for add information that related to IDPs like (form number, form organizer, organizer phone number, number of residents, name of household, household phone number, household age, occupation number, tent number, etc), and the other feature is sorting.



الاسم	#
علي عبد الله صالح مهدي	1
moaath	2
عباس بونس	3

**Figure 8: Add Resident to Database Schema**

## 8. Mobile application interface (Sign In)

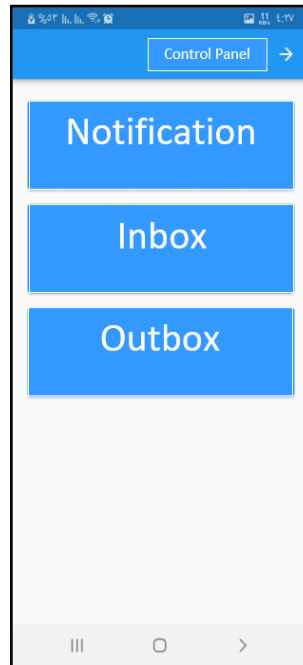
The property of this system is its ability to use the application on mobile devices, which is used by the IDP and the system administrator, through which several functions are dealt with, such as reading news or instructions or communicating with the camp administration. The application has been uploaded to Google Play.



**Figure 9: Mobile Application Interface (Sign In) Schema**

## 8.1 Mobile Application Interface (Sign In)

This interface is the control panel, which contains the Notifications: it's show to IDP from administrator, Outbox: the message that sent to Admin., and inbox: the message that IDP received.



**Figure 10: Mobile Application Interface (Control Panel) Schema**

## 9. Conclusions

After completing all stages of the system in terms of analysis, design and implementation, the system was tested using real data through Excel tables. These tables were used as a database to test the system and ensure its efficiency, which resulted in the following:

1. The proposed system fulfilled most of the requirements found in the traditional paper-based system in an efficient, simple, and error-free manner.
2. Modern programs were used in the process of analysing and designing system data, which clearly contributed to the development of the proposed system and the design of an integrated database that could be referenced when needed.
3. The use of drop-down menus provided by the system in many interfaces, which helped the system administrator to speed up work, reduce errors and save time during data entry.
4. The proposed system helped to store all the data of the IDPs, contractors, donors, and stored materials electronically without resorting to paper records.
5. The system provided the possibility of searching for all the information related to the displaced person and storage materials, which is positively reflected on the speed of work and the lack of time to search for information in paper records.

6. The system provided the ability to send text messages (SMS) to the IDPs when needed to communicate with them in the absence of the Internet and inform them of the instructions.
7. The system helped reduce the effort made by the IDPs on the one hand and the camp administration on the other hand, as the IDP does not need to go to the administration to inquire about the date of receiving the materials or to inquire about any subject.
8. The system provides the possibility of freezing the work of contractors (suppliers) if they violate the instructions and regulations of the camp management, in contrast to the paper-based system that may allow because of the employee's omission to stop his work.
9. Training all staff in the camp administration on the use of computers and consolidating the idea that the electronic system at work is better than the paper system and is easier to use.

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