

Spatial Evaluation of The ATM Service Map in Benha City

مجلة كلية الآداب بقنا (دورية أكاديمية علمية محكمة)

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Abstract

This study deals with the evaluation of the automated teller machines network map at Benha city , the work of a lot of workers and customers in the accumulation of teller machines, (ATM) and the resulting loss of a lot of time, This time may range from half an hour or an hour or more as a result of distributing these machines randomly or most of them are based in one or two study sites in the study area Or that automated teller machines are located inside institutions or a commercial market with fixed working hours.

This research aims at the improve efficiency of the ATM service map, and to achieve this goal several approaches were used, including: Previous history, with the help of research methods such as field work, spatial analysis, statistical analysis, and the method of geographic information systems and remote sensing.

Keywords: ATM, Spatial evaluation, the ATM service map ,benha city .

Introduction

The development of the countries of the world until the transformation of the number in its parts, and then it comes far from the banks in this stage, and also from all the services or other services through the machines of the money exchange AUTOMATIC TELLER MACHINE (ATM). and the case of the reduction of the pressure on the government institutions by the transfer of the electronic services from the one who draws the money to the other, and then one of them will take one of them. (Yazeed Abdul Mumin., etal, 2014, p138).

Everyone who has an account in a bank can spend the money he needs in his balance without the need for the bank itself, and no specific time is required for the money to be spent. Citibank, but the ATM machine (ATM) was removed after only 6 months, due to the lack of acceptance by customers of its idea and reluctance to deal with it.

After more than 25 years, the idea was put forward again and the first automatic teller machine was installed in Anfield, north London, on June 27, 1967 AD, by Barclays Bank, and John Sheard Barron was the first to invent the automatic teller machine (Omari,2012,P20).

The idea of the automatic teller machine was developed by John Sheard Barron until the first model of the automatic teller machine (ATM) appeared in 1967, and the idea spread in the whole of Britain in 1973 (Kumar,2011,P4).

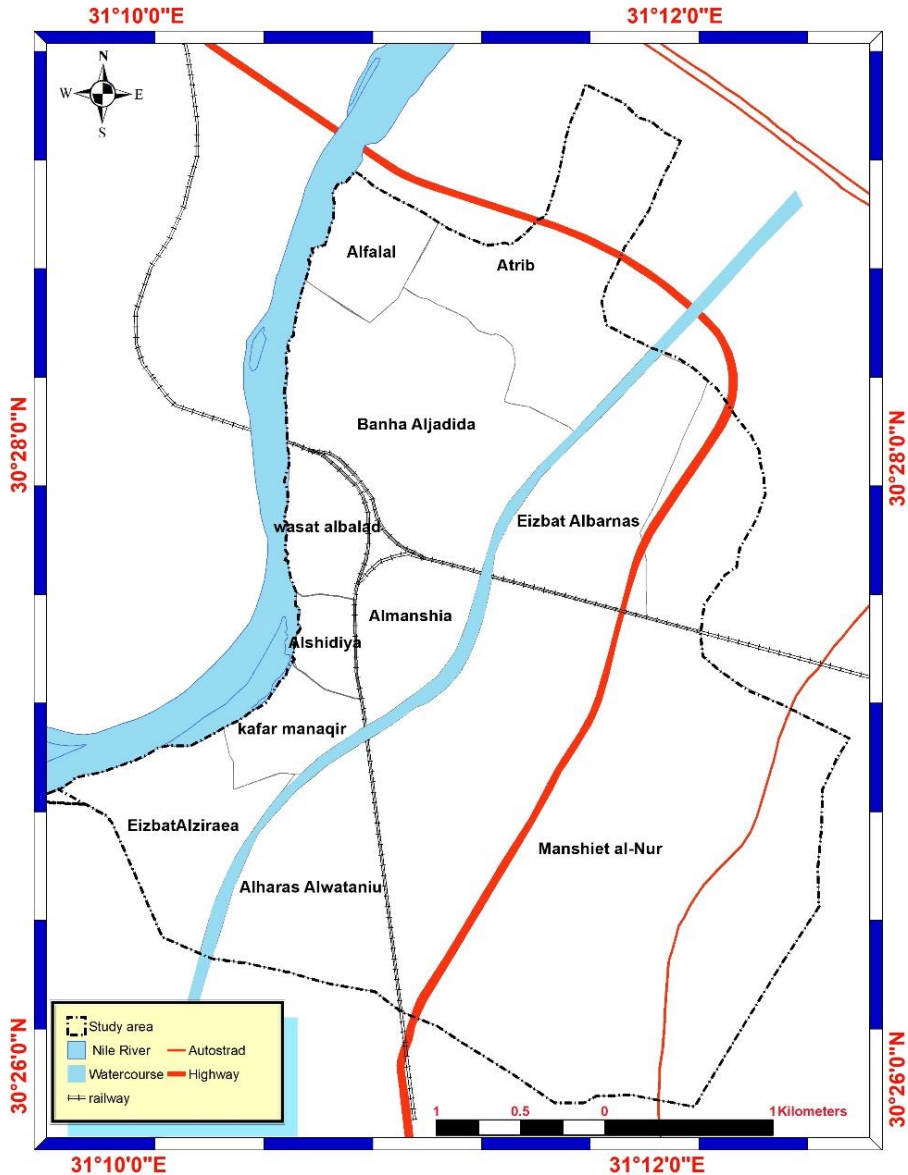
Banque Misr was the first to introduce the idea of the evening banking service in Egypt, through the work of a deposit machine that was placed outside the bank in 1931. <https://www.capmas.gov.eg/>. The ATM machines in Qalyubia

governorate are estimated at about 251 ATM machines, of which about 58 ATM machines are located in Benha.(Field work,2021).

The city of Benha is one of the important administrative capitals in Qalyubia governorate, as it is located on the Nile River and extends between latitudes 25 29, 30, 0.26, 30 north, and longitudes 34, 9, 31, and 31, 12, 0 east.

The city of Benha is one of the most important cities in Qalyubia governorate, because it includes many government agencies and institutions that need to service the ATM, in addition to that, its population is 207857 thousand people, which is 43% of the total population in the center of Benha and 4% of the total population at the level of Qalyubia, with a population of 5,627,420 (the final results of the general census and the housing conditions of Qalyubia Governorate, Censuses , 2017).

The city of Benha can be divided administratively by into five shyakhas as follows: Old Benha, Kafr Mnaqer, Manshiyya, Al-Rayyah, and New Benha Fig (1), in addition to ten neighborhoods (Manual of Administrative Division of the Governorates up to the level of Shiyakha and the Village, _____, p. 76). The total area of the study area is 11,6 km². That is, equivalent to (2656,06) acres, and thus it represents 1% of the area Qalyubia Governorate



Source: From the researcher's work depending on the final The topographic sheets (scale 1: 250000) , The topographic (scale 1: 50000) Egyptian Survey Authority,1953, 1996.

Fig (1) Administrative Division Of The city of Benha

A. Reasons for choosing the topic:

- I. Random distribution of ATMs in the study area
- II. The continuous population congestion to implement some services from ATM machines

- III. Difficulties facing residents in accessing automatic teller machines

B. Objectives of the study:

- I. Monitor the problems faced by the residents of the city of Benha in dealing with automated teller machines
- II. 2) Producing a map for the ATM in the study area and providing proposed solutions to solve these problems
- III. 3) Producing a map for the ideal distribution of ATMs in Benha city
- IV. 4) Updating the database of automatic teller machines for all banks in the study area

C. Previous studies :

There are some previous studies that dealt with the field and area of the study, the most important of which are Massad El-Sayed Behairy, "Spatial analysis of the influence and efficiency of mobile network relay stations in the city of Benha" (2015), and Wafik Mohamed Gamal El-Din, "The bread industry in the city of Benha." in the geography of industry"(2007), Mina Samir Sobhy An applied model for assessment the road network efficiency in Benha city(2019), Jaber Al-Bahansi study the spatial variation of banking services in the city of Al-Mahalla Al-Kubra 2017, and the study dealt with the development of banking services in the city of Al-Mahalla Al-Kubra and Abdel Salam Ismail studied the spatial analysis of banking services in the city of Port Said (2018), and it was a study in the geography of communications and dealt with Stand on global development and domestic banking Classification and geographical distribution in the city of Port Said.

D. Methodology:

The study relied on the descriptive analytical method and some modern methods in studying the results. The study depends on the study on some methods, the most important of which are the statistical method, the cartographic method, the quantitative method, and the field work mainly: monitor the problems experienced by the study area and take photographs and data processing, signing through satellite images and The field work was carried out in two phases in January 2021 to sign ATM machines on the map, the second phase of July for photography and counting the number of machines in Banha City 2021.

Geographical Information Systems were also relied on in data analysis, including spatial analysis to determine the most important places where ATMs are focused, how to access them, processing tools and coding tools to analyze service density.

The study included 6 axes to achieve the objectives of the study as follows:

1. ATM Definition
2. The Components of the ATM Machine
3. Types of ATMs
4. Factors Affecting The Distribution of the ATM
5. The Results
6. Recommendations

1. ATM Definition

It is a machine that contains cash inside it and is called (ATM) for short to an Automated teller machine, which is a communications device that provides bank customers with access to financial transactions in public places without the need to visit bank branches, in addition to easy access to banking services and

cash, through plastic cards. Especially the “visa” that customers use to withdraw cash from their bank accounts using an automated teller machine (Egyptian Banking Institute, 2012, p. 4,3). The plastic cards contain the user's information on a magnetic strip, and the tape contains an identification code that is sent to the bank’s central computer via modem so that users insert the card into ATMs to access the account and process their account’s transactions.

Customers can perform many banking operations without the help of the cashier, such as cash withdrawals, deposits, bills payment, obtaining bank account statements, and making cash transfers. Also called Automated Banking Machine, Remote Service Unit. <http://www.businessdictionary.com/definition/automated-teller-machine-ATM.html>.



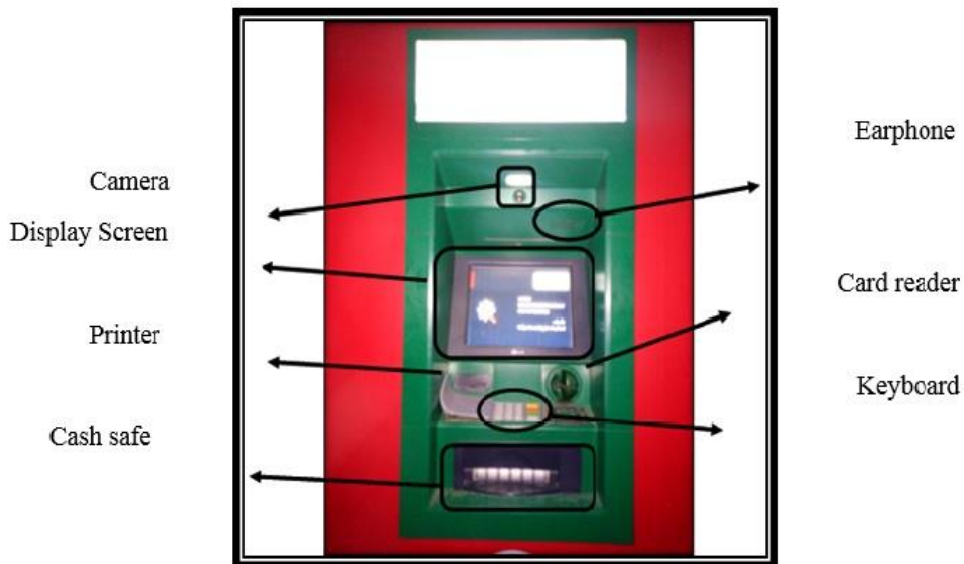
Source: Field work 2021

Plate (1,2) Samples of the ATM shape in the very study area

2. The Components of the ATM Machine

The ATM contains a computer, record-keeping system and cash safe in one unit, allowing customers to enter the bank's record-keeping system using a plastic card containing a personal identification number (PIN) or by punching a specific code in the computer terminal associated with the bank records that are accounted for. 24 hours a day. (Yazeed Abdul Mumin., etal, 2014, p140.)

The automatic teller machine consists of two basic systems; The first is the input system and the second is the output system, and each of them contains several main units in order to achieve the desired goal by the customer. As shown in Plate (3):



Source: Field work 2021

Plate (3) the physical components of the automatic machine

A. Entry system

It consists of two basic units for entering data in order to identify the customer's account belonging to the bank, and then provide him with the necessary services. The following is an explanation of these units:

I. The "Visa" card reader unit

It is one of the most important operations that the customer performs, because it aims to determine his account number, as it is a plastic card that allows the customer a set of operations that can be implemented in his own bank, and it contains a magnetic tape or a chip that contains a unique card number and some security information As the expiration date, and through these cards the person or customer withdraws or deposits cash (Anurag Anand Duvey., etal, 2013, p192) Plate (4).



Source: Field work 2021

Plate (4) The form of the bank card "visa"

II. The keyboard

The second step that the customer performs is to define the required process, and the machine asks for the personal

identification number (PIN), and he cannot perform any transaction without that identification (PIN), and then the automatic communication occurs between the ATM and the bank's computers from Through a banking network. (Roni Sambiangga., 2007, p2) Plate (5).



Source: Field work 2021

Plate (5) keyboard In The ATM Machine

B. output system

I. Earphone

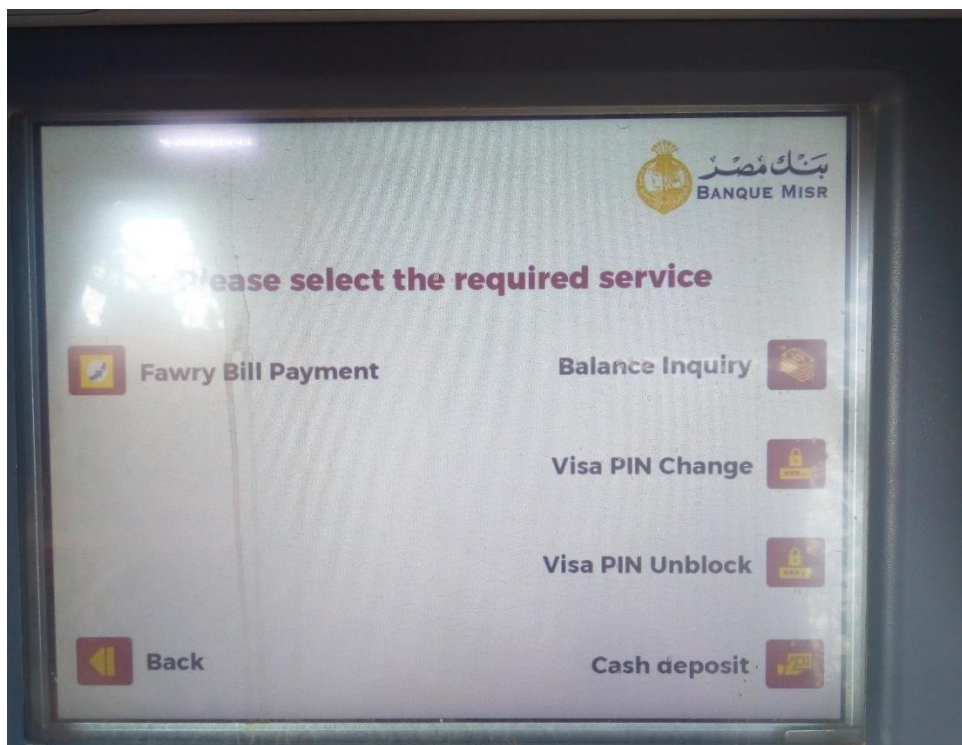
Enable the customer to hear voice comments when pressing any key or dealing with the display screen.

II. The printer

ATM machine provides a printer; In order to print all the details, such as the withdrawal process, the account balance, and the transaction is recorded with the date and time on the receipt.

III. Display Screen

It provides all the details of the available operations by recognizing the "visa" card. There are some types of touch-based ones and some that are dealt with through the keyboard. Plate (6).



Source: Field work 2021

Plate (6) Operations available at an ATM

I. Cash safe

It is used to exit the money from the machine according to the amount of money requested from the customer through his personal "visa" account. Plate (7,8)



Source: Field work 2021

Plate (7,8) The Components Of the ATM machine from the inside

3. Types of ATMs

Automated teller machines vary in the city of Benha as a result of the diversity of banks in the study area, which number twelve, and some of them are government and private. As shown in Table (1).

Table (1) Types and number of ATMs

S	Bank name	the number	%
1	Union National Bank	0	0
2	ADIB	1	1.7
3	Faisal Islamic Bank	1	1.7
4	Alexbank	2	3.45
5	Credit Agricole Egypt	2	3.45
6	QNB ALAHLI	3	5.2
7	CIB	3	5.2
8	Arab African International Bank	3	5.2
9	Housing & Development Bank	4	6.9
10	Banque du Caire	10	17.2
11	Banquemisr	11	19
12	National Bank of Egypt	18	31
	Total	58	100

Source: From the researcher's work based on the field work

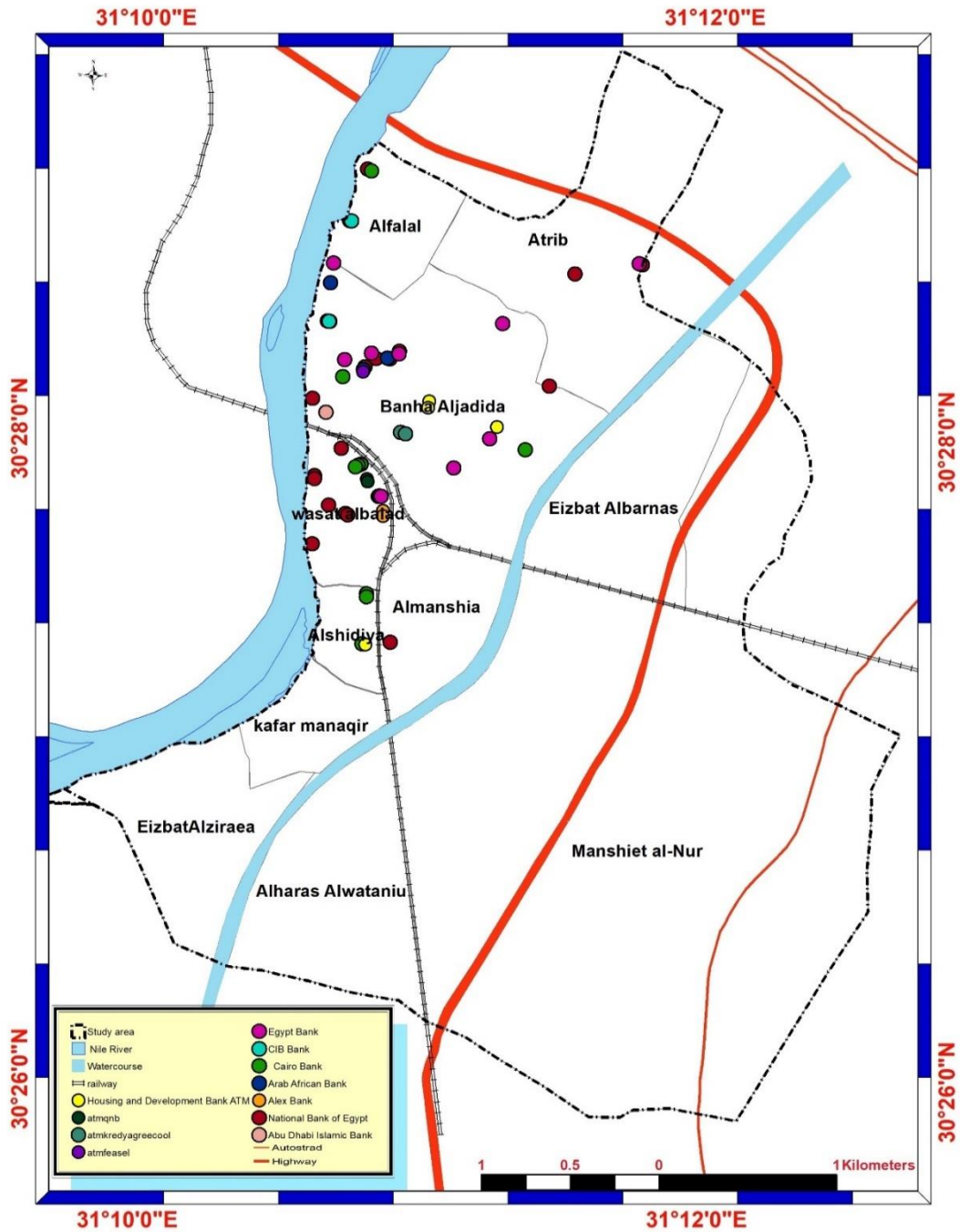


Fig (2) The geographical distribution of ATM machines in the study area

4. Factors Affecting the Distribution of the ATM

There are 58 automatic teller machines in the city of Benha, distributed among eleven banks, although the number of machines appears to be large. However, there is some difficulty in using it.

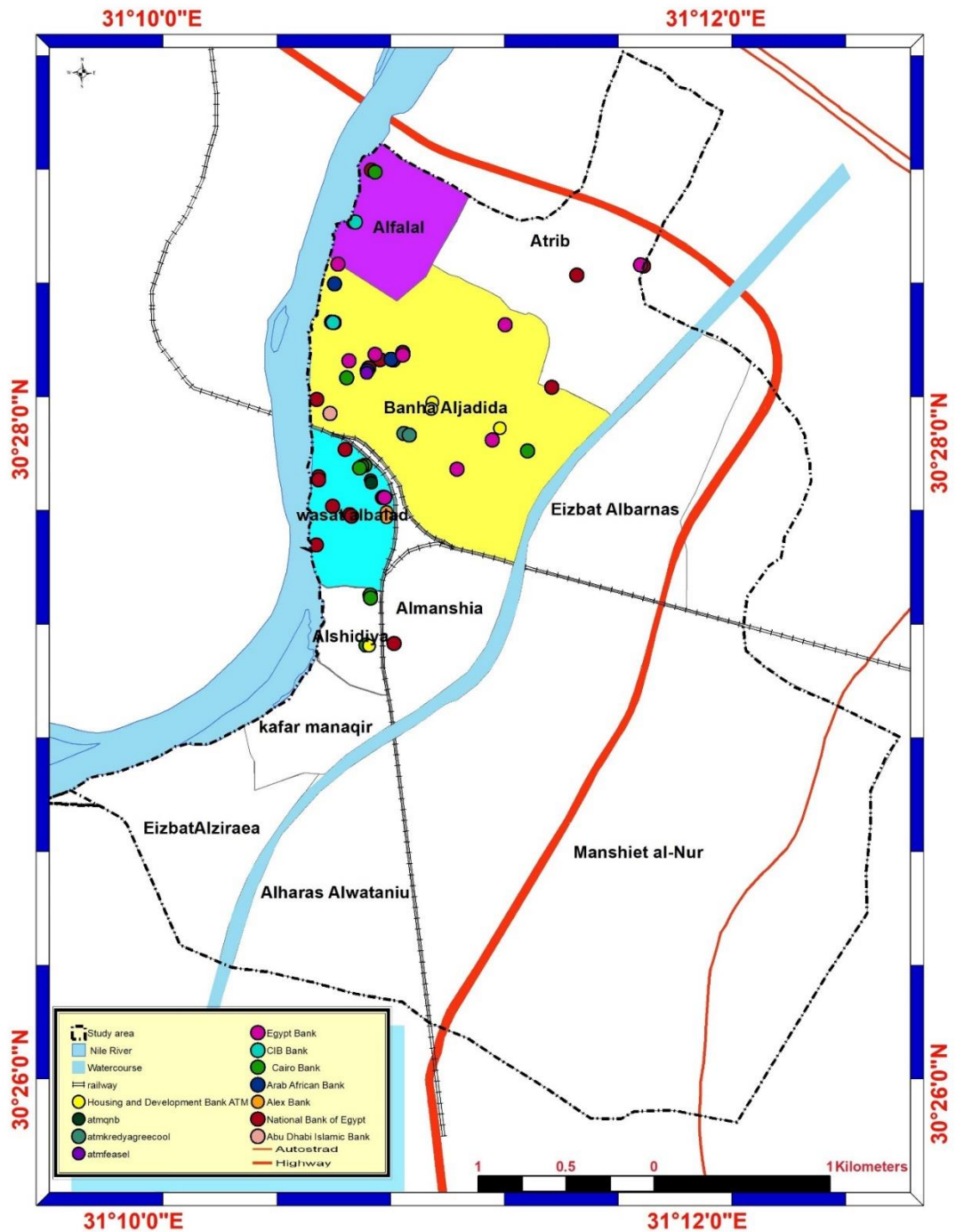
A. Random distribution of machines

Automated teller machines are used by a large number of residents in the city, for their ease of use and quick cash savings at any time and anywhere. (RKAR. Kariapper., etal, 2020, p1).

The current distribution of ATM machines represents a major constraint for customers, for several reasons, the most important of which is the inconsistent random distribution of ATMs, as shown Fig (2), in addition to the difficulty for customers to access the machines to conduct withdrawals and deposits in some parts of the city as a result of an unprepared scientific distribution, as there are machines ATM is inside governmental institutions that do not benefit this institution, as is the case in the Faculty of Engineering, in which there is a machine of the National Bank of Egypt, despite the fact that the members of the faculty, staff and administrators carry cards belonging to the Bank of Egypt.

Automated teller machines are concentrated in half of the study area, and the other half of the area is completely devoid of any automated teller machine, as shown in Table (2) , Fig (4).

The distribution of ATMs in the city of Benha is concentrated in three main areas, the villas, the new Benha, and the city center. There are 52 ATMs in these areas, with a rate of about 89.65% of the total ATMs located in the city of Benha, due to the importance of these areas and the modern buildings, And there are the most important major institutions in it such as the train station, the hospital, the universityetc. Fig (3).



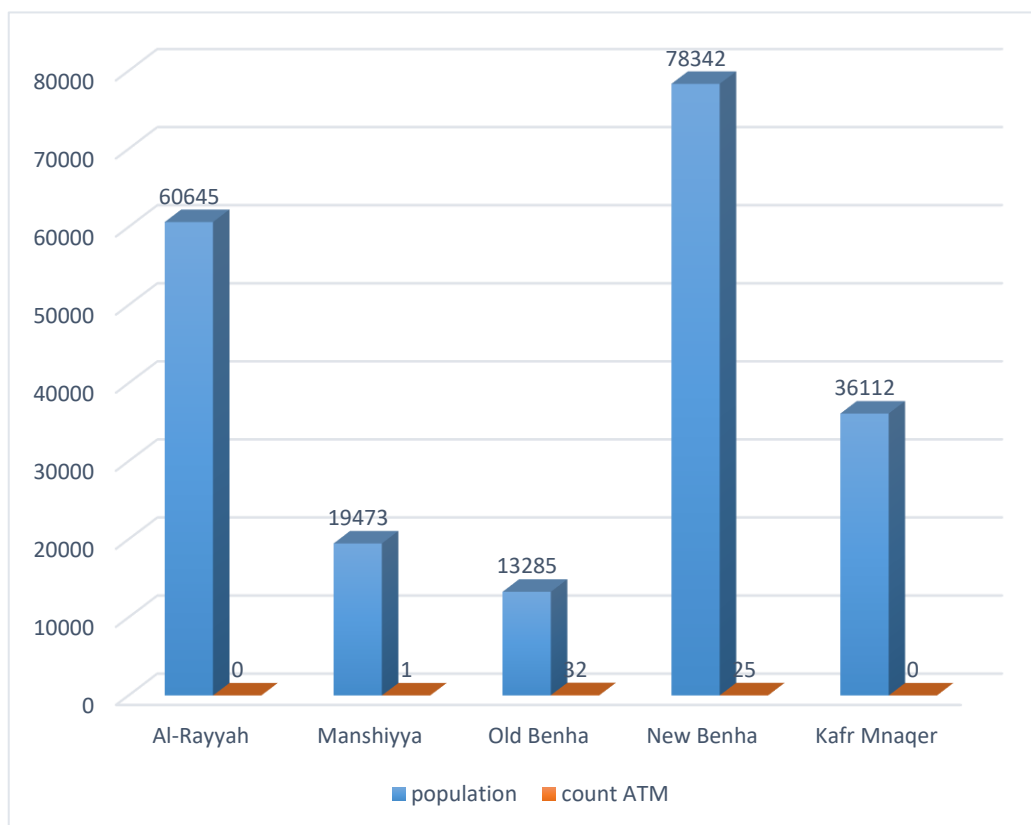
Source: From the researcher's work depending on the final The topographic (scale 1: 50000) produced in 1996 Egyptian Survey Authority, field work and Sentinel, 2021.

Fig (3) ATM concentrated in the study area

Table (2) The Relationship of regions to population, number of ATMs and area

S	population	ATM number	area /km
Al-Rayyah	60645	0	4.29
Kafr Mnaqer	36112	0	1.89
Manshiyya	19473	1	0.56
New Benha	78342	25	3.93
Old Benha	13285	32	0.49
Total	207857	58	11.16

Source: From the researcher's work based on the Data of the Engineering Department of Benha City Council



Source: From the researcher's work, based on the data of Table (2)

Fig (4) Population ratio to ATM number

It is clear from Table (2) and Fig (4) that:

- The old Benha and New Benha areas account for 55,17% and 43,10% of the total number of ATMs in the city of Benha, Because of the development of vital institutions. In addition to the spread of some university faculties in them.
- The number of ATMs in Farid Nada Street and Saad Zagloul Street is about 12 and 11, respectively, with a percentage of about 39.65% of the total number of ATMs in Benha City, because they are the two most important lively streets in the city.
- The Al-Rayyah and Kafr Mnaqer regions are devoid of automated teller machines, which have a population of 60,645 people and 36,112 people, respectively, Because of their relative distance from the vital area of the city.

B. Clients

The ATM network represents an important role in the dynamic development of banking services by providing multiple services to customers through electronic payment cards "Visa"(Pavel Leonov., etal,2020,p204).

Table (3): Population numbers in the shyakhas of the city of Benha between 1996 and 2017

Area	1996	2006	2017
Old Benha	12415	9989	13285
Manshiyya	15391	14768	19473
Kafr Mnaqer	26642	27239	36112
Al-Rayyah	35267	46012	60645
New Benha	46177	57912	78342
Total	135892	155920	207857

Source: From the researcher's work depending on the final results of the general census and the housing conditions of Qalyubia Governorate, Censuses (1996,2006,2017), unpublished data, Central Agency for Public Mobilization and Statistics.

The population of the city of Benha varies from one shiyakha to another according to the population census, as shown in Table (3). The new Shiyakha Benha comes in first place, as its population represents 37.78% of the total city's population, followed by Shiyakha al-Raya 29.18%, followed by Shiyakha Kafr Mankar 17.37% then The old shyakha of Benha is 9.36%, and the old Shiyakha Benha comes in last place, with 6.39% of the total population in the city.

The population of the city of Benha is 207857 thousand people according to the population census in 2017, and therefore the general average of the number of ATMs in the city of Benha is 3583 people / machine. This is in addition to about 70,000 university students who enroll in the university and pay visa fees, which contributes to overcrowding on ATMs. Plate (9), (10).



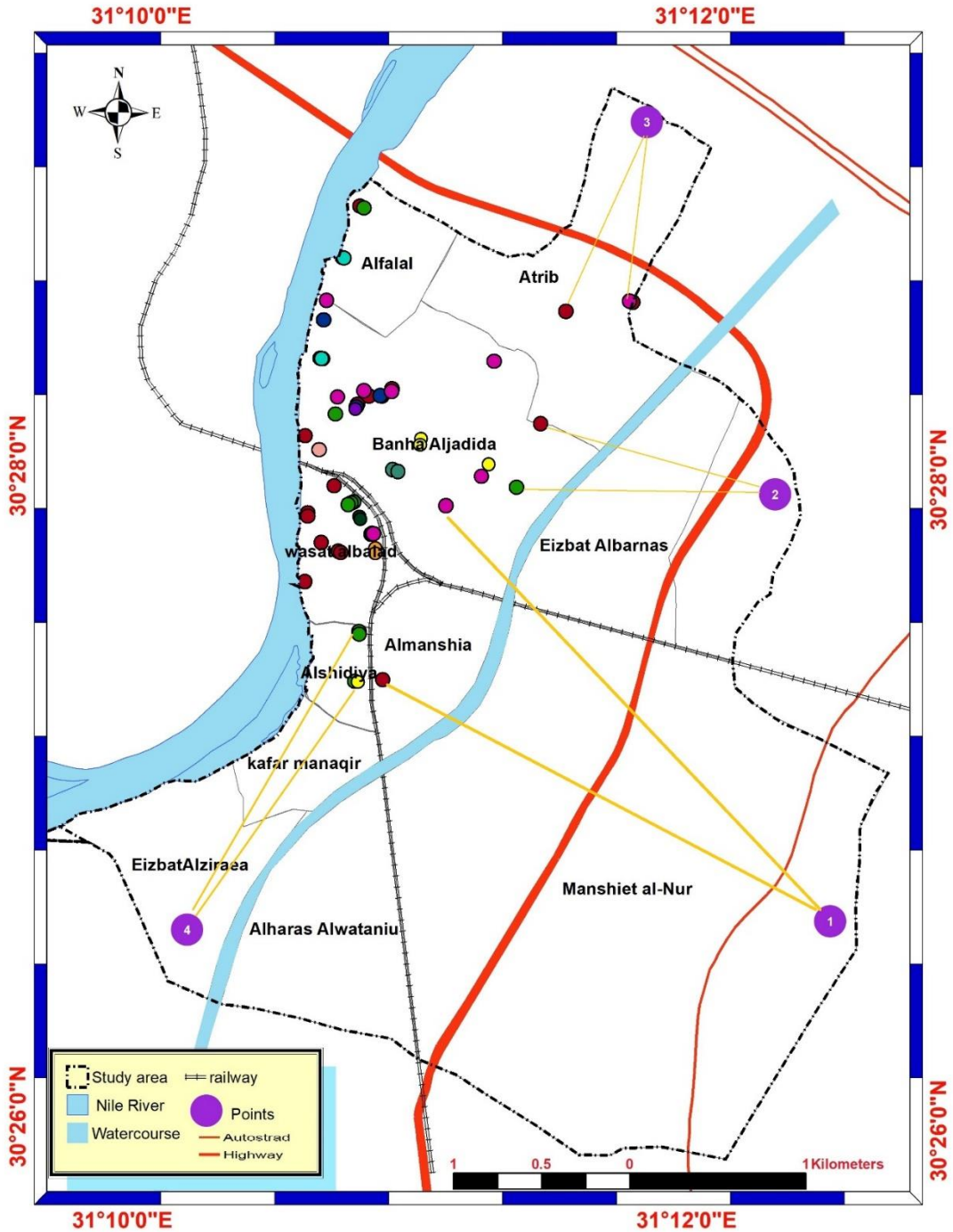
Source: Field work, July 2021

Plate (9,10) for clients during cash disbursement from ATM

5. The Results

Residents of the city of Benha suffer from overcrowding and overcrowding at ATMs, in order to obtain cash, and the customer may take a lot of time without interest, for several reasons, the most important of which are as follows:

- A. The small number of ATMs compared to the number of residents in the city of Benha, as the general average was 3583 people / machine. Which increases congestion and congestion during the cash exchange operations.
- B. The distance between some machines of the same type that requires more time, which is estimated at 20 minutes or more in order to exchange money from the nearest other machine. Fig (5) So a point (1) is 3 km away from the nearest ATM machine, while a point is (2) A distance of 1.3 km, while two points (3,4) are 1 km away from the nearest machine.
- C. Frequent technical faults at ATMs, including withdrawing the customer's visa and not giving it to the customer, executing the process of withdrawing cash by the customer without giving it to the customer and obtaining a receipt for the successful completion of the process.
- D. The working period of the ATM machines inside the hyper is limited to the period of the hyper's work only, what is inside the hyper is only for the period of the hyper's work, what is the place in the hyper for any reason the existing ATM machines are present due to the closure of the hyper as is the case in hyperkhair Our country is in the villas district of the new Benha region

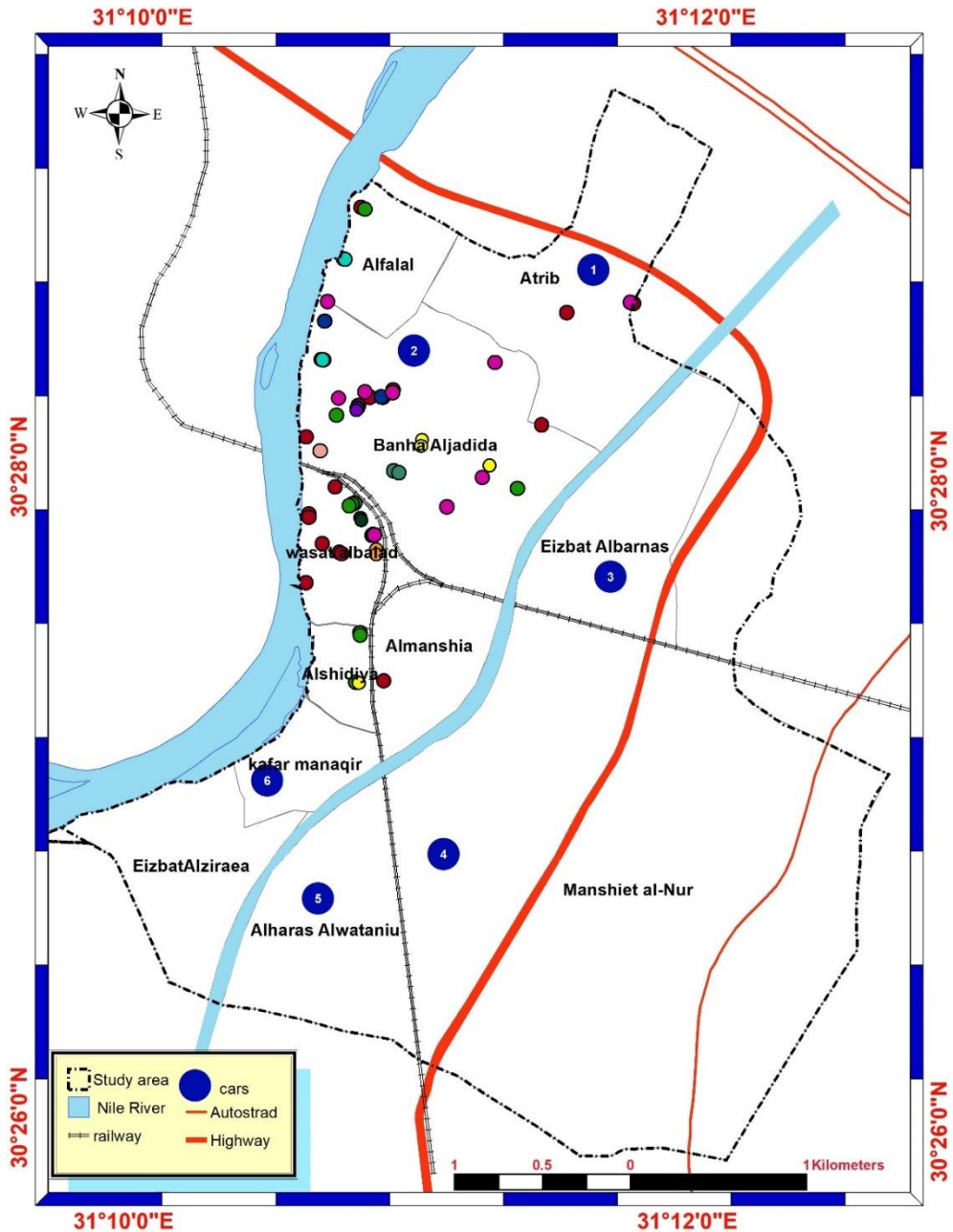


Source: From the researcher's work depending on the final The topographic (scale 1: 50000) produced in 1996 Egyptian Survey Authority, field work and Sentinel, 2021.

Fig (5) The distance it takes to reach the nearest ATM

6. Recommendations

a- Provide 6 mobile banking cars, especially in public places, as shown in Fig (6) and Plate (11).



Source: From the researcher's work depending on the final The topographic (scale 1: 50000) produced in 1996 Egyptian Survey Authority, field work and Sentinel, 2021.

Fig (6) Geographical distribution of the proposed locations of the cars of banks



Source: <https://www.nbe.com.eg/NBE/E/#/EN/Home>

Plate (11) Bank car model

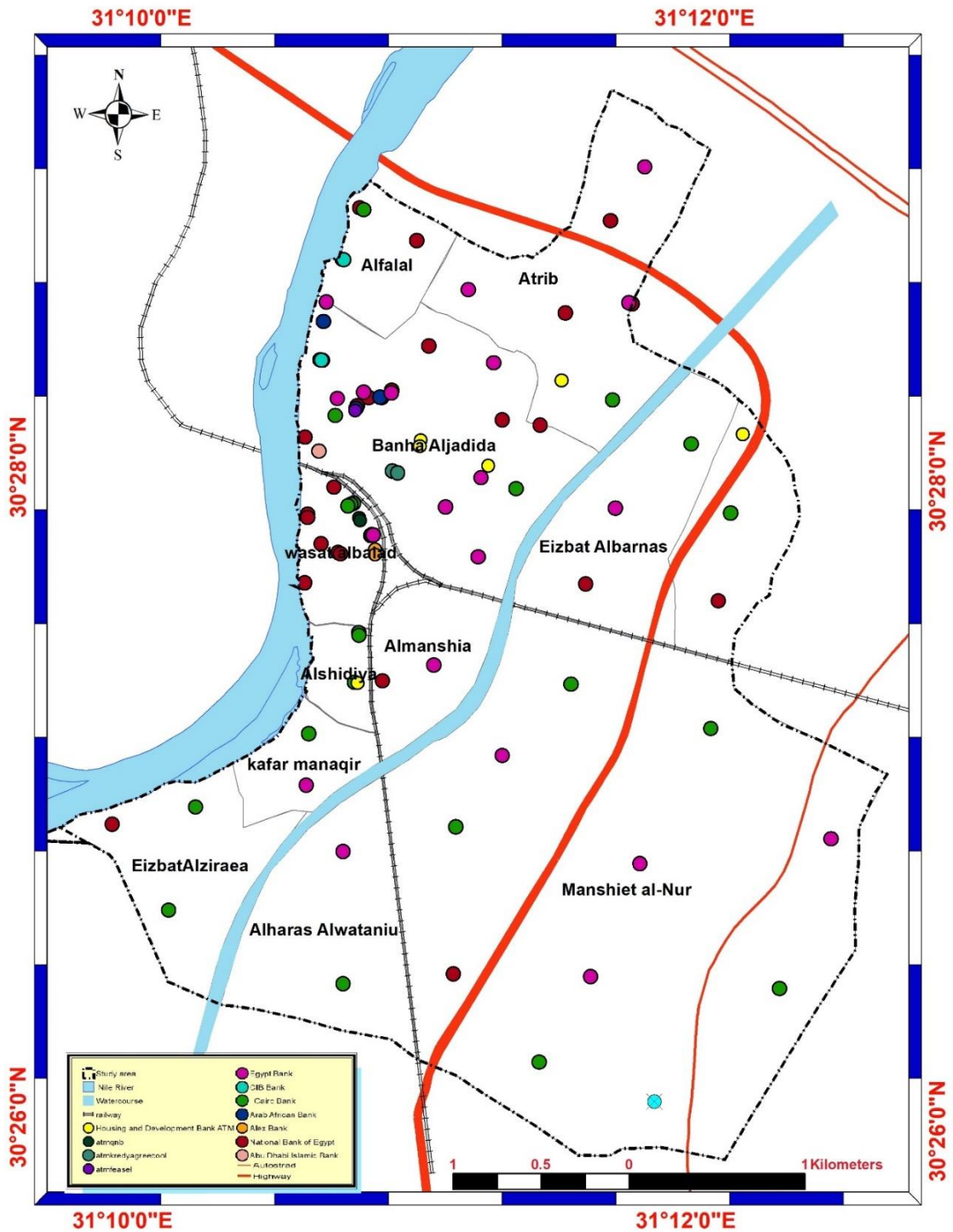
b- Reconsider the decision-makers of the ATM distribution map in Benha city Fig (7).

c- Establishing an interbank protocol that provides for withdrawal and deposit from any ATM machine without fees for clients.

d- Distributing the machines inside government institutions in a better way, which allows better service to the citizen or customer who does not belong to that institution.

e- Increasing the number of automatic teller machines, with good planning and choosing the ideal places in order to facilitate the customers.

f- Sending messages to customers' mobile phones by banks if there is any technical malfunction in a machine.



Source: From the researcher's work depending on the final The topographic (scale 1: 50000) produced in 1996 Egyptian Survey Authority and Sentinel, 2021.

Fig (7) The new geographical distribution of the ATM

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19- <https://www.nbe.com.eg/NBE/E/#/EN/Home>

التقييم المكاني لخريطة خدمة الصراف الآلي بمدينة بنها

الملخص:

تتناول هذه الدراسة تقييم خريطة شبكة ماكينات الصراف الآلي بمدينة بنها وسهولة الوصول إلي ماكينات الصراف الآلي من قبل المستفيدين والعملاء، وذلك وفقا لمعايير التوزيع المكاني لماكينات الصراف الآلي والحد من الازدحام عليها وما ينتج عنه فقد الكثير من الوقت من أجل الوصول لاقرب ماكينة صراف آلي، وقد يتراوح الوقت المفقود ما بين نصف ساعة أو ساعة فأكثر من أجل الوصول إلي اقرب ماكينة صراف آلي، وذلك نتيجة لتوزيع هذه الماكينات بشكل عشوائي أو أن معظمها يتركز في مكان واحد أو مكانين بالقرب من بعضهم البعض في منطقة الدراسة أو أن ماكينات الصراف الآلي موجودة داخل مؤسسات أو سوق تجاري ذات مواعيد عمل ثابتة. ويهدف هذا البحث إلى تحسين كفاءة خريطة خدمة الصراف الآلي ، ولتحقيق هذا الهدف تم استخدام عدة مناهج منها: المنهج التاريخي، بمساعدة عدة طرق بحثية كالدراسة الميدانية ، والتحليل المكاني ، والتحليل الإحصائي واستخدام نظم المعلومات والاستشعار عن بعد.

الكلمات المفتاحية : الصراف الآلي، التحليل المكاني، خريطة خدمات الصراف الآلي، مدينة بنها.