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Evaluation project - Automated Teller Machine (ATM)

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Introduction

The Automated Teller Machine has become an integral part of our society. Nowadays, some people can't imagine raising money without using the ATM. However, using an ATM can be a frustrating experience. How often have some of us experienced the people in the queue in front of you spending a lot of time and having difficulties with the ATM navigation menu? Why does this happen? It seems that many ATM navigation menus are not as intuitive or as efficient as they could be.

ATM - Automated Teller Machine. It is also referred to as a cash machine, a cash dispenser and 'the hole in the wall' among other names.
The ATM is an electronic computerized telecommunications device that provides the customers of a financial institution with access to financial transactions in a public space without the need for a human clerk or bank teller (the person in the bank who gives out money to customers).
ATM's are activated by inserting a bank card (cash or credit card) into the card reader slot. The card will contain the customer's account number and some security information, such as an expiration date or CVC (CVV). Security is provided by the customer entering a personal identification number PIN. When a customer is trying to withdraw cash, for example, the ATM calls up the bank's computers to verify the balance, dispenses the cash and then transmits a completed transaction notice.

As part of this project, I will perform an evaluation of an ATM machine. In this project, you can find a report and a description of the way the interaction and the evaluation were carried out. I will show in my personal example which difficulties I had with using ATM and I'll give my opinion on how better solutions can be found and how ATM machines can be improved.
At the end of the project, I will give a conclusion of the evaluation, with useful suggestions and improvements.

Background

The idea for an ATM originally was to simply replace or reduce the workload of a bank teller. The ATM would help reduce bank's overheads as wages would be decreased.

The ATM made its debut at Barclays' Enfield Town branch in north London in June 1967. Its invention is credited to British inventor John Shepherd-Barron. The story goes that Mr. Shepherd-Barron saw vending machines selling chocolate bars and asked why a similar machine couldn't be used to dispense cash. Bank tellers issued paper vouchers with unique codes that allowed customers to take out a maximum of £10 at a time.

In 1970, just a few years after the introduction of the ATM, the patent was granted for British engineer James Goodfellow's concept of a personal identification number (PIN) that could be stored on bank cards. This was a landmark moment in the growth of self-service banking, as it allowed machines to verify the identity of a customer without human intervention.

ATM popularity continued to grow in the early 1970s, with 1,000 ATMs installed around the world by the end of 1971, as financial institutions looked to offer self-service convenience to consumers. Many banks continued to deploy this technology over the rest of the decade. In 1977, Citibank invested more than $100 million in the installation of ATMs across New York City. It was seen as a gamble at the time, but when a blizzard hit the city, banks were forced to close for days and ATM use rose by 20 percent.

It was in 1977 that NCR launched its first ATM, the NCR model 770. An easy-to-operate self-service terminal that allowed financial institutions to offer services 24/7. It was a self-contained unit including terminal, controller, cash dispenser and depository, all within one safe. By the early 1980s, NCR had launched the 5070 ATM – an ATM developed in Dundee that achieved global success through new standards of excellence based on reliability, flexibility and customer requirements. It was also based on totally new software and an electronics platform enabling connections to worldwide networks.

By 1984, there were 100,000 ATMs installed. The growth since then has been huge. There are now more than three million ATMs operational around the world.

Before interaction and evaluation, I will say more about ATM cards and parts of the ATM machine. If you have a bank account there is a good chance that you have an ATM card, which stands for Automated Teller Machine. The card gives you the ability to go to an ATM and perform transactions. Every customer has a four-digit pin code,

as a matter of security must be keyed in before transactions that can be performed. Customers have access to their funds 24 hours per day, seven days per week. There are many different types of cards used to make purchases or withdraw money. There are several different types of cards that fall under the category of an ATM card.

Basic ATM Card: Your basic ATM card only has a few uses. It can be used at any ATM machine for the bank that issued it and sometimes at other banks for a fee. You can use your ATM card to withdraw and deposit money, check your account balance and transfer funds.

Debit ATM Card: An ATM debit card has all the features of a regular ATM card with the added features of a debit card. This card can be used to make purchases at any store or online. Every time when ATM debit card is used – money is taken out of the checking account it is linked to.

ATM Credit Cards: A new type of debit card is available at some banks. This type of card has all the features of the ATM debit card plus the features of a credit card. Credit cards allow a consumer to purchase goods and services by borrowing against an approved line of credit. It is a loan. Purchases made during the month are billed to the consumer and the consumer pays the bill at a later date.

There are mainly two input devices and four output devices for an ATM. The input devices are (Figure 1):

Card Reader: This is a part of the identification of your particular account number. For this, the magnetic stripe on the back of the ATM card is either swiped or pressed on the card reader so that it captures your account information.

Keypad: After the card is recognized, the machine asks further details like your personal identification number (PIN) the type of withdrawal you prefer, your balance inquiry and so on. The keypad is used to interact with the machine.

There are mainly four outputs. They are (Figure 1):

Speaker: When a particular key is pressed, the speaker provides the feedback as audio.

Display Screen: The questions asked by the ATM machine regarding the transaction and the input from the user are all displayed on the display screen. Each step of withdrawal is shown by the display screen.

Receipt printer: All the details regarding your withdrawal like the date and time and the amount withdrawn and also the balance amount in the bank is also shown in the

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receipt.

Cash dispenser: This is a central system of the ATM machine. This is from where the required money is obtained. From this portion, the person can collect the money.
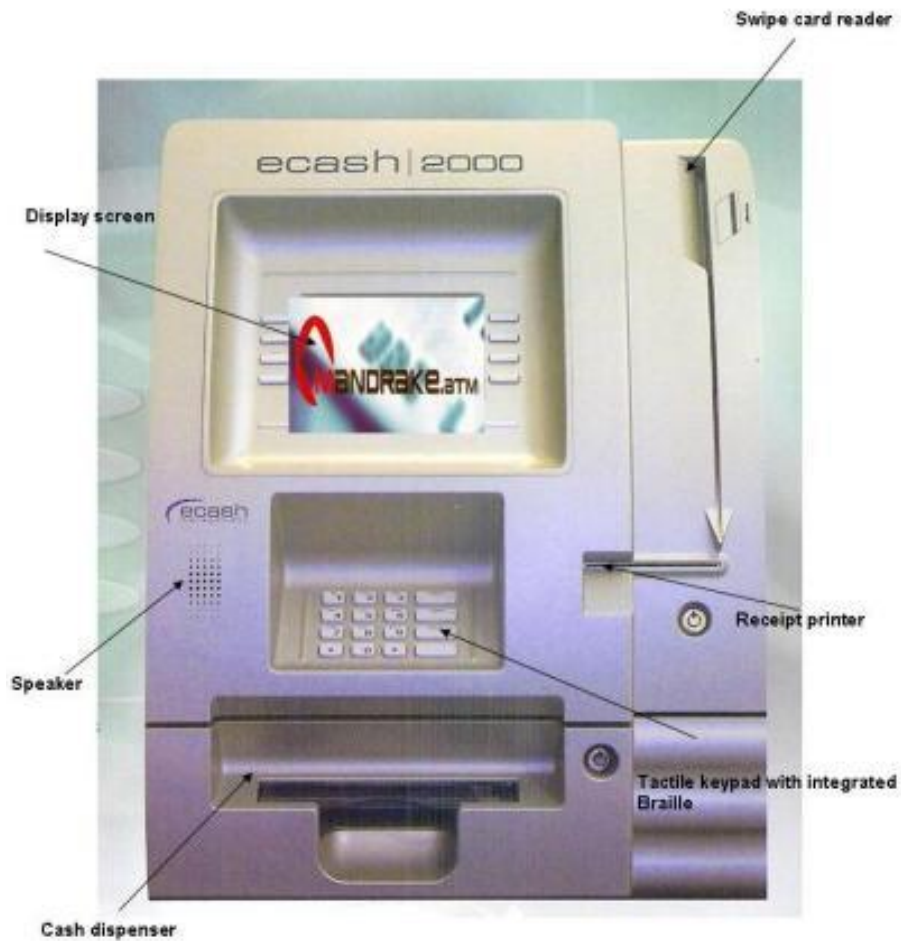

Figure 1: Parts of the ATM machine

Interaction and Evaluation

Interaction and evaluation were performed on an ATM machine in Figure 2.

Figure 2: ATM machine

The evaluation was carried out in this way:

1. Find an ATM machine.
I chose an ATM machine (Figure 2) near my apartment in Panormou. ATM was part of the *ALPHA BANK* (Figure 3). On approaching the ATM machine I looked at other people. If you are uncomfortable with the area or the people around the machine, you should find a different machine or use the machine some other time. After making sure it was safe, I got in line behind a few people and waited for my turn.

Figure 3: ALPHA BANK - Panormou

2. Insert your ATM card into the machine.

After my turn, I approached the machine and looked where is card reader (Figure 4).
I found it easily, because it was well marked (green circle). The disadvantage of this
marking is that because it wasn't drawn which side of the card should be inserted
first. This wasn't a problem for me because I had experience with using an ATM
before, but it can be a problem for people who use the ATM for the first time. I
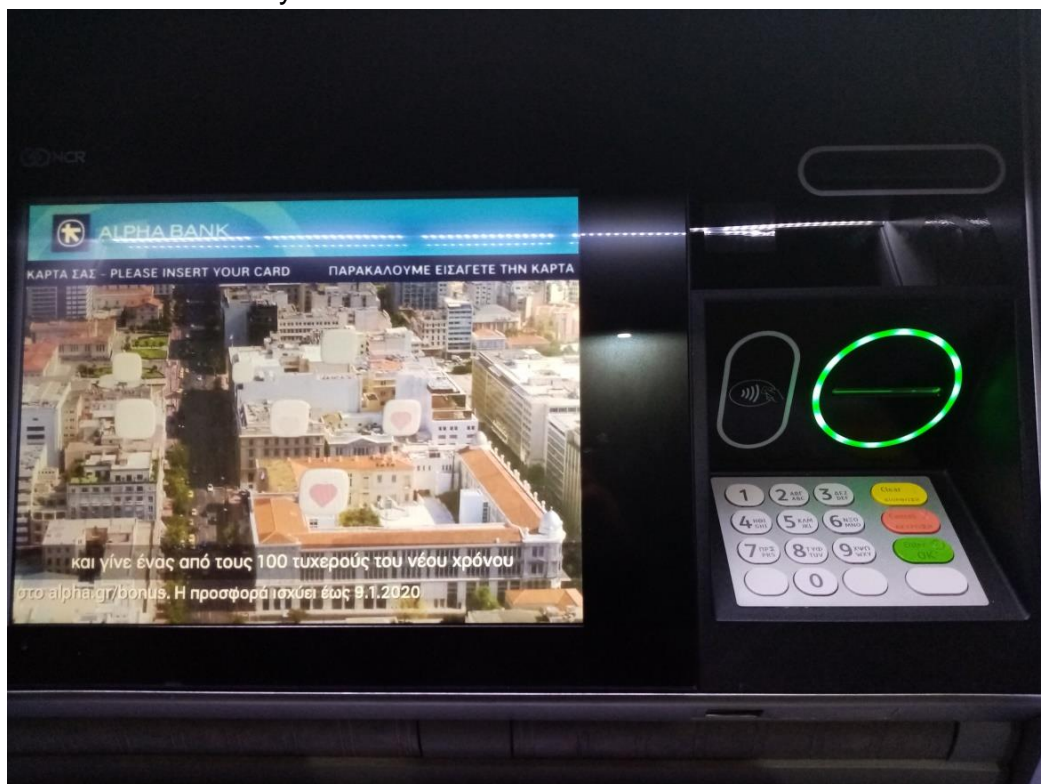inserted the card correctly.

Figure 4: ATM screen

3. Initial Screen.

After inserting the card I got information that Alpha Bank implements the EU General Data Protection Regulation (GDPR) and I had two options: CANCEL or CONTINUE (Figure 5). I chose the second option (I clicked on the touch screen). ATM machine recognized that my card is from another country (Serbia) and I automatically got a menu in the English language.
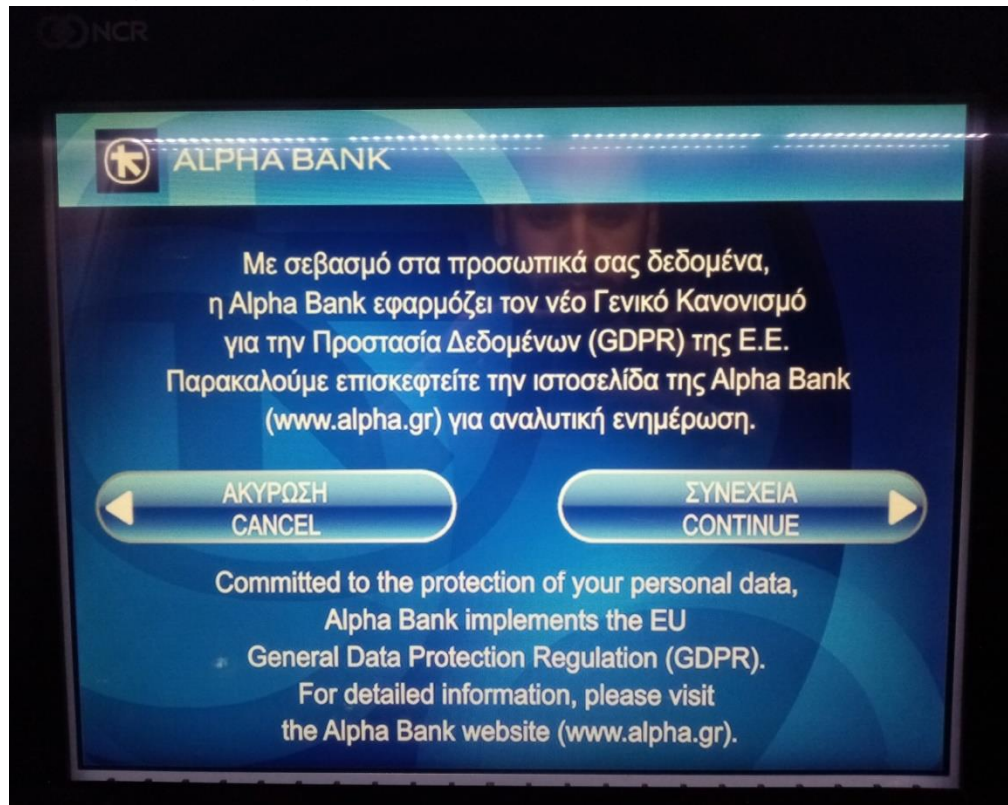

Figure 5: Initial Screen

4. Enter your PIN (Personal Identification Number).

I pulled up close to the ATM machine so no one can see my PIN. I entered the PIN and then I pressed Enter - Green button on the keypad (Figure 6).
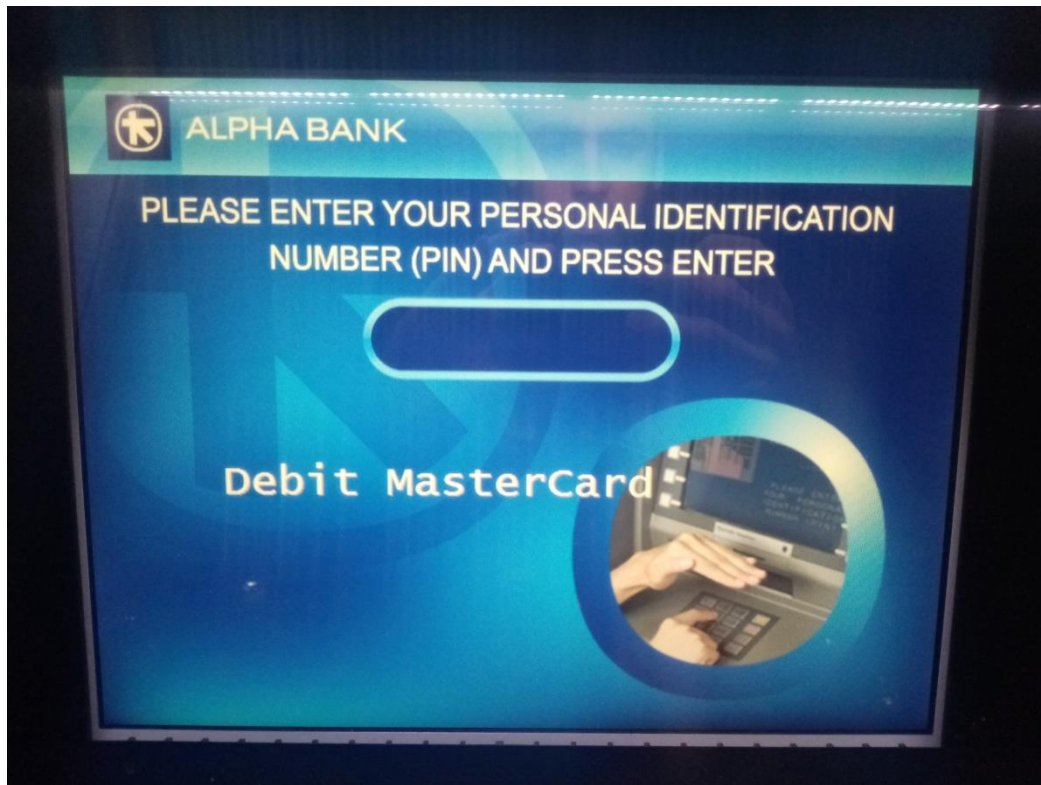

Figure 6: Enter the PIN

5. Select an option (CASH WITHDRAW)

After I entered the PIN, the following options appeared on ATM's screen (Figure 7):

- CASH WITHDRAWAL
- ACCOUNT BALANCE
- PIN CHANGE
- PIN UNBLOCK

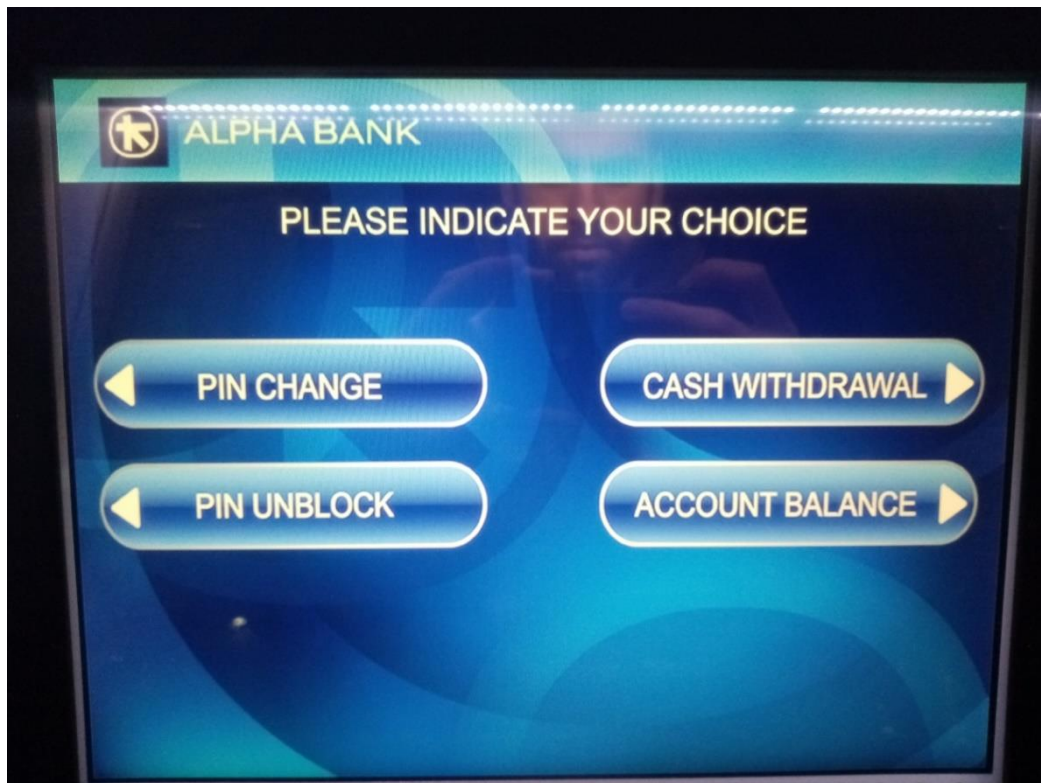I chose the option CASH WITHDRAW (take out money).

Figure 7: Select an option

6. Select an account type

After I chose option CASH WITHDRAWAL, I got an option to select an account type
or to do other transactions (Figure 8).

The following account types appeared on my screen:
- SAVINGS ACCOUNT
- CHECKING ACCOUNT
- CREDIT CARD

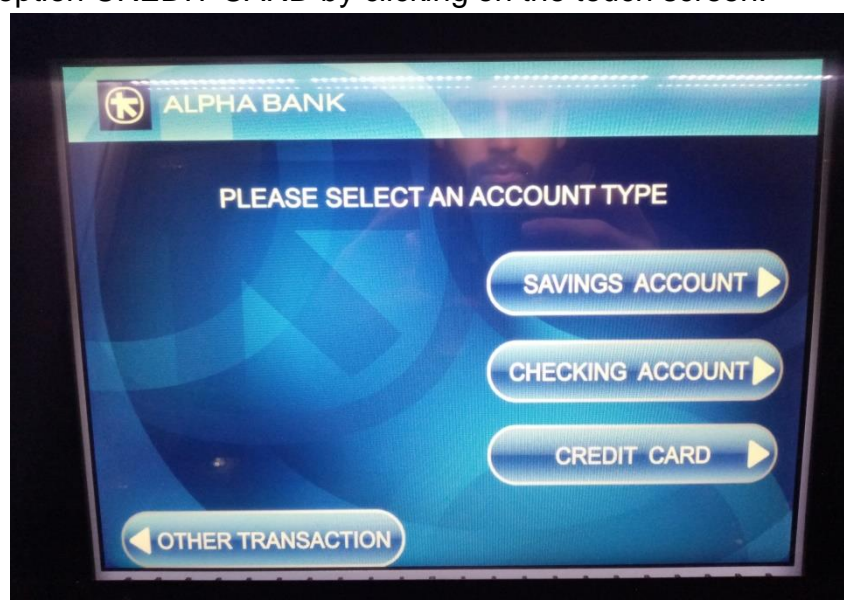I chose the option CREDIT CARD by clicking on the touch screen.

Figure 8: Select an account type

I entered a number (50) on the keypad and after that I chose option CONTINUE by clicking on the touch screen.

7. Select an amount of money.

After I selected the account type, I got an option to select or enter another amount of money (Figure 9).

Most machines dispense money in fixed amounts. You may be given a choice between common amounts or you may be asked to enter the amount of money. I chose the option OTHER AMOUNT by clicking on the touch screen.

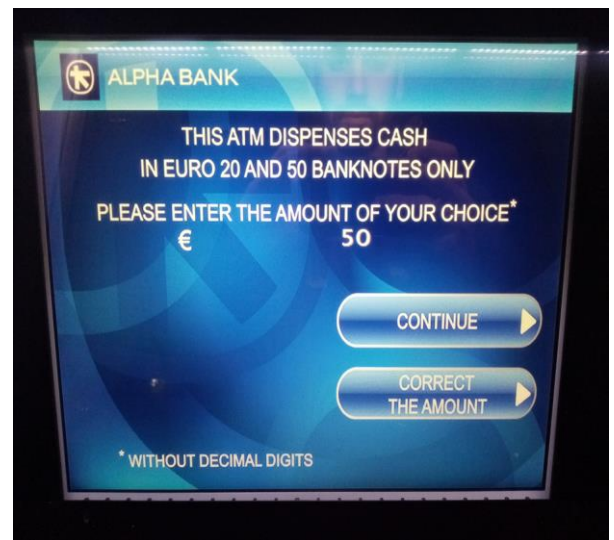**Figure 9:Select an amount**

Figure 10: Enter the amount

8. Enter the amount of money.

After I chose the option OTHER AMOUNT, I got an option to enter the amount of money (Figure 10). This ATM dispenses cash in euro 20 and 50 banknotes so I had to enter number that is a multiple of 20 and(or) 50 (20,40, 50, 100, etc.). I entered a number 50 on the keypad and after that I chose option CONTINUE by clicking on the touch screen. After I clicked option CONTINUE, the following content appeared on ATM's screen – Figure 11, I got a notification that Alpha Bank will charge a 2.50 € access fee for this withdrawal transaction. I chose option CONTINUE by clicking on the touch screen.
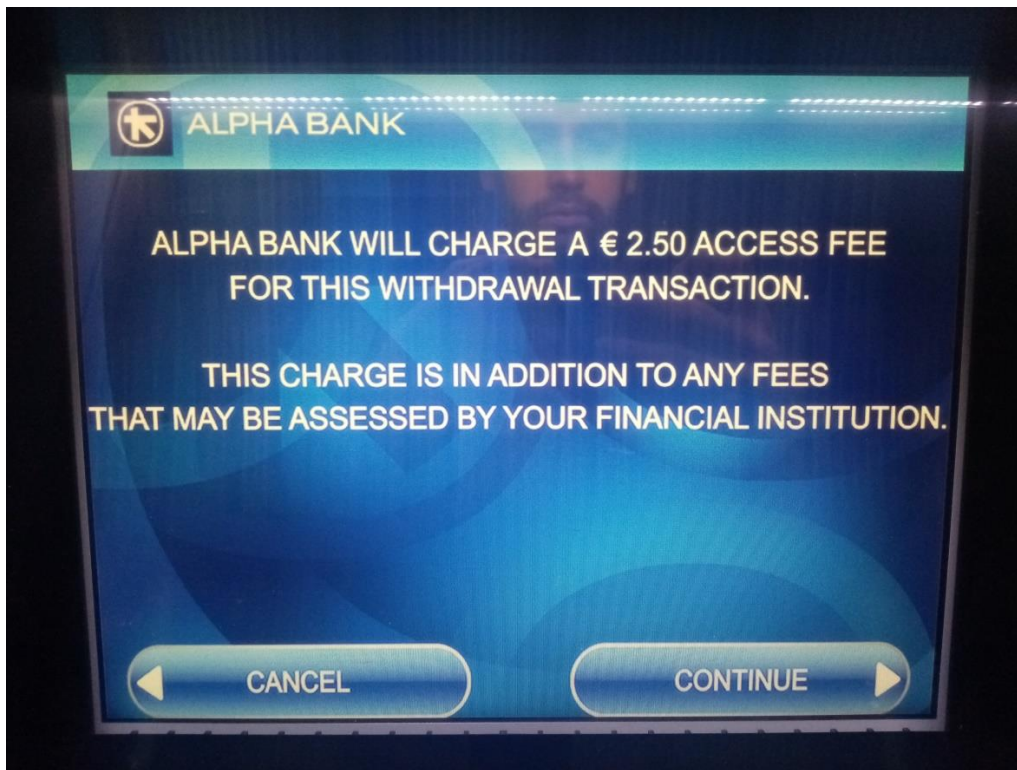
Figure 11: Access Fee

9. Wait while the system processes transaction

When the machine finished with processes I heard a beep from the machine. After that, first, the card appeared in the reader card slot and I took it. After that, the cash dispenser's door opened and I took my money and put it directly in my wallet. After that, I took the receipt from the receipt printer.

10. Select an option (ACCOUNT BALANCE)

I wanted to check other transactions so I repeated steps **2.** and **3.**
After I entered the PIN, the following transaction appeared on ATM's screen (Figure 7):

- CASH WITHDRAWAL
- ACCOUNT BALANCE
- PIN CHANGE
- PIN UNBLOCK

I chose the option ACCOUNT BALANCE.

11. Account Balance

After I chose the transaction ACCOUNT BALANCE, the following content appeared on ATM's screen - Figure 12 and receipt with account balance appeared from receipt printer, so I took it.
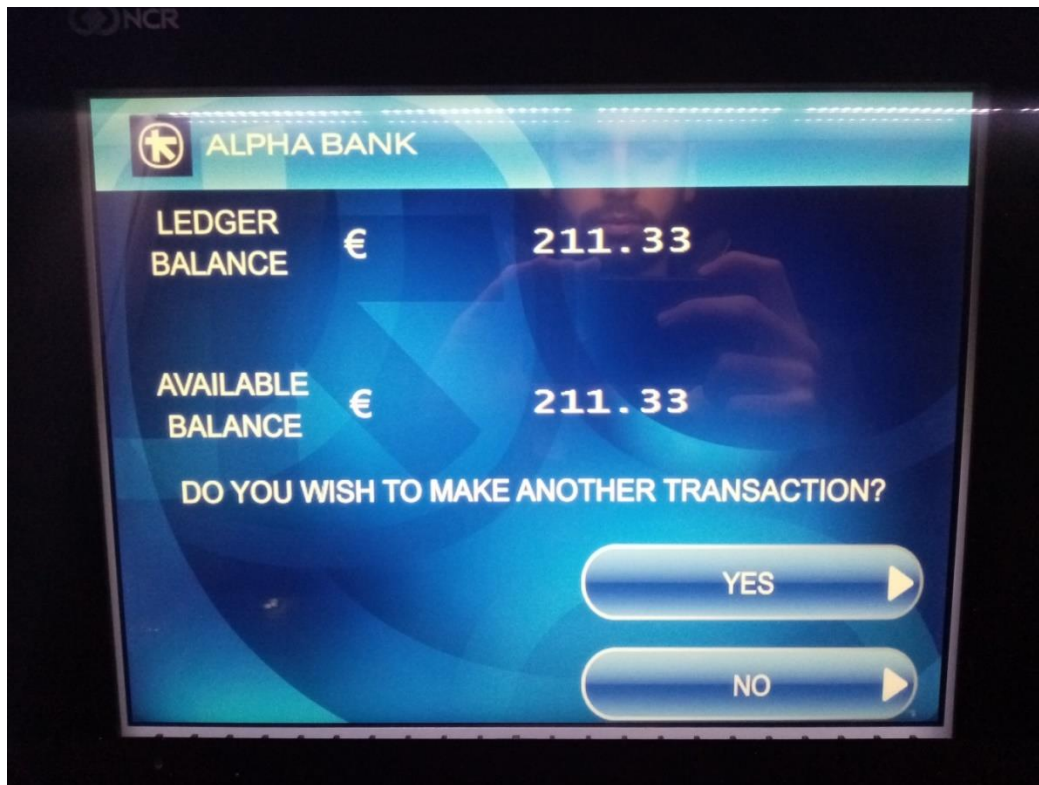
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Figure 12: Account Balance

I got an option to make another transaction if I want it, so I select YES by clicking on the touch screen. After that, I had to enter my PIN again, before another transaction (Figure 6).

12. Select an option (PIN CHANGE)
After I entered the PIN again, the following option appeared on ATM's screen (Figure 7):
- CASH WITHDRAWAL
- ACCOUNT BALANCE
- PIN CHANGE
- PIN UNBLOCK

This time, I chose the option PIN CHANGE.

13. Pin Change
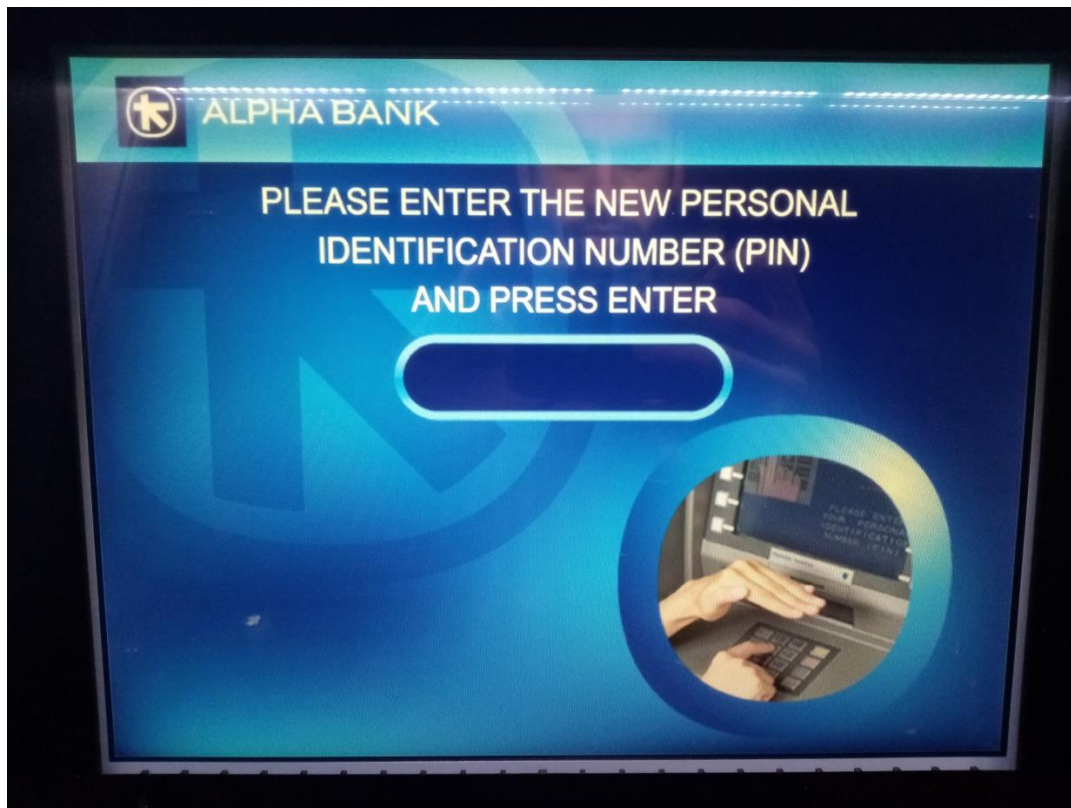After I chose the option PIN CHANGE, the following content appeared on ATM's screen – Figure 13.

Figure 13: Enter the new PIN

I didn't want to change my PIN, so I just pressed Cancel - Red button on the keypad. After that, the following content appeared on ATM's screen – Figure 14 and the card appeared in the reader card slot and I took it.

Figure 14: Cancel of Transaction
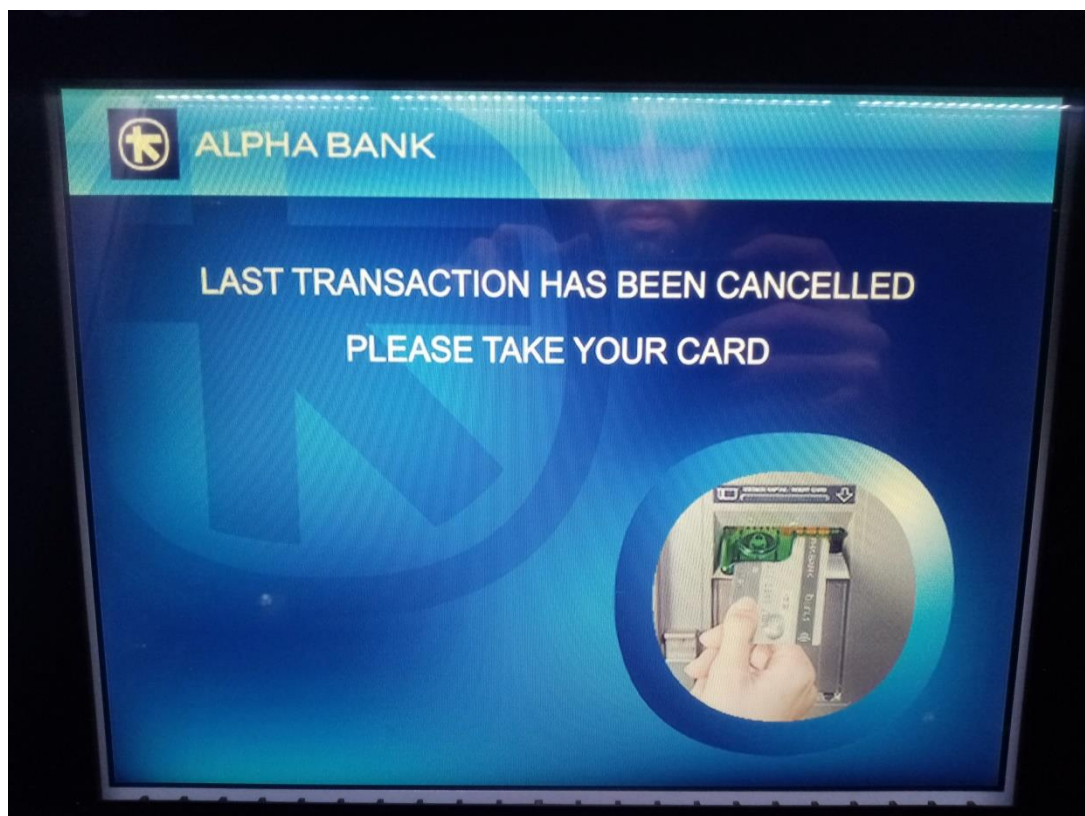
My friend (Marija) from Serbia, who came to visit me, hadn't experience with ATM machines before and I was curious how she would handle it. So, she helped me with the evaluation of this ATM machine (Figure 15 and Figure 16).

I will describe the problems she had in the next chapter.

Figure 15: Me during interaction with ATM

Figure 16: Marija during interaction with ATM

Findings and Improvements

Findings, Improvements and the problems that my friend and I discovered during the evaluation and interaction with ATM machine are:

Problem with waiting in the queue:
In some parts of the day, large queues can be created in front of the machine and this can be very irritating. If users ahead of you in the queue have difficulties in using the machine, this will increase the time waiting in the queue.
This problem can be solved by installing more ATM machines and making it easier to use ATM machines, so they don't take much time.

Wrongly inserting the ATM card:
I didn't have this problem because I already had experience with using ATM machines, but my friend Marija had this problem during interaction with the ATM, because she wasn't sure where is a card reader and which end of the card to insert first. This problem is more common with new ATM users who aren't familiar with their card and the ATM.
This problem can be solved by marking a card reader with a symbol that shows how to insert a card.

Inability to see the ATM screen well:
In some parts of the day, due to the influence of the sunlight, it can be difficult to view the contents of the ATM menu. This depends on the location of the ATM in relation to the position of the sun.
This problem can be solved by placing a shield around the machine that creates a shade or can be used more quality ATM's screen that is more resistant to sunlight.

Getting the required amount of money:
Some ATM's may not offer the user the required amount of money they want on the initial cash withdrawal screen. The user will have to use a few more keystrokes to select the required amount. For example, I wanted to withdraw 150 €, so I have to select the 'other amounts' option, then type in '150' using the keypad and then press 'enter'.
This way doesn't take so much time, but it can be solved in a better and faster way, one of them is to enter the amount of money by voice.

Understanding how to perform operations:
Some ATM users find the instructions on how to perform operations quite difficult to understand. For example, I didn't understand the meaning of operations PIN UNBLOCK and how to perform these operations.

ATM card is returned before another transaction:

The card was returned to me after I completed a cash withdrawal transaction, although I wanted to perform another operation (such as check balance). Often the ATM card is returned to the user while further operations are required. This will lead to the customer having to re-insert their ATM card, further increasing their time spent at the ATM.

This problem can be solved by asking if we want to make an additional transaction before returning the card.

A design problem with ATM navigation menu:

We didn't have a design problem with a navigation menu on this ATM machine, but I had a design problem with a navigation menu on ATM machines that I used in Serbia earlier. The problem was that the navigation menu options aren't aligned with their corresponding menu key. That can be very confusing because you aren't sure which option you selected.

Conclusion

The ATM's have gained worldwide popularity within a few years. ATM machines are easy to operate and hence, attract more and more customers. There are quite of innovations, which are being taken place in the ATM machine. The locations of ATM's are the key location of any particular area. ATMs are a form of easy banking. The customers using the ATM machine are satisfied with the service and have less complaints about the machines. In the near future, the banks have also promised to come up with new innovations in the ATMs.

Useful suggestions:

Find an ATM machine in a safe place:
If you use an ATM machine during the night, find one that is in a well-lit place. If you spot suspicious people nearby, then find another place with the ATM machine.

Minimize your time at the ATM:
The more time you spend at the ATM, the more vulnerable you are. After the transaction, if you think you are being followed, go to an area with a lot of people and call the police.

Avoid using ATMs at night:
There is a risk of robberies, especially at night. If you have to use an ATM late at night, use one at a bank itself. They are well-lit and they also have cameras on all the ATMs.

Keep your card and receipts before leaving the place:
Before you leave the machine, make sure you have your card and your receipts! Receipts are very important because they contain information about your bank account.

Memorize your PIN:
I saw a couple of times that cardholders walk up to an ATM and pull out a piece of paper containing four numbers. If you are not sure, make it a point that you don't keep the PIN and ATM card together in your wallet – If someone steals your wallet, they're going to have all your information right there. Don't write down the PIN number – it should be memorized.

Change your PIN:
If you suspect someone has reached your PIN, change your PIN immediately.

Never provide information via e-mail:
About 3.5 percent of ATM fraud originates from 'phasing' e-mails. Fraudsters attempt to obtain information about your bank account by asking for your PIN, account

number and personal information. These e-mails appear legitimate and the most important thing is to report e-mails like this and don't share information about your bank account!

Card security and the protection of information are some of the most important things. Card abuse and fraud are common at this time, so it is important to increase security as much as possible. One of the ideas is to use biometrics for security purposes – the authorization of transactions can be based on the scanning of fingerprints, the eye or face, so this could prevent card abuse in the future.

ATM Advantages and Disadvantages.

ATM Advantages:
- Ability to draw cash outside normal banking hours.
- It is faster than using normal cashier services.
- Although ATMs are primarily located on bank premises, some are available elsewhere.
- Where an incorrect PIN is used several times in succession (say where a thief has stolen the card), the ATM will retain the card.
- ATM service is available 24 hours a day, 7 days a week.
- It helps to check the balance in an account.
- It is easy, saves time for customers.

ATM Disadvantages:
- May be ATM's may not be situated nearby when it is urgently required.
- If someone watches or hacks the ATM machine then details of customers can be misused.
- Banks have maintained a limit of the amount of money per transaction (this information is displayed on the ATM). There is a maximum limit per day and no one can withdraw money beyond this limit.
- If a person doesn't have sufficient money in its account, then in this case, the ATM may not recognize his card.

The emergence and development of the ATM over the past five decades has had a transformative effect on the banking industry. Now it's time to look forward to what we can achieve in the decades to come.

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