

DEMOCRATIC AND PEOPLE'S REPUBLIC OF ALGERIA
MINISTRY OF HIGHER EDUCATION AND SCIENTIFIC RESEARCH
MOHAMED BOUDIAF UNIVERSITY - M'SILA

**FACULTY: MATHEMATICS AND
COMPUTER SCIENCE**

**DEPARTMENT OF COMPUTER
SCIENCE**

N °:



**DOMAIN: MATHEMATICS AND
COMPUTER SCIENCE**

SECTOR: COMPUTER SCIENCE

**OPTION: INFORMATION SYSTEMS AND
SOFTWARE ENGINEERING**

Thesis

Submitted in partial fulfillment of the requirements

For the degree of academic Master

By: Bennacer Salima

Barkati Nassiba

Building An Islamic Banking System

Presented to the jury composed of:

.....	University of M'sila	President
Mm. HELASSA Madiha	University of M'sila	Reporter
.....	University of M'sila	Examiner

Academic Year: 2019/2020

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DEDICATION

I dedicate this humble work to:

My dear parents who have never stopped helping me and encouraging me throughout my journey as no one.

My brother, my sister and all my family.

All my friends.

My partner and her whole family.

Salima

I dedicate this modest work to:

My dear parents who have never stopped helping me and encouraging throughout my journey as no one.

All my family, brothers and sisters and their husbands.

All my friends.

My partner and her whole family

Nassiba

TABLE OF CONTENTS

List of Figures.....	v
List of Abbreviations.....	vi
General Introduction.....	vii
Chapter 1: Banking System	
1 Introduction.....	3
2 Origin and Development of Banking	3
3 Definition of Bank.....	3
4 Technologies in the Banking Sector.....	4
4.1 Automated Teller Machine.....	4
4.2 Mobile Banking.....	5
4.3 Tele Banking	5
4.4 Core Banking.....	6
4.5 Electronic Funds Transfer.....	6
4.6 Real Time Gross Settlement.....	7
4.7 Electronic Clearing Service.....	7
5 Telecommunications for Banks.....	8
5.1 Internal Needs.....	8
5.2 External Needs.....	8
6 The Different Actors in the Bank.....	8
6.1 Suppliers.....	8
6.2 Customers.....	9
7 Securing Online Payments.....	10
8 Types and Tools of Electronic Payment Methods.....	10
8.1 Bank Cards.....	10
8.2 Electronic Checks.....	10
8.3 Electronic Money.....	10
9 Development of Banking Services and Adoption of Electronic Banking in Algeria.....	11
9.1 Domestic Banking and Electronic Payment by Telephone	11
9.2 Operation of the Algerian Electronic Banking Services...	11

9.3 Operation of Estrom Technology for Packing Using Bank Card	11
10 Conclusion.....	12
Chapter 2: Islamic Banking System	
1 Introduction.....	14
2 Definition of Islamic Banking.....	14
3 Objectives of Islamic Bank.....	15
4 Characteristics of Islamic Bank.....	15
5 Islamic Banking Services.....	15
6 Islamic Finance Services.....	16
6.1 Mudharaba (Profit Sharing).....	16
6.2 Musharaka (Joint-venture).....	17
6.3 Murabaha (Cost Plus).....	17
6.4 Wadeea'a (Safe Keeping).....	18
6.5 Ijar (leasing that ends with Ownership).....	18
6.6 Gardh Hassan (Free Loan).....	18
6.7 Bai-Assalam.....	19
6.8 Rent.....	19
6.9 Sokook or Islamic Bonds.....	19
6.10 General loans.....	19
7 Islamic Bank Activities.....	19
8 Products Offered by Bank El-Baraka.....	20
9 The Differences Between Islamic Banks and Conventional Banks in the Banking Operations.....	21
10 The State of the Art.....	22
11 Conclusion.....	24
Chapter 3: System Conception	
1 Introduction.....	26
2 Application Goals.....	26
3 Services of Application.....	26
4 Analysis and Conception.....	27
4.1 Global Use Case Diagram.....	27
4.2 The Sequence Diagrams.....	27
5 Conclusion.....	29

Chapter 4: System Implementation

1	Introduction.....	31
2	The language and the programming environment.....	31
	2.1 NetBeans.....	31
	2.2 Start UML.....	31
	2.3 JAVA programming Language.....	32
3	Presentation of the Application.....	32
	3.1 Login Interface.....	31
	3.2 Main Interface.....	31
	3.3 Customer Management.....	32
	3.4 Account Management.....	33
	3.5 Islamic Banking Services.....	33
	3.6 Murabaha Interface.....	34
4	Conclusion.....	34
	General Conclusion.....	35
	Bibliography	

LIST OF FIGURES

Figure 1.1	Participants of the ATM process.....	5
Figure 1.2	Overview of Core Banking System.....	6
Figure 1.3	Real Time Gross Settlements.....	7
Figure 2.1	Traditional Banking Processes.....	14
Figure 2.2	Islamic Banking Processes.....	14
Figure 2.3	Islamic Banking Services.....	16
Figure 2.4	Mudharaba Contract.....	16
Figure 2.5	Musharaka Contract.....	17
Figure 2.6	Murabaha Contract.....	17
Figure 2.7	Ijar Contract.....	18
Figure 3.1	Global Use Case Diagram.....	27
Figure 3.2	Sequence Diagram create new customer.....	28
Figure 3.3	Sequence Diagram Murabaha transaction.....	28
Figure 4.1	Login Interface	32
Figure 4.2	Main Interface.....	33
Figure 4.3	Customer Management Interface	33
Figure 4.4	Account Management Interface.....	34
Figure 4.5	Islamic Banking Services Interface.....	34
Figure 4.6	Murabaha Interface.....	35

LIST OF ABBREVIATIONS

AGB	Gulf Bank of Algeria
ATM	Automatic Teller Machine
AVR	Automatic Audio Recorder
BPEL	Business Process Execution Language
CBS	Core Banking System
Core Bank	Centralized Online Real-time Electronic Banking
ECS	Electronic Clearing Service
EFT	Electronic Funds Transfer
ESB	Enterprise Service Bus
IBS	Islamic Banking System
ICT	Information and Communication Technologies
IB	Islamic Banking
PSIA	Profit Sharing Investment Account
RTGS	Real Time Gross Settlement
SATIM	Société Algérienne D'automatisations Des Transactions Interbancaires de et Monétique
SOA	Service Oriented Architecture
TPE	Electronic Payment Terminal
P2P	Peer to Peer
UML	Unified Modeling Language

GENERAL INTRODUCTION

Today, software and systems are the key of business success. The efficiency of systems has played a key role in determining the success of the business.

In fact, the banking industry as a distribution system environment depends on the speed and speed of its implementation in order to provide banking services and products.

Banks are the main pillars on which countries depend for the development of their economies, because they have an important and effective role in linking economic processes and trade deals, in order to revitalize all sectors that contribute to the building of each country's economy.

The rise of Islamic banks for doing business has had a major impact on the need for a better assessment of the value of businesses cultivated by Information Technologies investments.

On the other hand, Islamic banking relies on a financial system based on Islamic law, which is transformed by the Islamic economy. Islamic law also prohibits the payment and collection of interest or Riba, so it is at a critical stage in dealing with banks.

Most of the work in this field has been devoted to the development of Islamic business transactions that contribute significantly to the activation of the e-commerce service, which has recently become necessary in the global financial environment.

These banking Islamic systems also provide a new addition to Islamic-style e-commerce and provide a significant development in both sharia-compliant electronic and financial trading structures.

Organization of the Thesis

This brief is organized into four chapters:

- In the first chapter, we talk about banks, giving their definition, the information systems used in them, as well as the types of electronic payment methods. On the other hand, we will determine the telecommunications, in particular, different actors for banks. The last point of this chapter will be the development of banking systems in Algeria.
- The chapter two presents Islamic banks, their main characteristics and objectives. Then describes the various financing services and some products offered by Islamic banks in Algeria Finally, we give the main differences between Islamic and traditional banks.
- In chapter three, we provide some concepts related to the application of Islamic banking.
- In the fourth chapter we address the design and the implementation of transactions in our project.

CHAPTER 01

BANKING SYSTEM

CHAPTER 01

BANKING SYSTEM

1 Introduction

The banking system occupies an important place in the country's economy. The banking institution is indispensable in a modern society. It plays a pivotal role in the economic development of the country. To compete with private banks, public sector banks are now undergoing significant changes in the image and customer-friendly plans.

One of the current trends in the banking industry is increased competition and technology-based products. Technology-oriented banking has become one of the latest mantras of success in the market specially to win customers. Due to the entry of private banks renowned for their technical an.

2 Origin and Development of Banking

There seems to be no consistency among economists about the origin of the word "bank". It was thought that the word "bank" was derived from the German word "bank", which means a contribution from a company or from the Italian word "banco", which means a pile or a pile.

In other words, the development of commercial banking in the past was closely linked to money-changing businesses. In simple words, the bank refers to an institution that deals with money. This institution accepts deposits from the people and gives loans to those in need. Besides dealing in money, in our days the bank performs various other functions, such as creating credit, job agency and public service. [14]

3 Definition of Bank

“Banking Company is one which transacts the business of banking which means accepting for the purpose of lending or investment of deposits money from the public repayable on demand or otherwise and withdraw able by check, draft, order or otherwise”.[14]

Dictionary meaning of the Word ‘Bank’ – The oxford dictionary defines a bank as “an establishment for custody of money received from or on behalf of its customers. It’s essential duty is to pay their drafts on it. Its profits arise from the use of the money left employed by them”.

4 Technologies in the Banking Sector

Many studies have taken place in the past with the aim of knowing which banking technologies the client wishes to see developed or not between him and his branch. And it was noted in this respect a relative opposition between the new technologies put forward by the experts and / or the bankers and the customers clearly more reserved (the ATMs come at the head of the choices of the customers while the interactive terminals and banking on digital bouquet are practically rejected). This was explained by the fact that banks are looking for technologies that generate savings in operating costs, while customers are looking for technologies that make it possible to obtain a more friendly and personalized relationship. It will therefore be a question of making technological choices allowing satisfying this a priori double requirement. The banking sector can be defined from a marketing point of view as “non-branch banking”.

At the origin of the banking sector, there are three different technological fields which are:

- PC - interactive TV
- The ATM
- The telephone

For the consumer, it results in four application fields which are:

- Payment or electronic payment services (cards, etc.)
- Auto ATMs, such as: electronic payment terminals (TPE).
- Remote electronic services such as home banking
- Information and communication technologies (ICT)

4.1 Automated Teller Machine

ATMs are a computerized communication device that allows customers to access financial transactions in public places without having to contact the employees of that institution. At modern ATMs, the customer is selected after entering the card (cash), which contains a unique number. Permission is then granted to press the client pin station each computer connected to the serial connection, mainly supports the UNIX operating system or Windows, with limited functionality. ATMs can also be accessed for services such as account information, cash deposit, payment of regular bills, purchase of mobile reloading vouchers, mini-statement, money transfer, loan account enquiry, etc. [12]

In addition to cash withdrawals, ATMs can be used to pay utility bills, transfer funds between accounts, deposit checks and cash in accounts, and inquire about the balance.

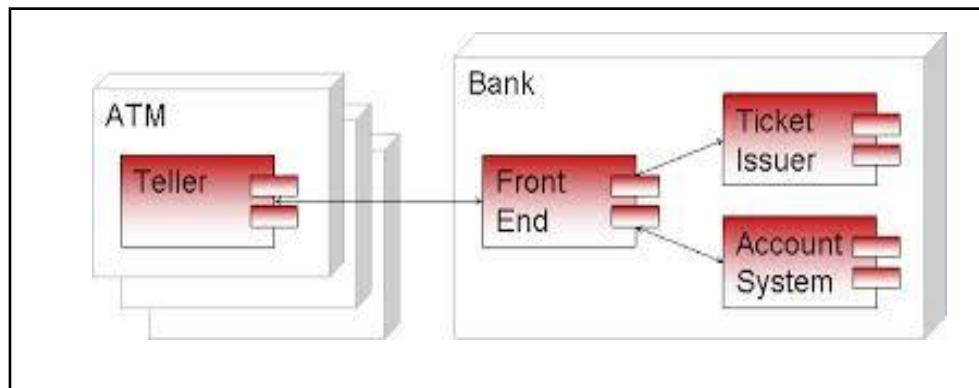


Figure 1.1 Principle of the ATM Process

4.2 Mobile Banking

A service that allows customers to conduct banking transactions through a banking app or mobile browser. The services consist of updates on bank balances, summary banking transactions and bank data loading. Mobile banking facilities are an extension of online banking. The Bank provides this service in collaboration with cellular service providers. The mobile phone must be either SMS or WAP enabled. These facilities are available even for customers who have credit card accounts only with the bank. Customers can now call the bank's designed phone number, and by dialing their ID number, you will be able to contact the bank that set the computer. The software provided in the interactive device with the computer asks him to request the service code number required by him and the answers appropriately for him. Use an automatic audio recorder (AVR) for simple queries and transactions and manned telephone stations for complex queries and transactions. [7]

4.3 Tele Banking

Tele banking is based on the voice processing facilities available to the bank computers. The caller usually calls the bank at any time and can inquire about the balance in his account or other transaction history. In this system, computers in the bank are connected to a telephone link with the help of a modem. The audio processing facility available in the program. This program identifies the caller's voice and provides him with the appropriate response. Tele banking makes it easy for the customer to do full non-cash related banking on the phone. Under this device the automatic audio recorder is used for simpler queries and transactions. [12]

4.4 Core Banking

The core banking system is the software used to support a bank's most common transactions. This means that the entire bank's branches access applications from centralized datacenters.

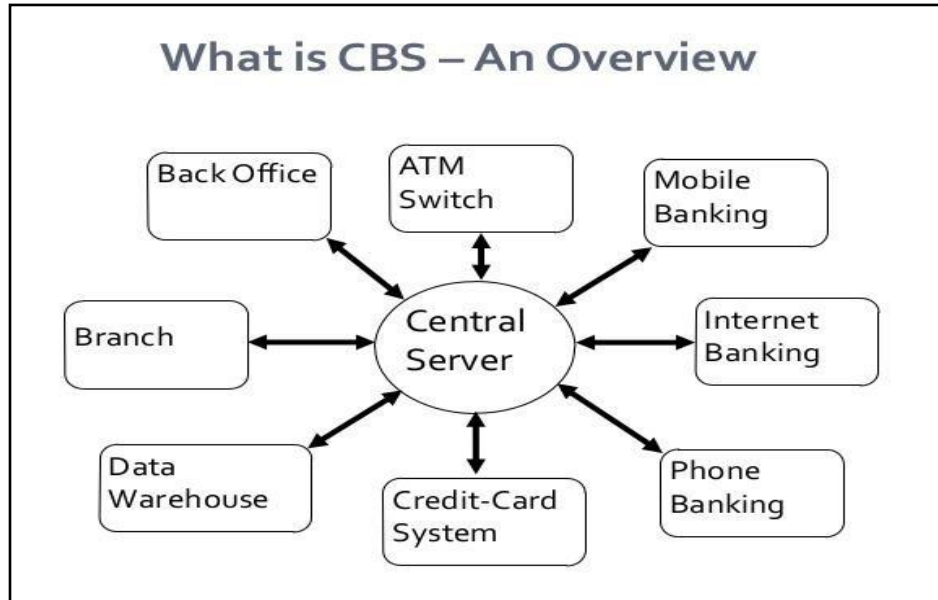


Figure 1.2 Overview of Core Banking System [32]

This means that the made deposits are reflected immediately on the bank's servers and the customer can withdraw the deposited money from any of the same bank's branches throughout the world. Core banking solution is a networking, which creates an environment where the entire bank's operations can be controlled and run from a centralized hub. This creates a centralized customer database, which makes anytime, anywhere, anyway banking possible. [12]

4.5 Electronic Funds Transfer

EFT is a system that allows anyone who wants to make payment to another person/company. Can contact his bank and make cash payment or gives instructions/authorization to transfer funds directly from his own account to the bank account of the receiver/beneficiary. Complete details such as the receiver's name, bank account number, account type, bank name, city, branch name etc. should be furnished to the bank at the time of requesting for such transfers so that the amount reaches the beneficiaries account correctly and faster. Money depositing through cash vending machines is some examples of the electronic transfer.

EFT allows transferring money from one place to other electronically on a real-time basis where any transaction in form of deposit, withdrawal, payment, receipts can be performed. The process also automatically calculates currency and exchange rates in case of funds being transferred from one country to other and transferring amount from buyer to vendor's account. [7]

4.6 Real Time Gross Settlement

RTGS is a payment mechanism for interbank payments where one bank makes payment electronically to another bank through core banking-enabled servers. On receiving message from paying bank, debits the paying bank's current account and credits the receiving bank's current account without a time lag where both banks are necessitated to maintain a current account. Transaction or remittance made through RTGS can never be cancelled or modified. [7]

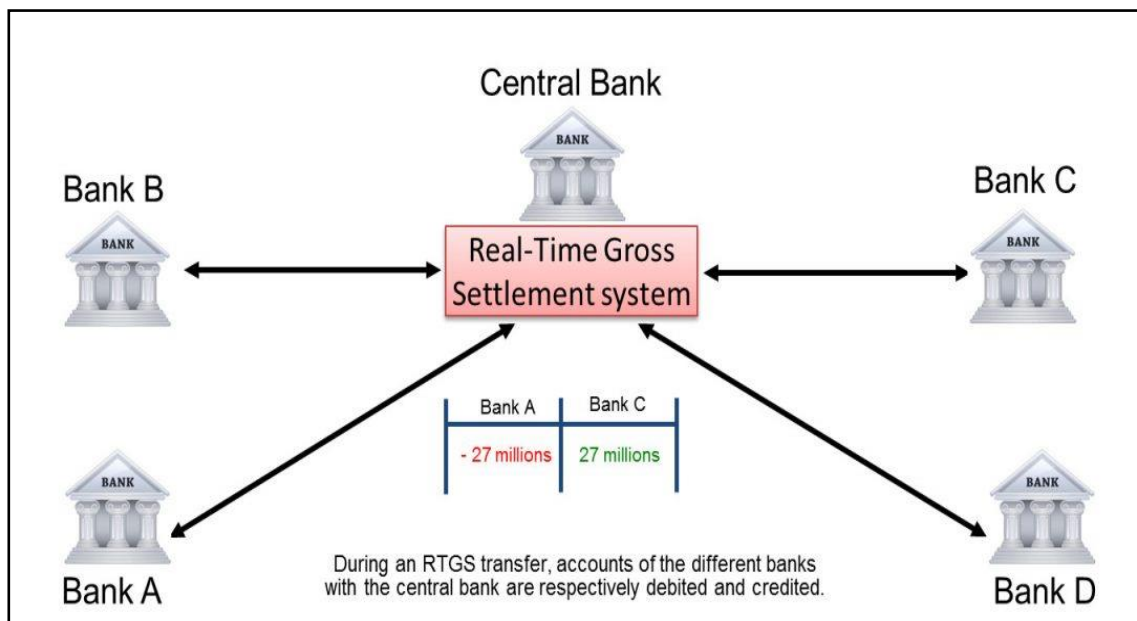


Figure 1.3 Real Time Gross Settlements [30]

4.7 Electronic Clearing Service

Electronic Clearing Service is a retail payment system that can be used to make bank payments/receipts of a similar nature especially where each individual payment is of a repetitive nature and of relatively smaller amount. This facility is meant for companies and government departments to make/receive large volumes of payments. [16]

5 Telecommunications for Banks

5.1 Internal Needs:

- Production information: which includes the data and messages that serve intermediate consumption as much for the exercise of trades banks, carried by internal information systems;
- Coordination information: which includes exchanges between banks, conveyed by national telecommunication networks or interconnected networks of bank cards [23]

5.2 External Needs:

A kind of transaction that links directly the bank and their customers, whether via ATMs or portfolio and cash management on networks and point of sale terminals. Telecom technologies served the strategic vision of banks, differentiating themselves from competitors to capture and retain a larger share of customers. [23]

6 The Different Actors in the Bank

6.1 Suppliers:

A real industry has emerged around electronic means of payment. Banks have at their disposal a real electronic payment offer. They are:

- Producers-distributors of cards, producers-distributors of electronic payment equipment, IT Service Companies processing the information,
- Producers-distributors of security systems,
- Software producer-distributors,
- specializes specialized organizational consultancy offices,
- Telecommunications operators,
- Network operators,
- Financial flow managers (authorization servers). [23]

6.2 Customers:

There are two types: Acceptors (businesses) and end users (individuals, professionals)

- Acceptors:

Legal or natural persons who subscribe to the different e-banking systems are called "acceptors". This official name makes it possible to account for the diversity of the entities which accept electronic banking systems. These can be traditional businesses, service providers, liberal professions, associations, etc.

They are the ones who will allow electronic money to exist. Indeed, it is thanks to their collaboration that the system is viable: It is through the merchant network that the banker can reach the end user of the electronic payment system. It is therefore essential for the banker to convince this target of the merits of the payment system and of any modification to be made to the system.

Different types of operations are possible. It can be:

- “proximity payment”, that is to say a traditional sale with the physical presence of the bearer,
- Remote payment: mail order sale,
- Quasi “quasi-cash”: issuance of cash by certain acceptors (exchange offices for example),
- “self-service payment”: purchases of products available from an automatic machine,
- “electronic payment”: remote payment with code control,
- Secures secure online payment
- User customers:

The bank must also satisfy the consumer. It is therefore a question of offering it an inexpensive, secure, easy-to-use system which has advantages over existing payment systems.

The price: All users must actually "buy" this type of payment method.

The others being free, the price must be low and correspond to the remuneration of advantages granted elsewhere to its user (example: permanent credit, etc.).

Security: This is essentially ensured by the development of a confidential code assigned to the card holder. Consequently, in the event of loss or theft, the risk of having the bearer's card used without their knowledge is minimal (unlike other means of payment).

Easy to use: Technically, the use has been simplified to the maximum and does not require any particular capacity. Commercially, inter banking, the multiplication of points of sale, and ATMs have given this means of payment a real substitutability compared to others in developed countries. [23]

7 Securing Online Payments

Securing online payments requires satisfactory technical responses to a few requirements that are valid for any payment by secure card

- **Authentication:** This involves being even to recognize with certainty his correspondent; this requires the establishment of a real virtual identity card; this is the role of the certificate issued and checked by a “trusted authority”;
- **Identification:** this involves collecting the electronic signature of the author of the message, which completes the guarantee of the integrity of the message and makes the data transmitted non-contestable by its author;
- **Integrity:** It is a question of being sure that the data have not been altered during transmission; it is the “sealing” function of the messages;
- **Confidentiality:** it is a question of protecting sensitive data in such a way that it can only be accessed by the intended recipient; it is the encryption function

8 Types and Tools of Electronic Payment Methods

8.1 Bank Cards

They can be issued by a loan organization, a financial institution or an authorized service, which may place and issue the card, such as banks, the public treasury, and the postal service.

8.2 Electronic Check

Electronic Checks are equivalent of the traditional paper checks that we used to deal with, and the electronic check is a documented and insured letter sent by the source of the check to the recipient of the check (holder), to be approved and submitted to the bank, which operates through the Internet to transfer the value of the financial check to the account holder check. The check will then be returned electronically to the check recipient (holder) to be proof that the check has been disbursed. The check recipient can electronically verify that the money has already been transferred to his account. [15]

8.3 Electronic Money

The European Central Bank prepared a report on electronic money, including a definition of electronic storage of financial value on a technical pillar such as memory cards or computer memory, and accepted as a means of payment by enterprises and traders. [15]

9 Development of Banking Services and Adoption of Electronic Banking in Algeria

9.1 Domestic Banking and Electronic Payment by Telephone

The majority of Algerian commercial banks contain the electronic banking service in simple form (check the balance, request a checkbook) but with the establishment of banking applications for smart phones in the future will be able to dealers in the Algerian economy to use banking services provided by banks across the Internet and mobile devices easily, Including the query on the balance, the transfer of funds or the payment by The card inter-bank, the telephone payment system will enable all customers to pay or collect regardless of the existence of bank accounts or not. The business sector will achieve better returns than it does when using the payment card. It will also provide individuals with a convenient mechanism for instantaneous payment at any time and place. [15]

9.2 Operation of the Algerian Electronic Banking Services

The company has signed a partnership agreement between the French group DIAGRAM EDI, a leading provider of e-banking software and data exchange security, And three Algerian institutions: MAGACT MULTIMEDIA, SOFTANGINERIN and CERIST. The establishment of a joint venture called Algeria for Electronic Banking Services. This company provides its services related to remote banks and the management and security of the exchange of financial data for all banks and financial institutions according to different types of customers Major, groups of companies, traders, professionals, properties), Providing a range of services with a high level of security and safety in the performance of operations. It focused on development and consolidation processes aimed primarily at modernizing banking services and electronic payment systems. [15]

9.3 Operation of eStrom Technology for Packing Using Bank Card

The Ooredoo mobile phone operator runs eStrom, an exclusive, secure and free online credit card payment solution with an interbank payment card. This innovative packaging solution comes in the context of the partnership between OOREDOO, SATIM and the Gulf Bank of Algeria (AGB). [15]

10 Conclusion

In this chapter, we review modern communication systems and the digital economy, which brings new concepts, foundations and systems, particularly e-commerce and e-business, which necessitated the development of the financial sector, particularly the banking system and the application of information in the field of banks or so-called electronic banks, through the use of electronic payment methods. Like traditional banks, Islamic banks have taken care of this technological development.

CHAPTER 02

ISLAMIC BANKING SYSTEM:

STATE OF THE ART

CHAPTER 2

ISLAMIC BANKING SYSTEM

1 Introduction

Islamic Banking is a Banking system that is based on the principles of sharia and guided by the Islamic economics. Although, Islamic banking may seem similar to conventional banking, the two differ conceptually. One key difference is that in conventional banking, banks earn their money by charging interest and fees for services, whereas in Islamic banking, banks earn their money by profit and loss sharing, leasing, charging fees for services rendered.

2 Definition of Islamic Banking

The Islamic bank is defined as "an institution which receives deposits and conducts all banking activities except the lending and borrowing operation at interest".[25]

Islamic banking is seen as an intermediary between owners of capital and borrowers. It engages in the collection of deposits (time and savings), as it also uses the funds collected in banking operations.

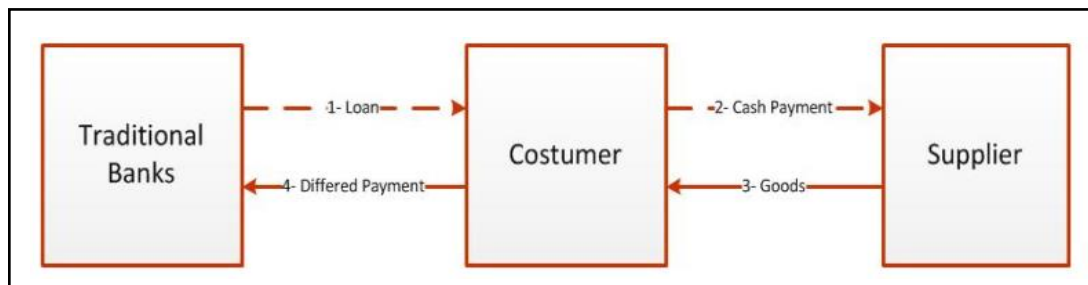


Figure 2.1 Traditional Banking Process [1]

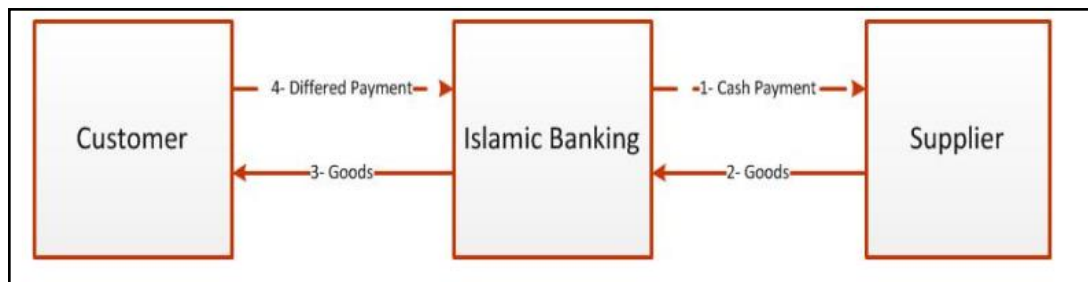


Figure 2.2 Islamic Banking Process [1]

3 Objectives of Islamic Bank

- To present the Islamic alternative to traditional banking transactions.
- Compliance with the provisions of Islamic law in all aspects of activities and various financing process, and should follow the “halal” and “haram” rule.
- Provides funds for business owners in the manner not opposed to Islamic law in order to support economic and beneficial projects.
- Encourages investment and fights the compactness through the creation of opportunities and a variety of formats for investment commensurate with the individuals and companies.
- Applies the Islamic values and ethics in all transactions.
- To achieve a real solidarity between the owners of financial surpluses and entrepreneurs who benefit from such surpluses, which links the return on deposits, the performance the investors which are able to be a profit or loss.
- Assists clients in the performance of Zakat on money and do their part to participate in the economic and the social development.[22]

4 Characteristics of Islamic Bank

There are many characteristics discriminate the Islamic banks against the conventional banks:

- a. Application of the provisions of Islamic law in all transactions and investment banking.
- b. Applying the method of the Islamic banking operations in the profit and loss in all the transactions.
- c. Applying the method of financial intermediation based on Islamic banking.
- d. The application of Islamic values and ethics in the banking business. [22]

5 Islamic Banking Services

The Islamic banking services can be divided into two types: finance service and deposit service. Finance services are exported from finance part of Islamic Banking such as Murabaha, Musharaka, and Mudharaba where as deposit services exported from deposit part like Islamic current account and Islamic deposit account.

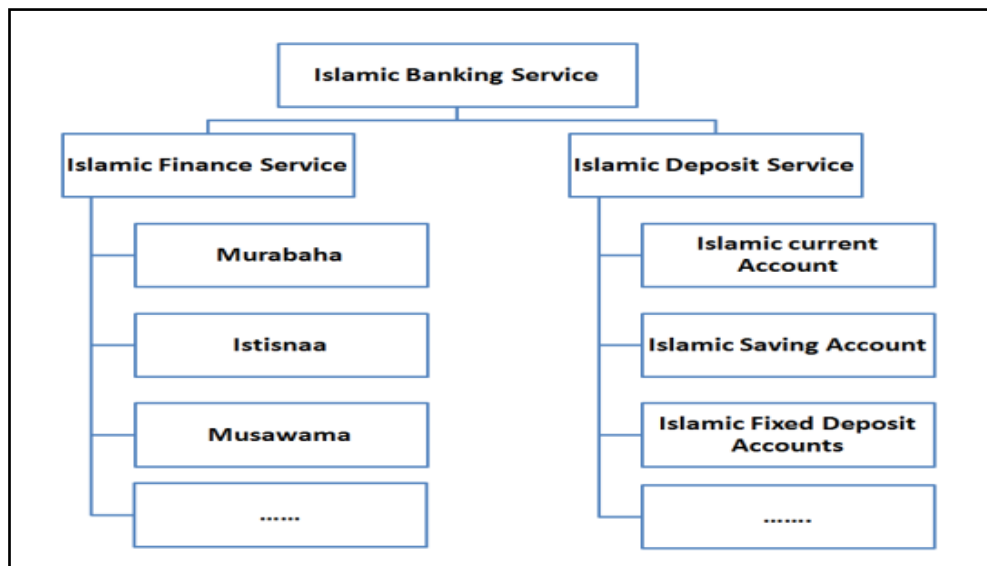


Figure 2.3 Islamic Banking Services [1]

6 Islamic Finance Services

6.1 Mudharaba or Profit Sharing

A basic principle or even policy that many of those policies are extracted from is that in Islamic money cannot be borrowed for money. In Mudharaba, both the bank and the customer can invest money with the other side or partner (the bank or the customers). The business process will then be subjected to gain and loss and each partner will be affected by either case. Usually the money investor partner will lose the money and the other partner will lose the effort or time. [5]

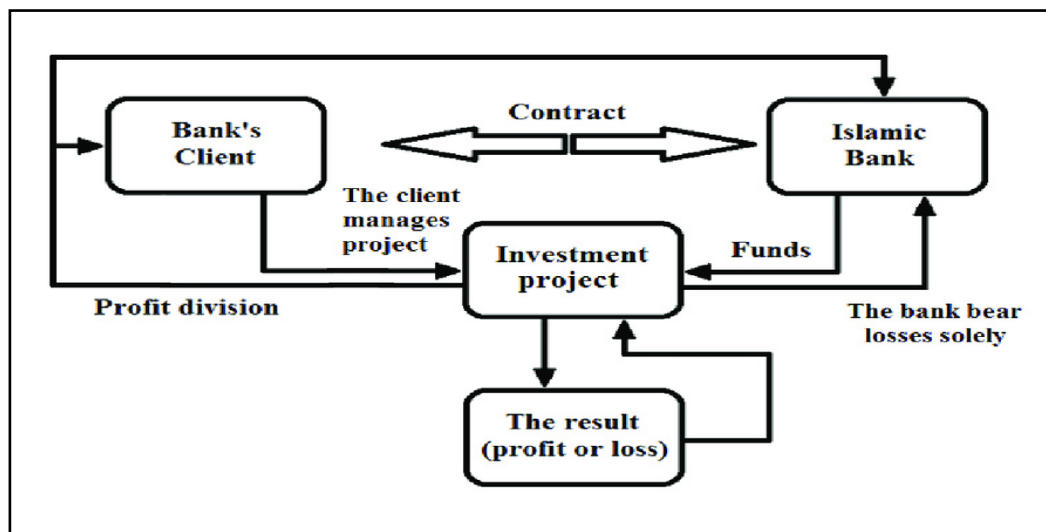


Figure 2.4 Mudharaba Contract [31]

6.2 Musharaka or Joint Venture

This is somewhat similar to profit sharing where investors can contribute to a new business with their money, support, place, equipment and the other partner with the idea, the effort, etc. The main idea from Islamic Sharia perspective is that both partners are subjected to winning or losing money. [5]

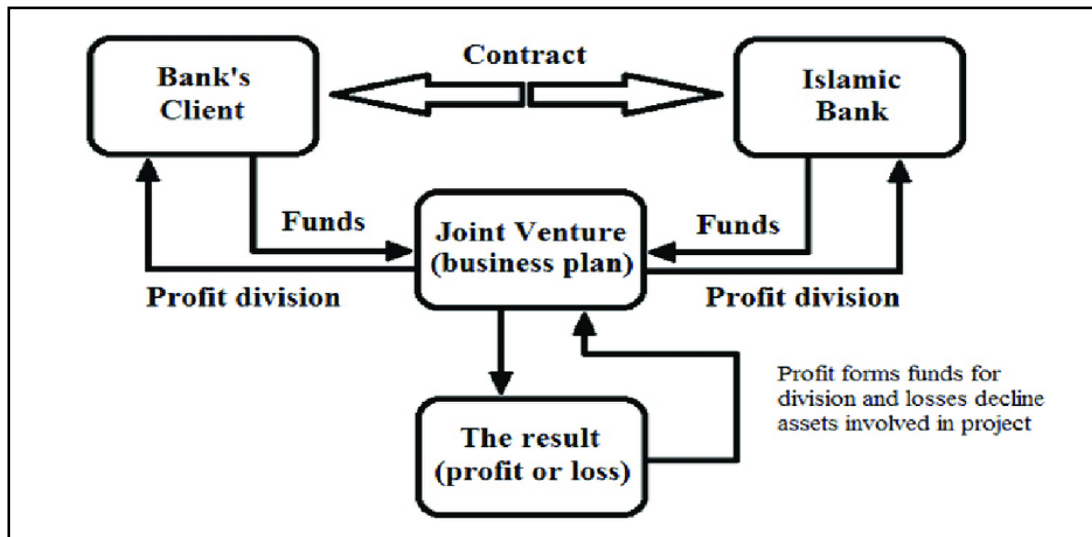


Figure 2.5 Musharaka Contract [31]

6.3 Murabaha or Cost Plus

In most cases Murabaha refers to the cases where customers decide to invest their money with the bank. The bank can use the money for building houses, buying lands, establishing businesses, etc. The profit or loss that comes from such investment can then be shared with the customers based on their investment amount. [5]

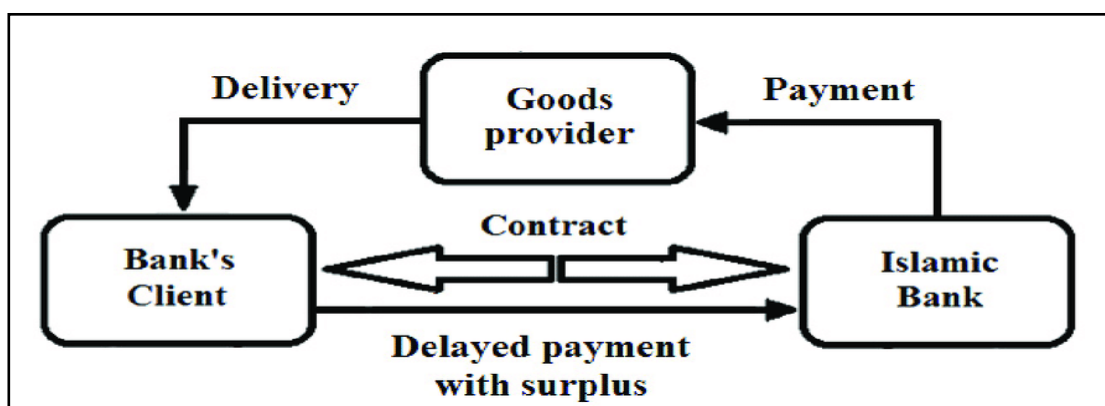


Figure 2.6 Murabaha Contract [31]

6.4 Wad'ee'a or Safe keeping

The customers hold their money in the bank as Wad'ee'a for safe keeping. The amount of money is fixed and does not inflate with interest as in other typical banking systems. [5]

6.5 Ijar or Leasing that Ends with Ownership

This is usually used when customers buy apartments or houses. A partnership is formed between both partners where each one will pay a certain amount of money to buy the apartment or the house. The bank usually pays the majority of the capital and hence the customer pays money to the bank for renting of their part of the apartment. The rent amount keeps decreasing as the customer share keeps increasing with the bank share decreasing. Some Islamic banks or scholars may still not agree on this process or some of its details. [5]

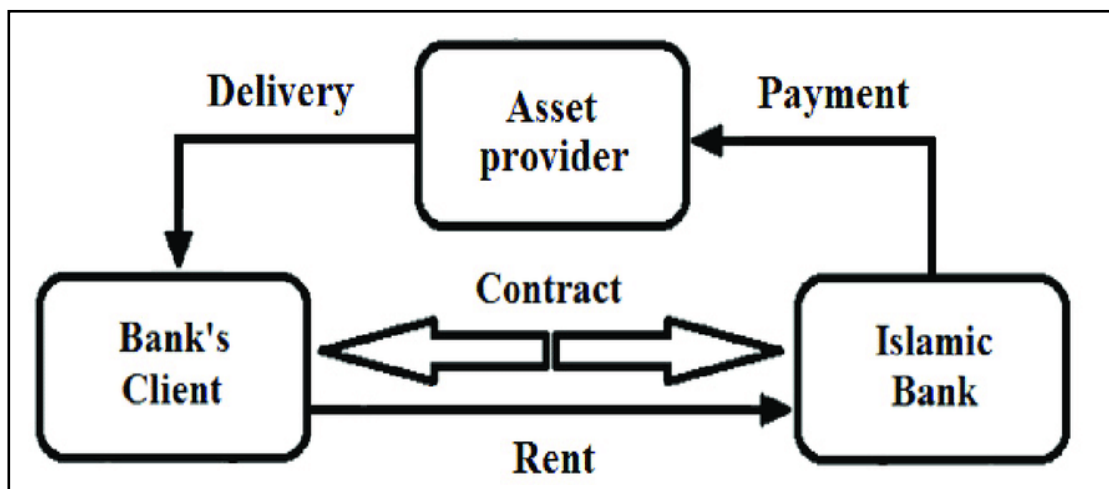


Figure 2.7 Ijar Contract [31]

6.6 Gardh Hassan or Free Loan

Some banks offer to their customers loans with no interest at all. In some cases, processing fees are accepted as they are not considered as add-ons on the capital but as loan processing fees. [5]

6.7 Bai-Assalam

A contract is made between a buyer and a seller. The buyer pays money in advance for some goods that will be received later. This is usually applied to crops. For the process to be conforming to Islamic law (Sharia), the sold items should be specified in detail. [5]

6.8 Rent

Islamic laws legalize rent with conditions that rent should specify not only the payment amount but should also specify the period. The rent can be not only for a house, car, land, apartment, but it can be also for a service or for using some equipment or material. [5]

6.9 Sokook or Islamic Bonds

Sokook are financial certificates that have no interest. The money in such a process can be utilized fewer than one of the legalized activities mentioned earlier. [5]

6.10 General Loans

Islam legalizes loans in general within certain conditions. As mentioned earlier money cannot be borrowed and returned as money. The same thing is applied for gold or silver. Typically, if a customer for example decides to take a loan from an Islamic bank to buy a car, the bank should own the car first and pay its capital completely. The customer can then buy the car from the bank under a typical loan process. Further interest is fixed and decided at once and cannot then be changed. Nonetheless, most Islamic banks recently modified this scenario and allowed customers to refinance in certain times and under certain conditions. [5]

7 Islamic Bank Activities

- The offer of credit cards.
- Personal loans constitute microloans bearing no interest, but remuneration of bank charges independent of the duration and the amount of the loan. The gain withdrawn from this credit must be submitted to Sadaqua.
- Investment products, the bank places bonds (Sokook), with customers.

- There are various kinds of investments, the profitability of which varies according to the risks involved. Islamic banking offers two forms of investment: Direct investment by which the bank takes care of the investment of capital in projects which bring in income in the form of dividends, and participative investment: where the bank enters the capital of a business of production as a partner concerned and through investment and management. [5]

8 Products Offered by Bank El-Baraka

El Baraka Agency carries out all Banking operations, in particular:

- **Account Management:**
 - a- Islamic Current account
 - b- Islamic Saving account
 - c- Investment account
- **Investment and Exploitation Financing:**
 - a- Musharaka contract
 - b- Mudharaba contract
- **Non-participatory (commercial) Financing:**
 - a- Murabaha contract.
 - b- Salam contract.
 - c- Istisnaa contract.
 - d- Ijar contract.
- **Co-financing:** Co-financing is the financing operation which calls upon the two categories of classical and Islamic financing used in the context of large projects requiring considerable amounts.
- **Other Banking Services:** Islamic banks like their conventional counterparts provide services of various kinds to their customers.
 - a- Commercial bill receipts.
 - b- Transfers.
 - c- Payment by check.
 - d- Foreign exchange transactions. [20]

9 The Differences Between Islamic Banks and Conventional Banks in The Banking Operations

There are distinctions between Islamic banks and conventional banks in almost all accounts concerning its management and structure.

Current Account Management

Current account management differs from a traditional bank compared to an Islamic bank.

- **In Islamic Banking**

When a customer requests the Islamic bank for the acquisition of a good, the current account of the customer does not receive money. The bank pays the money to the supplier for the purchase of the goods and sells them back to the customer. So, the bank's remuneration is made up of the margin on the sale of the property. If the client wishes the bank to lend for an urgent cause (marriage or death), the bank goes through a special account (Al Qard Al Hassan) where the bank does not charge interest on the loan.

- **In Conventional Banking**

When the traditional bank grants a loan, it transfers it to the current account of its client, this loan produces interest.

Investment Account Management

"Profit Sharing Investment Account (PSIA)" This account is specific to Islamic banks.

- **In Islamic banking**

The funds deposited in the investment account are managed by the bank in return for management fees which may be profits or losses. Custodians have no control over the management of their accounts. The duration of deposits varies between 1 month and 5 years. If the account holder withdraws before the end of the term, he shares the losses, but not the profits that the funds may have generated. Therefore, in an investment account of an Islamic bank, neither the capital nor the rate of return is guaranteed.

- **In conventional banking**

In conventional banking, there is no equivalent to "PSIA" accounts. However, it should be noted that in any traditional account the capital is assumed to be guaranteed. The bank must

therefore be able to repay part of the capital of all its depositors at any time. This is not the case for "PSIA" accounts.

Savings Account Management

Unlike conventional banking, Islamic banking produces no interest.

- **In Islamic banking**

The savings account does not generate interest. The account holder can receive profits such that the capital is guaranteed but it is paid after the "zakat" has been deducted.

- **In conventional banking**

The savings account generates interest, the fixed interest rate of which is known in advance. Management of the client-banker relationship In an Islamic bank, the settler is a partner and not a creditor. On the other hand, its traditional banks have relationships with creditors / debtors with their customers.

10 The State of The Art:

10.1 The Work of Ako A. Jaafar and Dayang N.A. Jawawi (2013)

This study presents the concept of Service Oriented Architecture (SOA) based application integration, by proposing an application integration framework for IBS using Enterprise Service Bus (ESB) and Business Process Execution Language (BPEL). The outcome of this paper demonstrates that applying ESB/BPEL in IB that increase the reusability and loosely coupled of Islamic Banking services. [1]

10.2 The Work of Izzat Alsmadi, Mohammad Zarour (2015)

In this study, the authors discuss the application of sharia rules from an IT point of view and show how these rules are applied and enforced in the financial institution. In this XACML architecture research, which is used and applied in many tools and system structures, used to enforce Sharia rules in the banking sector rather than their original goal of enforcing security rules where policy management systems such as XACML are usually used. They have developed a model based on the management of XACML policy to show how Islamic finance

the information system can be used to make decisions for day-to-day banking activities. Such a system is required by all Islamic banks all over the world. [5]

10.3 The Work of Mesut Pişkına, Merve Can Kuş (2019)

In this study, how to create such a digital platform is explained from the business and technical aspects. With the platform implemented, P2P lending is fully digitally operated, and all processes are performed automatically on this platform. [11]

10.4 The Work of Mohammad Hamad Allaymoun and Omer Awad Hag Hamid (2019)

This study adds a value to the proposed system of Murabaha contract, this can be achieved with the system through different digital orders, and the client can view the item available on the bank's website and directly select the item and reviews its details. The system executes digitally the negotiation with client in regards to the cost price of commodity and the agreed margin of profit, and method of payment which is applying the necessary transparency and disclosure to give the transaction the Sharia legality. The system properly can execute the last stage of the transaction, the process of selling and delivery which takes place after the client has agreed to all the required details of the contract subject matter. [10]

10.5 The Work of Nouredine Bahi (2016)

The aim of this study is to analyze the information system in Islamic bank by using Unified Modeling Language. The major objective is to prepare the background for all actors working in Islamic bank to understand and use this free platform especially, Murabaha act. [13]

10.6 The Work of Mohammad Hamad Allaymoun and Omer Hag Hamid (2019)

This paper initiates new ideas, for technical proposal, to digitalize the traditional Mudharaba contract, with a very special proposal, provides an effective technical mechanism, to complete the process of managing the Mudharaba account, in accordance with the requirements of Islamic Sharia, regarding the Mudharaba rules, by providing variety of proposed technical options, covering the set-up of Mudharaba investment account, managing this account, through

withdrawal and deposit operations, easily distribution of generated profits, ability to convert the account nature from investment to current account, and vice versa. As well as, simplifying the operations, with the ability creation of an electronic system instead of the complex traditional procedures, which used in the traditional management of Mudharaba. [9]

10.7 The Work of Mohammad Hamad Allaymoun and Omer Awad Hag Hamid (2019)

This research concerns E- Murabaha contract. It provides an effective technical mechanism for the implementation of the Murabaha contract, allowing the purchase of goods online from the Islamic Bank's commercial websites, in a manner consistent with the Islamic faith. Murabaha in Islamic Banks: The customer can view the item available on the bank's website and choose the item directly and review its details. The next step is to agree on the cost price of a real commodity and the price of a commodity after determining the margin of profits, premiums and payment mechanisms. Moving to the last stage of the system, the sale and transmission process takes place after the customer has agreed to all the details of the property contract for the items. The Bank discloses the actual cost of the item, including agreed profits. These systems provide a new addition to E-commerce, in the Islamic way. [8]

11 Conclusion

In this chapter, we have presented the transactions of Islamic banks, which have their particular characteristics that distinguish them from traditional banks; these characteristics are in fact the main problems of the work done by the Islamic transactions in the field of informatics research. To avoid these problems, we will identify some solutions on the set of our study in order to take into account all the specifics of Islamic banks. From this study we saw the need to use a system which facilitates managing and implementing of sharia rules.

CHAPTER 03

SYSTEM CONCEPTION

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SYSTEM CONCEPTION

1 Introduction

The analysis phase is the starting point for our work. In addition, the adequacy of the entire application to be implemented, to the needs of users and the intended processors in these options, will ensure the future success and usefulness of the application. To achieve these goals, it is essential that we get a clear picture of the needs of our project. We start with the presentation of the application, and we will detail the UML diagrams.

2 Application goals

The main objective of the project is to achieve a designated financial application to Islamic banks; this application aims to facilitate the access and the use of the Islamic banking services.

3 Services of Application

The application's services are as follows:

- Customer Management:
 - Create a New Customer
 - Delete a Customer
 - Display a Customer List
- Account Management:
 - Add an Account
 - Delete an Account
 - Display an Account List
- Islamic Banking Services:
 - Ijar Service
 - Musharaka Service
 - Mudharaba Service
 - Bai-Assalam Service
 - Istisnaa Service
- Murabaha Service:

Consult Murabaha Contract

Calculate Murabaha

4 Analysis and Conception

In these different interfaces, we will present some sequence diagrams and cases of uses of our application.

4.1 Global Use Case Diagram

Below is the general use case diagram of the system's operation.

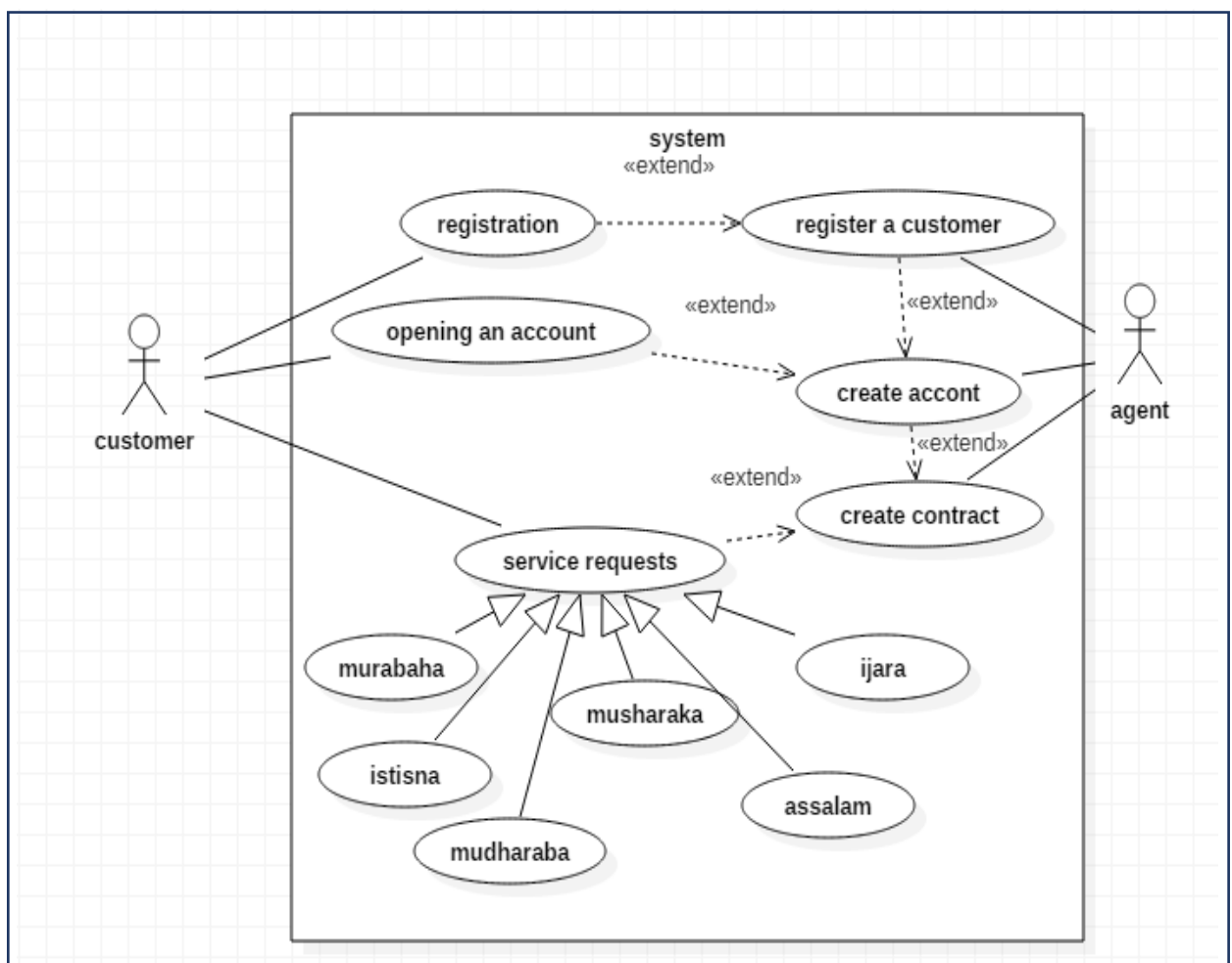


Figure3.1 Global use case diagram

4.2 The Sequence Diagrams

Customer management: Example: creating a new customer

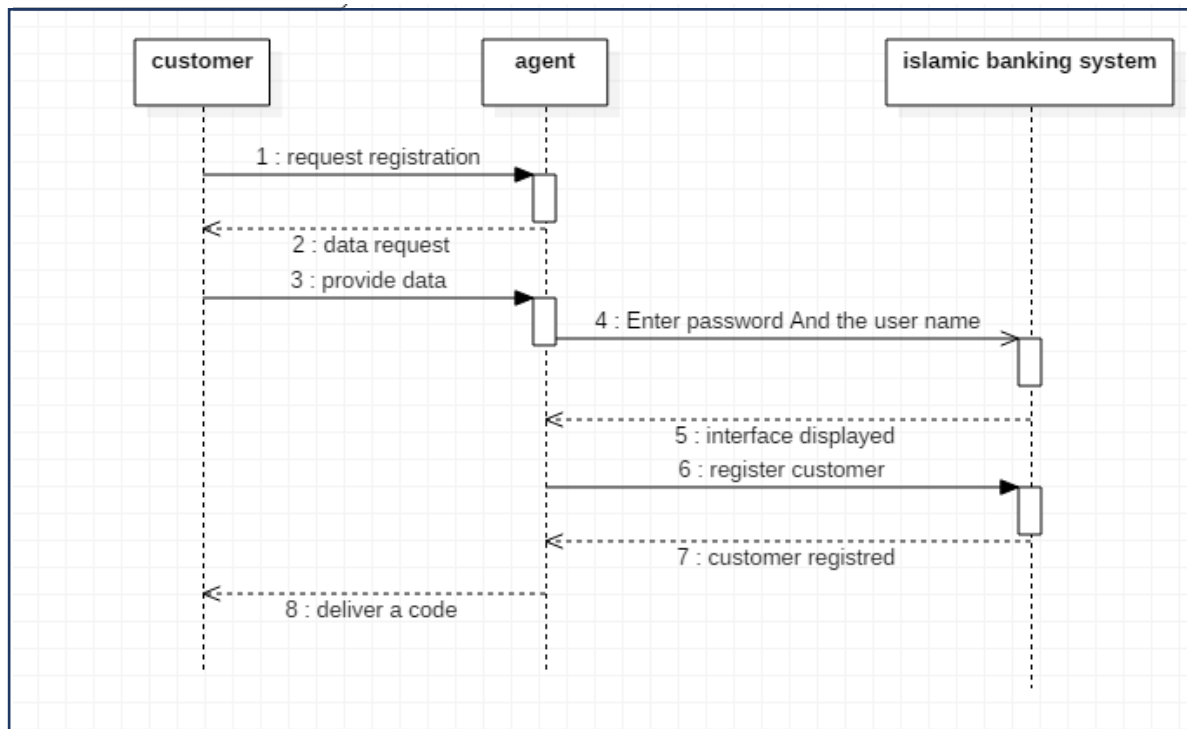


Figure 3.2 Sequence Diagram: Create a new customer

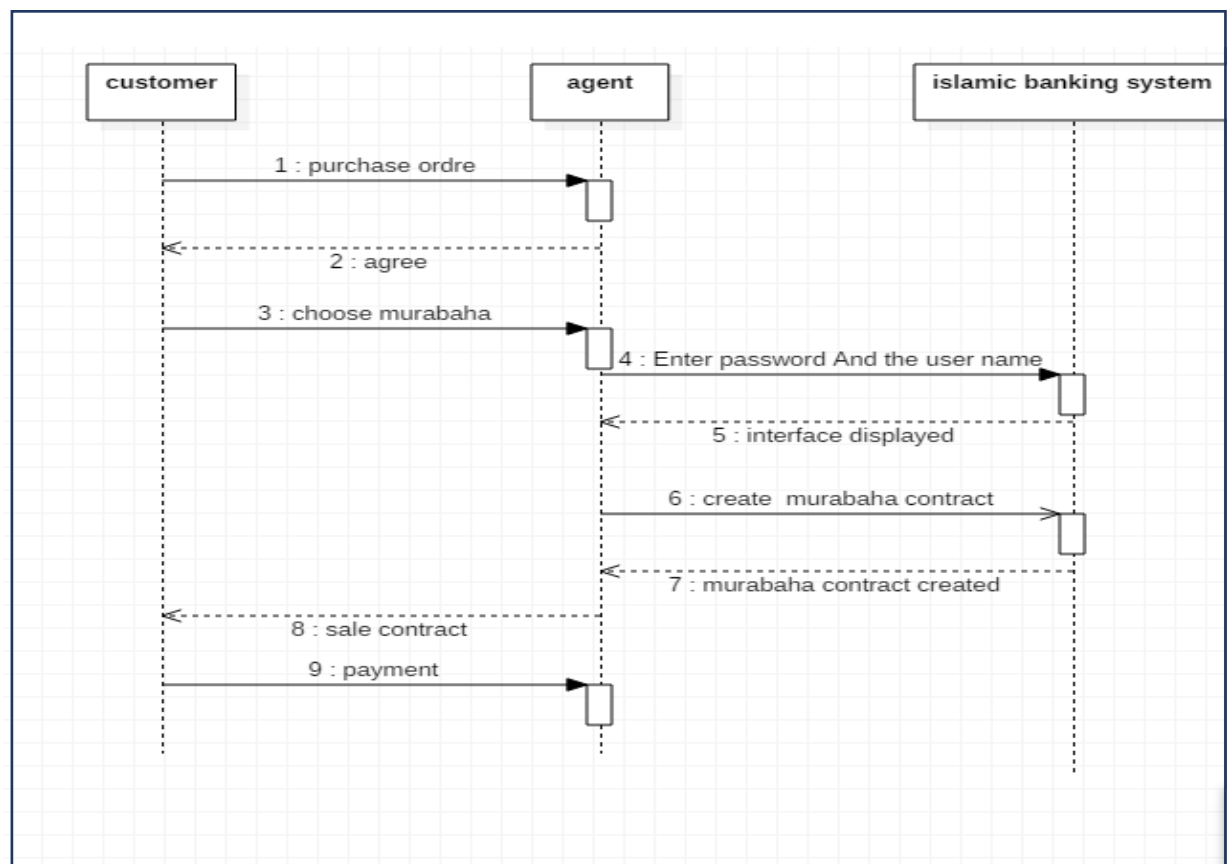


Figure 3.3 Sequence Diagram Murabaha transaction

5 Conclusion

At the end of this stage, we were able to express the expected objectives of the future system to be designed, as well as the diagrams of the UML to properly begin the implementation of the application.

CHAPTER 04

SYSTEM IMPLEMENTATION

CHAPTER 04

SYSTEM IMPLEMENTATION

1 Introduction

Financial technology is technological innovation in the field of financial sector; these innovations include a range of digital software used in banks' financial operations. Islamic banks have adopted the financial technology to develop its services in this chapter we will implement a program that clarifies the work of the Islamic Bank.

2 The language and the Programming Environment

2.1 NetBeans



NetBeans is an integrated development environment for developing primarily with Java, but also with other languages, in particular PHP, C/C++, and HTML5. It is also an application platform framework for Java desktop applications and others. The NetBeans IDE is written in Java and can run on Windows, OS X, Linux, Solaris and other platforms supporting a compatible JVM.

The NetBeans Platform allows applications to be developed from a set of modular software components called modules. Applications based on the NetBeans Platform can be extended by third party developers.

2.2 Star UML



StarUML is a UML tool by MKLab. The software was licensed under a modified version of GNU GPL until 2014, when a rewritten version 2.0.0 was released for beta testing under a proprietary license. After being abandoned for

some time, the project had a revival to move from Delphi to Java/Eclipse and then stopped again. In 2014, a rewrite version was released as proprietary software. However, the open source version's community is still active and many topics are discussed on the forums.

2.3 JAVA programming Language

Java is a class-based, object-oriented programming language that is designed to have as few implementation dependencies as possible. It is a general-purpose programming language intended to let application developers.

3 Presentation of the Application

The user uses an Islamic bank application to facilitate communication through interfaces that allow dialog between the user and the application to meet their needs.

3.1 Login

In this interface we enter username and password

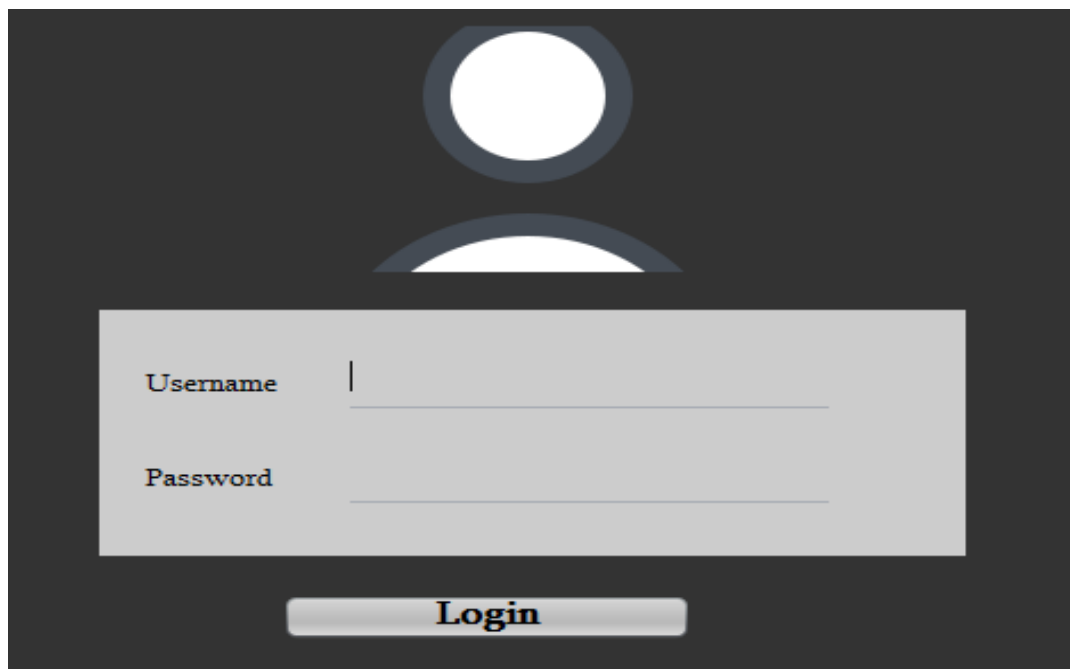


Figure4.1 Login Interface

3.2 The Main interface

In the main interface of the application we have the following menus:
Customer management, account management and Islamic banking service.
As shown in the figure:



Figure 4.2 Main Interface

3.3 Customer Management

After choosing this menu, an interface is displayed where you must choose the operation to be performed. Like a new customer, on this page we can create a new customer by entering the necessary data as is shown in the figure:

Figure 4.3 Customer Management interface

3.4 Account Management

When we choose this menu, an interface is displayed that enables us to choose the operation to be performed, like new account in this page we can create a new account.



The screenshot shows the 'Islamic Bank' logo at the top. Below it is a navigation menu with 'Home', 'Customer Management', 'Account Management', and 'Islamic Banking Service'. The 'Account Management' section is active, displaying a sub-header 'Account Management' and three tabs: 'New Account', 'Delete Account', and 'Account List'. The 'New Account' tab is selected. The form includes a 'Customer Code' input field, an 'Account Type' section with four radio buttons (Savings Account, Deposit Account, Commercial Account, Family Account), and an 'Initial Deposit' input field. At the bottom right are 'Create' and 'Cancel' buttons.

Figure 4.4 Account Management Interface

3.5 Islamic Banking Services

This interface contains forms of financing:



The screenshot shows the 'Islamic Bank' logo at the top. Below it is a navigation menu with 'Home', 'Customer Management', 'Account Management', and 'Islamic Banking Service'. The 'Islamic Banking Service' section is active, displaying a sub-header 'Islamic Banking Service'. The interface contains six blue buttons arranged in two columns: 'Murabaha', 'Musharaka', 'Mudharaba' on the left, and 'Ijara', 'Bai-Assalam', 'Istisna' on the right.

Figure 4.5 Islamic Banking Service Interface

One is to choose Murabaha

3.6 Murabaha interface

After choosing Murabaha, an interface is displayed where we choose calculate Murabaha or consult Murabaha contract.

Calculation method

Number of payments = duration * 12 (1)

Monthly payment = Murabaha amount * $\left[\frac{(1 + (\text{Murabaha rate} / 100) * \text{duration})}{(\text{number of payment} * 100)} \right] / 100$. (2)[28]

The screenshot displays a web interface titled "Murabaha". Below the title, there are two buttons: "Calculate Murabaha" and "Consult Murabaha Contract". The "Calculate Murabaha" button is selected. Below these buttons, there are input fields for "Contract Numbre", "Cutomer Code", and "Date of Contract". Below these fields, there are three more input fields: "Murabaha Amount", "Duration", and "Murabaha Rate". A "Calculate" button is positioned below these three fields. At the bottom of the form, there are two output fields: "Monthly Payment" and "Number of Payment".

Figure4.6 Murabaha interface

4 Conclusion

Islamic banks are very important institutions in developing the economy in a way legitimacy and convenience for Islamic peoples. Technology development is required to create programs that help to improve and facilitate the handling of these banks and to increase their effectiveness.

GENERAL CONCLUSION

Islamic banking has recently seen huge investments around the world. Islamic banking services are not limited to Muslim countries, but extend to other countries. It should be noted that Islamic banking through its various products and services promotes shares.

A large number of banks in the Islamic region are trying to attract their customers by affirming monetary rules in Islamic law.

Despite the proliferation of Islamic banking, Islamic banking is currently facing many challenges, some of which are independent technology related to regulatory issues, awareness and aspects of Islamic law. Other challenges are related to how to apply sharia rules in day-to-day banking operations.

In this study, we focus on the application of Islamic law in the daily activities of financial institutes. We have identified some financial transactions recognized by scholars of Islamic law. We have used this as a starting point for creating a proposed system to make such an Islamic financial information system documented and structured. With a focus on recent technical challenges, this (proposed) system addresses some of these obstacles or challenges to be a simple solution for users. An automated system can then be developed.

One of the main challenges related to the nature of these rules and how they are presented to banking or financial systems in an appropriate manner. This can be linked to different levels of abstraction between religious codes of conduct and what is permitted or not. The second challenge is related to different religious opinions, particularly certain transactions, whether religiously legal or not, and how these rules can be applied to real cases.

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ملخص

بالنسبة للعديد من البنوك و العملاء في العالم الإسلامي، فإن تطبيق قواعد الشريعة الإسلامية على الأنشطة المالية أمر مهم للغاية، وفي بعض الحالات يمكن أن تحد الحواجز التجارية و التقنية من القدرة على تطبيق وتقديم الخدمات المالية التي يتم تنفيذها وفق القواعد الشريعة الإسلامية. لهذا السبب، في هذا العمل سوف نقوم بتطبيق النظام المصرفي الإسلامي الذي يحترم قواعد الشريعة الإسلامية في جميع عملياتها التجارية.

الكلمات المفتاحية: الخدمات المالية، القواعد الشرعية، الخدمات المصرفية الإلكترونية، الخدمات المصرفية الإسلامية

Abstract

For many banks and customers in the Islamic world, the application of Islamic Sharia rules on financial activities is very important. In some cases, business and technical barriers can limit the ability to apply and offer financial services that are implemented according to Sharia rules. For this reason, in this work we will implement an Islamic banking system which respects Sharia rules in all its business processes.

Key Words: Islamic banking, E-banking, Sharia rules, financial services

Résumé

Pour de nombreuses banques et clients dans le monde islamique, l'application des règles islamiques de la charia sur les activités financières est très importante. Dans certains cas, les obstacles commerciaux et techniques peuvent limiter la possibilité d'appliquer et d'offrir des services financiers qui sont mis en œuvre conformément aux règles de la charia. Pour cette raison, dans ce travail, nous allons mettre en œuvre un système bancaire islamique qui respecte les règles de la charia dans tous ses processus d'affaires.

Mots clés : Banque islamique, E-banking, Règles de charia, services financiers