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*RESEARCH ARTICLE – COMPUTER*

# Modern Analysis Design and Implementation of an (SMS) Application Banking

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**Abstract**

SMS –Banking is a value-added service solution that allows banked customers to be able to perform certain banking operations related to their account such as balance viewing, transfer, etc. via the mobile network operator's SMS service. The integrated platforms for these services include added values, with one part connected to the mobile network via the SS7 protocol stack and the other end to the IP network. The development of SMS-based mobile applications requires the installation of a text messaging gateway that allows interconnection between the two networks (telecommunications and computer). OZEKI is open source software. It is an SMS gateway that can receive SMS from GSM network and forward them to another network. It supports several types, allowing SMSC to be linked between them or between a GSM network and another network (IP for example). The OZEKI portal therefore makes it possible to set up value-added services. Computer Science has a dynamic computer park that allows them to develop and conduct effective research in Computer Science because information technology makes the fundamental pillar in development for the progress made in the world today as Computer Science Department students have the necessary tools for them to help in their research.



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***Keywords**: :* financial services; microfinance; Delimitation; checkbook; unambiguous.

## 1. Introduction

Enterprise This service (SMS) has become one of the fastest and most powerful communication channels for transmitting information across the world via the most popular mobile data service. Due to its wide popularity, it is used through SMS technology in various field applications. This also includes sensitive security areas such as e-banking and e-government. Short Message Service (SMS) is sent as plain text; So the traditional SMS provided by SMS unfortunately does not provide a secure environment for confidential data in transit and SMS contains some metadata - sender number, server number, data encryption scheme, protocol identifier and timestamp. The SMS limit is (160 characters if the character encoding is 7-bit) or (70 characters) if a 16-bit Unicode character is used. Messages are sent as plain text between the mobile phone user (MS) and the Short Message Service Center (SMSC), using a wireless network. The contents of this service are stored in the network operators' systems and can be read by their employees.

Surprisingly, different mobile operators do not provide information security and the main problem is the security of Short Message Service (SMS) which is highly required to provide secure end-to-end communication between end users. Therefore, measures must be taken to ensure the security of the data contained in these messages by using encryption, which is the process of encrypting information to prevent anyone other than the intended recipient from viewing it. Encrypted messaging (also known as secure messaging) provides end-to-end encryption for user-to-user text messages. Encrypted messages prevent anyone from monitoring your text conversations. This service is managed by an organized group of resources (staff, data, procedures, hardware, software) to obtain, store, process, structure and communicate information in the form of text, images, sounds or encrypted data in organizations. According to their main purpose, we distinguish between operations support information systems (processing transactions, monitoring industrial processes, supporting operations office and communication systems) and management support information systems (assisting in the production of reports, decision support) Information security has increased significantly as it protects the availability, privacy and integrity of access to information stored in computer databases. It has become necessary to integrate multiple wireless networking technologies to support additional functions and services. One of the most important

developments that have emerged from communications technology is Short Message Service (SMS). Which was designed as part of the Global System for Mobile Communications (GSM). Its use has become an urgent necessity in many areas of practical life [1].

**Nomenclature & Symbols**:

| | | | |
|---|---|---|---|
| SMS | Short Message Service | M-Banking | Mobile-Banking |
| MS | Message Service | LDM | Logical Data Model |
| SMSC | Short Message Service Center | PDM | Physical Data Model |
| ATM | Automatic Teller Machine | | |

## 2. Research Problem:

Remote banking is a modern, realistic banking service that responds to certain expectations; Do not move around and do not stand in queues at the bank counter, whose working hours generally do not correspond to the availability of customers. Before there was online banking, it also allowed access to banking services remotely, but the biggest limitation of this technology is the need for a computer and an Internet connection. This is how the SMS banking solution reduces the customer's mobile needs. SMS Banking solution is a value-added service solution of innovative GSM networks enabling good communication with customers (financial services institutions or banking cooperatives) who want to access banking services without having to go to a bank branch. However, NTIC as tools. The development provides means and techniques for implementing such an application. What are these means and how can they be exploited to implement such a solution? This project will allow us to access the world of communications, computer networks, transport protocols, programming languages as well as management from the database..

## 3. Research Questions

It is necessary to ask the following questions which constitute the common thread of our work. What automation in the management of the bank in terms of information to overcome these difficulties raised above? Does computerization have an influence on the management of the bank? Does it influence the decision-makers in making rational decisions? What are the information system design methods and what is the language of the development of the management interface of the IS for managing credits granted by a micro-finance institution? These are the questions we must try to answer in order to find a solution to the problems posed in the problematic of our subject.

## 4. Research Hypothesis:

The hypothesis is a temporary and potential answer given in anticipation that we expect the bank to need a management system that integrates GSM SMS. This hypothesis will allow us to achieve our goals. Computerization of the service within banking institutions significantly improves the management of their services while significantly reducing the risk of error in the daily management of information circulating in services and significantly reducing the time required to perform certain operations. Therefore, it will be a matter of setting up the software so that each customer is always informed via his own phone about the transactions made on his account and his movements, on the credits granted, on the interest, on the due date. To pay. To successfully conduct our research, we initially proposed a series of potential answers to test as we work with banks that adopt this particular service.

## 5. The Purpose Of The Research:

The most important objectives of the research are:
5.1 -Study and operation of short messages within the GSM network.
5.2 - Showing the great role that free software occupies in implementing value-added services in the field of communications.
5.3 - Skill development in mobile phone applications[2].

## 6. Research Methodology :

Information is a collection of data that can be processed by a computer system. In our research, we relied primarily on the analytical approach, as information is a written form that is likely to provide knowledge. It is distinct from this knowledge. In computing, this information is also called "data." It will be stored, processed or transmitted using a medium. Any scientific study must follow a certain methodology because any science is based on a working method. The method is the set of operations intellectual means by which a discipline seeks to attain the truths it pursues, the demonstrate and verify them. The method is the set of rules and disciplines that organize the movements of knowledge, i.e. the relationships between the object of the research and the researcher, between the concrete information gathered using the techniques and level of theory and concepts. With a view to putting an end to this archaic management system and to ensure the normal functioning and balance of this microfinance, we are developing a Windows application for monitoring transactions occurring on the bank account and which will make it possible to manage in a way automatique:

Registration of new credit applications;
Consult the status of his account on any mobile phone for everyone;
Registration of members;
Follow – up of credit requests.

## Delimitation of the Subject

Our work is restricted in terms of time and space. Given the complexity of the issues related to the management of MFIs, we prefer to confine ourselves only to the study of the movements of transactions made on customer accounts and the management of loans granted by the Bank.

## 6.2 Previous Studies:

- Saravanan (2014) study under the title. Critical Success Factors of ERP Implementations – An Analysis , This study aimed to analyze what was stated in light of previous work, as it indicated that ERP systems are information systems that work to integrate organizational activities across geographical and functional divisions, and therefore it aims to study the factors. The critical success of implementing enterprise resource planning, as this type of system helps organizations improve productivity and the ability to respond to customers, and increase the effectiveness of information, which contributes to the ability to make the right decisions. The researcher was able to build a model consisting of four variables represented in both planning and implementation. , stability, improvement, based on identifying a set of critical factors for implementing ERP, which are supporting senior management, forming a team to implement the system, project management, defining a plan of action that includes vision and goals, re-engineering administrative processes, training, communication, and identifying the negatives of the current system. , organizational culture, and the study concluded with a basic recommendation, which is the necessity of keeping pace with the implementation of enterprise resource planning in light of the availability of the organization's strategic critical success factors.

- Dizdar's study (2012) entitled: Enterprise Resource Planning (ERP) Strategic and tactical factors for successful ERP projects: Insights from an Asian country. This study sought to identify the strategic and tactical factors that are taken into consideration with regard to the successful implementation of resource planning systems, where the strategic factors are represented by senior management, project management, and the process re-engineering method, and the tactical factor is represented by the foundations of communication at the organizational level, according to the findings of... ...users, and qualitative support for enterprise resource planning. The findings of this study are that there is a relationship between senior management support, project management, establishing communications at the enterprise level, and training users, especially enterprise resource planning (ERP) support, Which has a role in the system, which leads to improving the performance of the national institution. The study concluded that there was no consensus between process reengineering and the ERP implementation group. It concluded with recommendations that senior management must be effective in planning the ERP implementation project and must participate in every stage of system implementation and work to prepare the project team[3].

## 7. Computerized Information System

A system or subsystem of equipment, computing or telecommunications, interconnected for the purpose of acquiring, storing, structuring, managing, movement, control, display, exchange (transmission or reception) of data in the form of texts, images, sounds, and/or, involving hardware and software.

### 7.1 SMS banking

SMS – banking is a part of M-banking which combines SMS and mobile phones. As such, the bank's customers can manage their accounts, view the accounts request the checkbook on their mobile phone.

### 7.2 Division of Labor

Our work consists of three parts divided into five chapters. First, the context and the problem will briefly describe the nature of the work of companies that adopt banking transactions through their work, and we will provide an academic explanation through which we present the motives for choosing our topic. The second part, titled Theoretical Approach to Telephone Banking Services (M - BANKING), will present the different M - BANKING techniques with their strengths and weaknesses. The realization of our SMS-BANKING solutions will constitute the third part, in which we will reveal the approach we propose to create the SMS-BANK platform. Finally, we will end our thesis with a conclusion, appendix, and bibliographic references.

### 7.3 Place of the Information System in a Company:

Location of the information system in the company The information system has an invaluable position in the organization:

Role of Information in Organization One way or another, information is the key to everything. The management process, whether forecasting, planning, organizing, coordinating, facilitating or controlling. It is a topic of management in any company. It is supportive of knowledge, understanding, learning and decision-making, because it forms one of the basic foundations of organization cohesion. A computer system combines the means of computers useful for processing information: computers, networks, software, as well as buildings and personnel[4].

### 7.4 Information System Development Process and Architecture

The increasing complexity of computer systems has led designers to take an interest in methods. Although this phenomenon is more than 30 years old, we do not we can see today the existence of a rule that is both very formal and common to different cultures. For example, in 1994, up to 50 methods were counted different objects. Each method is defined by a notation and a specific process, but most converge regarding the semantics of their notation. Nevertheless the work definition of a process has always remained vague and succinct (Pascal and Franck 2007,11).
However, the process remains to be defined in order to really capitalize on rules in the field of software development. Defining a single universal process would be a serious mistake because the variety systems and techniques does not allow it. We can distinguish the process of system development and unified process:

### 7.5 IS Development Process

A process is defined as a series of steps, ordered in part, which Contribute to the acquisition of a software system or to the development of an existing system. The goal of the development process is to produce high quality software that meets the needs of its users at a predictable time and cost. And therefore, The process can be divided into two axes to control the development: the technical development axis, which mainly focuses on production quality; A development management axis that allows measurement, cost and time forecasting (Pascal and Franck 2007, 12).

### 7.6 Unified Process

A unified process is a software development process built on UML ; it is iterative and incremental, architecture-centric, case – driven use and risk-driven. The management of such a process is organized according to the 4 following phases: pre-study, development, construction and transition. His activities of development are defined by 6 fundamental disciples who describe business modelling, requirements capture, analysis and design, implementation, testing and deployment (Pascal and Franck 2007, 12).

- **E – Banking**

Web Banking or Online Banking means "The internet banking". All of these terms refer to the use of the Internet by a financial institution with a view to offering its customers a wider range of banking services. Or less broad, ranging from the simple commercial showcase to the remote management of transactions financial. E – Banking or electronic banking therefore designates the fact of using a electronic tool, such as a computer, to carry out the various banking transactions. THE Banking allows access to accounts, transfer of funds from one account to another, balance information, transfer of funds to a third party account, payment of bills, etc The possibilities are many and save people a lot of time who use these services. The following figure 1 shows the E – Banking services Source[5]:

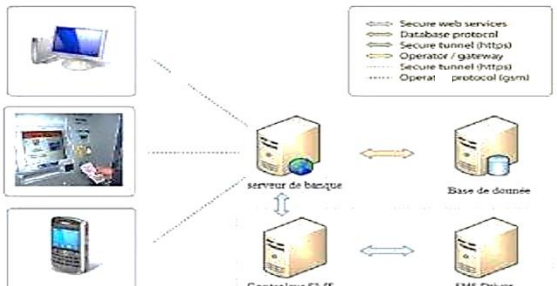

Fig 1: General architecture of E-Banking (Source: Mobile Networks 1994 page 177)

Among the services of E-Banking we can cite:
Internet Banking.
– The Automatic Banking Counter (ATM).
– Mobile Banking
– WAP Banking
– SMS Banking
– STK – Banking

- **Financial SMS Filter:**

In this module, filtering financial SMS takes place. Sender id codes of different banks were identified for this purpose. Sender id code of all messages is modified and then tested with the available list of identified id codes of various banks. If there is a match, then that particular message is a financial SMS else it is ignored and the next message is tested. If a specific SMS is a financial SMS, then it is further classified into a bank transaction or card transaction with the aid of regular expressions[6].

- **Financial Analyzer Interface:**

The interface displays the division of transactional messages into bank transactions and card transactions. For this interface, initially, the sender id of the SMS is tested with the bank codes and then using regular expressions they are classified as bank or card transactions. It also demonstrates the total number of transactions, the total amount credited and the total amount debited as illustrated in Fig 2.

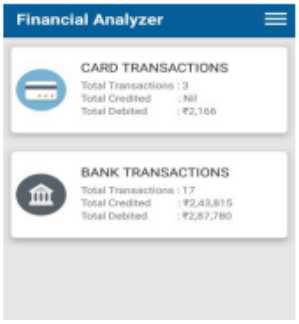


Fig 2. Financial Analyzer Interface

## 8. IT and Information System:

- **Notion of Information:**

Information is information that increases knowledge concerning a specific person, object or event. The information can be: of a on the other hand objective, when it reflects a set of meaningful data and on the other hand subjective, when it results from the interpretation of a set of data. Example: the diplomas held by a person, his place of birth, the brand of a car, the address of a person, the balance of an account, etc. are data which objectively provide information. However, they can give rise to interpretation in order to subjectively judge the value of a diploma, of what it means to own such a brand of car, of the interest of a person living in such a place…
Data only becomes information when it finds its meaning in relation to a frame of reference (a context, a system of values, a problem to be solved, etc.). The Data used in organizations resides in a stable repository. They escape in much to interpretation and then provide unambiguous information. In the computer systems, data is also the coded translation of information[7].

- **M - Banking Services (Mobile Banking).**

Mobile banking as defined by POUTTCHI and SCHURING in 2004 is the realization of bank account management operations over mobile networks using mobile gadgets (mobile phone, personal digital assistant). This service was launched in June 2000 because customers felt the need for it, especially young people.

Gradually, these SMS alerts have captured older customers. "Explains the head of mobile services at Societe Generale. According to M-Banking research, it is more convenient and slower than I-Banking because using a mobile phone is more flexible than using a personal computer, but on the other hand, transactions on a computer are easier and faster to carry out. Ubiquity The power of mobile banking due to the portability and availability of the mobile phone, regardless of time or place. In terms of cost, there is no difference between M-Banking and I-Banking. In the face of this diversity of electronic banking channels, the SMS messaging service appears (SMS) as an innovative service that can meet not only the requirements of customers and banks through flexibility and ease of use, especially since SMS is widely considered more technical, so we will shed more light on "banking via SMS," the subject of our study. : The ability to be in several places at once. Continue to develop remote distribution channels and multiple banking channels. Therefore, mobile banking combines the two applications "SMS Banking" and "WAP Banking"; The most commonly used ATMs were ATMs and then through SMS banking. The various banking services offered by SMS banks can be classified into two types: PULL or PUSH.

PUSH occurs when the bank sends information to the customer, for example, your banks send an alert if your account balance is below the minimum. A "pull" occurs when a customer requests information from a banking service, for example, five recent account statements[8].

- **The Operator's Network:**

The customer's use of a WAP terminal, i.e. which hosts a WAP browser. The terminal is of no use, with respect to the WAP, except by the existence from their WAP browser. The browser takes care of decoding the information transmitted through the WAP gateway. Fig 3 represents the general architecture of a WAP application[9].

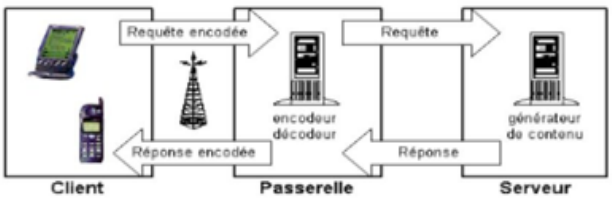


Fig 3: General architecture of a WAP application

The mobile terminal (a mobile device such as a telephone supporting the functionalities of the WAP, a personal assistant, or any other device capable of supporting this technology) wishing to obtain data from a WAP service, must first go connect to a gateway using a telephone number, or using a connection. When the mobile terminal is connected to the gateway, all transactions carried out by the mobile is sent by the gateway to the application server (web server) by a IP – type transmission, in the form of requests close to the HTTP standard. The server application will send documents back to the gateway in WML format (the formatting language documents that can be displayed on the mobile terminal), depending on the requests from the mobile terminal.

This means that the server can use the same technologies as a web server to provide its data (access to a database, execution of a CGI script, execution of PHP scripts or ASP, or servlets,...). Once the data is formatted, it is sent to the gateway, which will be responsible for transmitting them to the mobile terminal. The following figure explains the way in which an exchange of information will take place through a WAP application during a query.

- **SMS Broadcast Receiver:**

Suppose that after parsing all the messages and then a new transaction message is received, to handle such a situation through the broadcast receiver of the bank system a framework has been implemented that listens to all Incoming messages. Whenever a new message appears it is received and listened to by the broadcast receiver A regular expression is used to check whether the new message is a financial message or not. If it is a financial message, the basic information is extracted and stored in the local application database. And it is They are displayed to the user at the same time As in Fig 4.

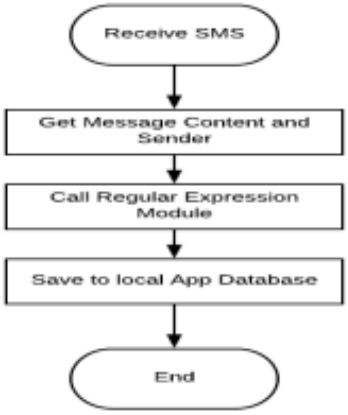


Fig 4. Receiving and Processing of SMS

## 9. USSD Banking:

### 9.1 USSD for Unstructured Supplementary Data Service

Which can be translated as "Additional service for unstructured data" is a functionality of GSM or 3G phones. It is usually associated with the services of real – time telephony or instant messaging. There is no possibility saving and forwarding which are a feature of SMS short messages (i.e. an SMSC is not present on the processing circuit). response times for USSD-based interactive services are generally faster than those used for SMS. This communication protocol can be used for many banking processes mobile such as balance enquiry, money transfer, bill payment, etc[10].

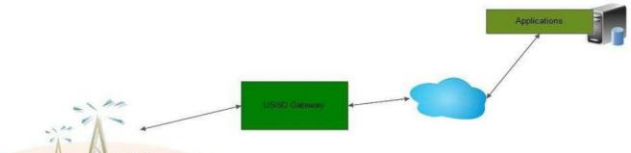

Fig 5: Architecture of a USSD2 application

### 9.2 Transactions Via SMS:

Using the card layout, a summary of the message of a particular transaction is displayed to the user As shown in Figure 5. In this interface, the user is given the option to filter his transactions Depending on the type of transaction, i.e. credit or debit. The red icon with the currency symbol in the middle They are coded as a debit transaction, while those with a green symbol are coded as a transaction credit. If the user clicks on any of the card layouts, the original message will be displayed to the user. At the bottom of the screen, the user is shown the total amount credited and the total amount debited from that specific account[11].


Fig 5. SMS Transactions

- **General Architecture Of An SMS – BANKING Platform :**

There are generally two types of architecture for setting up an SMS platform BANKING. But, whatever the architecture chosen, note that we will always need:

– GSM modems which allow the bank to connect to the network of an operator of telephony using SIM cards;
– The mobile phones that customers who want to subscribe to this service must have;
– A server application comprising all the functionalities of SMS BANKING and which will be deployed on the bank's servers[12].

- **System Implementation:**

A variety of interfaces have been implemented on the Android platform as shown below. Interfaces They are as follows:
(1) Financial Analyst interface,
(2) Chart interface,
(3) SMS transactions and
(4) Month wise summary.
The financial analyst interface gives an overview of the card and bank distribution Transactions. The graph interface is used to provide a statistical display of the analyzed data to the user. Short Message Summary interface displays basic information extracted from a particular message This interface provides the user to filter transactions accordingly into credit or debit transactions. Finally, the month-wise summary interface displays a user's monthly spending. Transactional messages are grouped in Different months according to their timestamp.

- **Advantages of SMS – BANKING**

The advantages of SMS-BANKING are also those of the telephone operator's SMS. They are among others:
– SMS using a signaling channel, they are almost always transmitted even when the mobile network is saturated with many calls. (exceptions: breakdown or destruction of the network mobile phone or at the end of the year when a large number of SMS are transmitted simultaneously); the service is almost instantaneous: each shipment is sent immediately to the recipient (s) selected;
– receiving and reading SMS are free, so they do not incur any financial burden for the receiver, and can be consulted despite an exhausted package;
– the communication, non-intrusive, does not disturb the receiver who can consult his SMS at his desired time;
– SMS are compatible on any type of phone [13].

- **Modern banking services applied in global practice and their role in Global banking system**

As the global economy develops, banks are also looking to evolve their operations, to improve their performance by expanding the scope of banking business and providing services. Modern banking can reduce banks' costs and also save customers' time. In order to expand the scope of services that banks began to provide such as “Internet Banking”, “Mobile Banking”, “SMS Banking”. Companies are constantly monitoring the situation of the remote banking services market, especially online banking, followed by experts analyzing this sector, and the increasing popularity of remote service delivery systems. Which are represented by the following target groups:

- Bank representatives;
- Bank employees who use the SMS system (employee departments responsible for working with clients and marketing operations);
- Executives and employees of the marketing department;
- IT department employees, involved in system maintenance at the bank.
- Bank clients - legal persons;
- Senior accountants, using SMS system.
- Departmental IT specialists;
- Bank clients - individuals.

SMS automation solutions focus on consumer segments banking services for individuals, large companies, small institutions, companies and major bank clients Here are the most relevant:

- Internet banking - provision of services on an SMS basis
- Banking system for payments through the Internet;
- Mobile banking - providing services on a mobile SMS basis
- techniques;
- External services - kiosks and ATMs.

- Phone banking
- Voice of the banking system;

All major banks and many mid-sized banks use the home page For the bank as an input to the online services system. The bank usually does this It does not specialize in any form of service - it is always a wide range of services and, moreover, there is always something that distinguishes the bank from its competitors. For example, a bank offers its banking services - via phone and banking using a touch phone is considered a conservative service but is still in demand.
The group offers a wide range of contributions from management to insurance. The savings bank allocates some of the “Internet client” services to the isolated service “Express client” - such as paying taxes. A good marketing method. Some banks provide the Lockbox service - a “mailbox”, a special account The customer who is processed by the bank to whom the payment is made Contractors from the client. Choosing this type of account allows you to reduce the cost of regular registration fees. Extensive ATM services (ATM based). ATM addresses can be found on most websites, lending institutions, ATMs divided by language, belonging to the bank itself, and also lists ATMs belonging to other institutions. Provides instructions. Through these technologies, it allows the bank to expand its territory and provide the banking services required by the user and communicate with him through SMS via the Internet[14].

**Conclusion:**

During the course of our final studies entitled “Analyzing the design and implementation of a single solution for banking services via SMS for banks that adopt this service in their work in particular", we were able to present a stand on the most important different problems that those responsible for the manual management of credit in those banks face, as well as on the different steps To design a single information system. In order to meet the needs of the administrators of those banks as part of managing credits granted and customers of account information, we started our study with stage design, build using MERISE method, database implementation with SQL Server Essentials Manager for Data and finally materialization of the application under Visual studio2008 programming environment in speaking visual basic2008. In the course of this study, we conducted an analysis of the existing system and then noted various deficiencies in the system. As a solution, we have designed and produced an application that allows access to information on accounts and credits via his phone and thus reducing the time normally required to carry out work manually. Thus, this project has the goal of one interesting experiment, and it has allowed us to improve our knowledge and skills in the field of programming.

However, improving their expectations for our app remains possible as computerizing everything the service gives credits in general In this part, we lets go to present some recommendations deemed necessary to every person interested by our study:

**Recommendations:**

Responsible for granting the service is strongly called upon to send in a future project for the general direction of the general extension of the "SMS-BANK" application to manage credits granted access to benefit computing and suggest computing other services still using the system directory.

For future researchers, the field of information systems management is an area of big news that needs a lot of attention, for future researchers, we recommend that they participate more in this field to reach the bet in the box of various applications that can allow good information management.

In computer science there is a dynamic computer park that will allow them to develop and perform effective research in computer science because information technology makes the main pillar in the development for the progress made in the world today that students from the department of computer science have the necessary tools - them to assist in their research.

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