

Modeling a Knowledge Management System for Banking Industry

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Abstract--The Nigerian banking industry is highly regulated and relies on its knowledge workers in order to deliver good quality products and services. A Knowledge Management system for Banks has been designed and implemented to enable the Banking industry and its employees all over the world to do their jobs to the best of their ability. At times it is normally difficult for employees to get a useful information from an expert to keep their jobs moving effectively, It is either gotten late or not at all. Tacit information of the best practice are hidden on the brains of the expert. A person in a Company may leave, retire or die and the tacit knowledge leaves with him as well, thereby damaging critical social network, causing reduction in productivity and financial breakdown etc. Therefore, the tacit knowledge need to be captured, converted into explicit knowledge and shared among the workforce. The system is made up of the user's mobile phone, GSM server (interfaced to a PC), a PC functioning as a server, Software developed in PHP, HTML, and JavaScript. A MongoDB database used which is a NOSQL (Not only Structured Query Language) is used. Users send their identification information for identification purposes through a GSM modem attached to the server for authentication. An Application software is developed in order to access SMS text by means of AT commands. The received data is used to communicate to the MongoDB (database) for authentication using JavaScript codes. The JavaScript codes fetches, authenticates, and submits the request. Subsequently, SQL is used to access the database in order to provide an appropriate response to the information needed. A portal-based user interface is used to encourage the workforce to share their knowledge. Power Holding Company of Nigeria can use this system to work more effectively, Radio Corporations can also use it to outperform their competitors. In fact, an exhaustive enumeration of its application is not possible. It finds application especially where knowledge of the best practice need to be shared.

KEYWORD: *MODELING, KNOWLEDGE, MANAGEMENT, SYSTEM, CORPORATE, BANKS.*

1. INTRODUCTION

Knowledge Management(KM) is about making the right knowledge available to the right people, at the right place and at the right time and integrating it into business practices and decision making. It is also about making sure that employees of an organization can improve in their skills by retrieving and using its knowledge assets in current applications as they are needed. In other words, it is "the coordination and exploitation of organizational knowledge resources, in order to create benefit and competitive advantage. Knowledge management Systems for Banks is an information System that will enable employees capture knowledge from experts easily before they leave. Useful information about processes and practices are stored on documents, projects, email messages and most times on people's heads and minds and is difficult to retrieve and use. In this era of uncertainty where there are Salary reduction, shrinking of budgets, Staff dismissal, people leave their place of work to another place where they would earn/ benefit more than the present, knowledge will be at risks. This system can be used in Corporations like radio houses to capture knowledge from experts who may be taken away by other radio stations. This would help to extract their knowledge before they leave. It can be achieved through a portal based approach, where information of the best practices are stored, it would be accessed only by authentic employees of a corporate body anytime and anywhere in the world. The Portal is designed that only the information particular to a department can be seen and accessed by them.

Knowledge Management Systems can be applied in corporate bodies like Power Holding Company, Federal road safety commission, Institutions etc. This system will help to beat competitors of such organisation by improving the organisation's performance through increased efficiency, productivity and quality. it will reduce training time for new employee, provide employees opportunity to enhance their skills and

experience by sharing other peoples knowledge and learning from experts.

1.1 Problem Statement

Banking is a risky business that has effect on the economy of a nation. This financial service industry is challenged on many fronts, all of them to some degree intertwined,

and critical to restoring the health and sustainable growth of the industry.

One of the problems the banking sector has worldwide is inefficiency in customers services. A customer stays in a long queue while waiting for services. A customer may thus miss most important appointments, and this could lead to loss of customers. At times banks server/ system will be down for hours and days, thereby disorganizing both the plans of the employee and the customers. Cashing cheques from other banks take especially if in different states with the drawee's bank. Banks machinery and equipments are abandoned by employee that has been offered a better pay elsewhere, thereby losing the knowledge of that completely if it was not codified.

New employees undergo some training not less than 6month (at times not in his state) before starting his new job, the concept of coding and transmitting knowledge in organizations is not new. Training and employees development programs, organization policies, routines, procedures, reports, and manuals have served this function for years. At times information gotten may be inaccurate if gotten at all. By capturing, codifying, and disseminating information on know how, the bank is run by best practices.

Retaining knowledge of the best practice is difficult since it is an order of the day to dismiss any employee who have worked for years but could not meet their target, when such an employee leaves, his knowledge assets leaves with him.

1.2 Aims and Objectives

At the end of this paper, the system should be able to achieve the following:

- Develop a data capture interface for each unit in a bank organisation that will match the way they prefer to present the information they have to share and to store the information gotten in a repository.
- Use a portal based approach for offering information to each unit so that only information concerned about that unit will be gotten by them when accessing sharable data.
- Develop a systematic plan of action for tracking and remunerating people who willingly share their knowledge.

- The system should be able to upload and retrieve information, authenticate login, exercise information search, forum discussion, chat and Email.
- The system could be able to send back the information to the user.
- The system can be customized to meet the demand of any envisaged user.

2.0 Knowledge Management In The Bank

Over the years, banks have utilized their manual process, this has brought the presence of electronic systems that has enabled them to handle large volumes of data and to manage their banking processes and at the same time caused them problems and setback. If an information is needed, one has to go through the pool of information in order to bring a perfect solution. When there are loads of information it could result in less reactive responses and decline of capacity. With huge amount of information being created consistently, inefficiency occurs. Consequently, efficient and effective recovery of knowledge is increasingly becoming an important research issue in recent times.

Without the proper management of information system, vital information are lost. Meanwhile being aware of the role information plays, banks are now making it a matter of precedence to capture, store and share knowledge in order words manage knowledge. However, the lack of process definition, classification, a comprehensive knowledge management model, and suitable knowledge based business model make the efforts futile in the last decade.

Application of knowledge management will make banks have the advantage to outperform their competitors. Apart from large volumes of information, the use of information technology (IT) in managing knowledge has given knowledge management a new dimension. With the appropriate strategies, IT could help to carry out and maximize the benefits of management initiatives, including knowledge management.

2.1 Concept of knowledge, knowledge management, knowledge management system

Knowledge: It includes familiarity, awareness and understanding gained through experience or study, and results from making comparisons, identifying consequences, and making connections. It could also mean expertise, and skills acquired by a person through experience or education; the theoretical or practical understanding of a subject.

Knowledge Management: This is when an enterprise consciously and comprehensively gathers, organizes, shares, and analyses its information with which they

work, such information can be possessed by few members of that corporation. By sharing such knowledge, the company is run by best practices.

Categories of knowledge

Table 1: Types of Knowledge

Types of knowledge	Description	Examples
Tacit	It is knowledge stored in the heads of people which cannot be used by others. It is learning by observation, interview etc. It can only be transmitted through training, socializing or gained through personal experience. It includes people's beliefs, values, intuition and expectations. It is difficult to communicate and share.	In throwing a ball. Driving a nail. Learning through observation, practice and trainings e. g learning from a master
Explicit	It is knowledge that can be articulated, codified, and stored. It can be transmitted to others easily.	Book knowledge, images, manual, booklet, documents, numbers and formulas
Implicit	Implicit knowledge is acquired relatively directly from the environment and requires substantially less mental effort during the learning process. Despite its relatively effortless manner, one common misconception about implicit learning is that it does not require attention to the subject matter.	1. learning geographic information about an area simply by driving to a different city even without having an intention to learn. 2. Attending to a task; they are just not deliberately trying to acquire certain aspects of the task stimuli.

KNOWLEDGE MANAGEMENT PROCESSES

Knowledge management processes and it's barriers.	Knowledge management techniques
<p>1. Knowledge Identification: A knowledge identification culture in an organisation that is badly role-modelled by those highest in the organisation's hierarchy and knowledge hoarding can hinder knowledge identification. High ranking staff may consider themselves to be more important than others and refuse to share (ie hoard) their knowledge. Also lack of expertise in the organization is a barrier.</p>	<p>Consulting a content expert who has long time experience in the field of interest. - Sub regional Workshops: create opportunities for face-to-face meetings and learn from one another. - Information coordinators: can point the key documents, Websites, databases and experts. Appropriate ICT solutions could support this process.</p>
<p>2. Knowledge Acquisition: Internet is considered one of the main tools for capturing knowledge and information however people particularly in rural communities may not have access to it, not</p>	<p>These can be extracted mainly from the human expert, by the following means:</p> <ol style="list-style-type: none"> i. By task analysis ii. Documentation

know how to (better) use it. In any case, time may be wasted while searching for useful information. Information may be on people's head that they may be reluctant to share it.	<ul style="list-style-type: none"> iii. Story telling iv. Interviewing Experts v. Learning by being told vi. Questionnaire vii. Learning from others viii. Brain storming or Ad-hoc session ix. Interviews
3. Knowledge Sharing. It shifts the KM team into 'solutions mode'. Knowledge sharing initiatives may focus on implementing a new expertise directory, or on improving collaboration tools. While these solutions may be potentially useful, if they don't meet specific business needs they won't be widely used (if at all). Most organisations are now littered with unused systems as the result of this emphasis on delivering knowledge management solutions.	These could be achieved through the use of internet, intranet, GSM, Portal, Emails, video conferencing, search engine, instant messaging.
4. Knowledge Storage. Because of the large volume of knowledge in the bank, an SQL database will not suffice. Bank Knowledge is better stored in a No SQL database.	By the use of a repository, knowledge warehouse, database etc.
5. Knowledge Use: Lack of expectancy due to the perception that implementation will not lead to improved outcomes for either the employee or the organization, inadequate motivation due to the threat to professional autonomy that jeopardise people's job security, lack of awareness, familiarity and Forgetfulness.	With a knowledge directory, one can easily find people who have specific knowledge.
6. Knowledge Management Measurement: Lack of proper appraisal from the current knowledge in the organisation.	Notify who accesses and who contributes information. Develop a way to remunerate those who use best practices.

Knowledge Management System: This could be said to be any information system that will be able to capture, store, retrieve, improve collaboration and innovation, use knowledge. It could be said to be a system that manages knowledge.

2.2 Benefits of adopting a knowledge Management Strategy.

- Knowledge management prevents employee and the organization from constantly reinventing the wheel.
- Knowledge management opens the doors to a new era of collaboration and sharing.
- Helps employee to improve in skills and experiences.

- Improves collaboration among employees standardizing ways of working and enabling discussions with leading experts.
- Increases the organization's efficiency and productivity.
- Help employees make better decision.
- Reduces the loss of knowledge
- Improves innovation through wider and borderless collaboration.
- Decreases training costs.
- Increases customers' satisfaction by having quick answers to their questions .

This system will serve the general public as it will help the employees to enhance in their skills and knowledge by getting the necessary information they need when they work together and share each other's

knowledge. It also helps to treat intellectual capital as an asset.

In the entire organization, it helps employees to work smarter, minimize duplication, and deliver more innovative products and services that meet the customers' requirements. From business point of view, knowledge management affects the whole organization by helping employees, managers, and executives share information and best practices that positively impact collective performance. It enables a corporate body to maximize profits, innovation, and decision making by sharing better information and knowledge between every member working and outside the organization.

2.3 Scope of the study

This study involves the conversion of tacit knowledge from experts in a given task to explicit knowledge codified to facilitate sharing among the workforce. Portal based approach that can be accessed anytime anywhere if there is a network coverage in such an area. It also involves the transmission and interpretation of SMS from a sender to a receiver through a mobile terminal. The sender and the receiver device is the PC or the mobile phone. The MongoDB will be connected to a computer through a serial port. Once query is sent from the mobile terminal, the system analyses and interprets it with the help of AT command. The terminal program instructs on the next action to take when the query has been interpreted by AT Command. This also involves the creation of a repository where information will be stored and scooped.

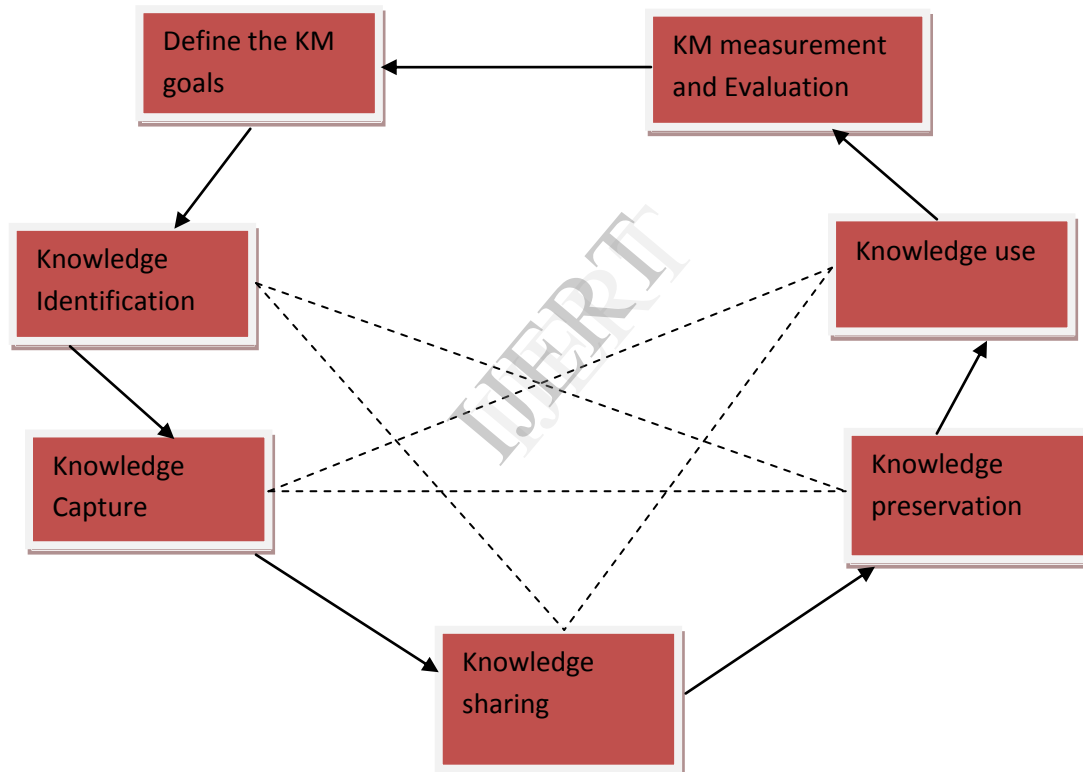


Fig 1: Bank's knowledge management model

Fig 1 depicts the bank knowledge management system where the target aim is known. First knowledge is identified in an expert, captured and codified from tacit to explicit which makes it easy to share. It could be stored/preserved in a repository and used later when similar knowledge is requested. Knowledge is measured and evaluated to know the extent of transformation that has taken place in the organisational memory.

3.0 Review of related work.

Ikujiro Nonaka and Hirotaka(1998), define KM as transferring tacit knowledge into more explicit form. They proposed a model of knowledge creation and conversion

process and used the SECI model[1].They were silent about what to do to encourage workers to share their knowledge. Li and Gao (2003)[2] studied the fundamental points of tacit knowledge on the basis of Nonaka's SECI model regarding knowledge creation and its constraints. They underlined the importance of the spiral-type model in providing an analytical framework for knowledge activities in business management. The study relied on Polanyi (1996) to categorise the tacit knowledge into two parts: implicit and real tacit, but they did not go into the human computer interface that will facilitate sharing. Boisot's KM model(2000)[3] considers knowledge as either codified or uncoded and as diffused or undiffused within

an organization[3]. His work is good for calling attention to the problem of unshared knowledge. KM process framework by Bukowitz & Williams (1999), depicts the process that defines the strategy for management to build, divest & enhance knowledge assets. It emphasizes on the “why” and “when” aspects, its strength rests on its strategic focus, that puts KM actions into context[4]. Gamble & Blackwell(2001), used a matrix to split KM into four stages-sense, organize, socialize, internalize. The strategic outline by Bukowitz is not included and is limited to knowledge sharing, acquisition/creation and divestment and they were silent on remuneration and evaluation aspect of sharing knowledge. A.C Botha[5] focuses on the creation of knowledge and omitted the managerial initiatives and too the strategic focus(the when and why as opposed to the what) is omitted. The model includes the creation of new knowledge.

3.1 Methodology

Rapid Prototyping [6] is used for this project development because:

- It is used to quickly fabricate a scale model of a physical plant or machinery (an environment where the knowledge management processes can be viewed).
- It decreases development time and cost.
- It extends product lifetime by adding necessary features & eliminating redundant features early in business.
- A developed prototype can help engineers to critically examine the technical issues associated with product development.
- It is much easier for the user to form his opinion by experimenting with a working model, rather than trying to imagine a hypothetical model

3.2 Technologies used in Knowledge Management

1. Portal

In this computer era, companies use different computer-based information sources, these need to be integrated and accessed through a widely found, yet personalized interface. Portals create a customized gateway to a large collection of data, information and knowledge. They also provide different kinds of

personalization so that content is presented in a manner that suits the role of each unit within the organization. Both the organization and the user can control what information is made available and how it is displayed. Portals pull information together from different sources and display it in a coherent way, performing an explicit-to-explicit knowledge conversion. Portals support knowledge distribution, creation, storage and collaboration. Portals help employees locate information and at a reduced time, it also helps to make best decision. Portals tend to deliver current and relevant information for decision making

2. KNOWLEDGE REPOSITORY

A Knowledge Repository is an online database that captures, organizes, and categorizes knowledge-based information. Retaining and sharing corporate knowledge has become a crucial objective for companies. Knowledge repositories help organizations connect people with information and expertise globally through online searchable libraries, discussion forums, chat etc. They provide a central location to collect, contribute and share digital learning resources for use in an organisation.

The repository used for this project is the MongoDB, it is an open-source database that uses a NoSQL. This contains large volumes of structured, semi-structured, and unstructured data and even an SQL. It is easy to use and flexible, NoSQL databases are built to allow the insertion of data without a predefined schema.

3. GSM

GSM (Global System for Mobile Communications)[7] is a standard set developed by the European Telecommunications Standards Institute (ETSI) to describe protocols for second generation (2G) digital cellular networks used by mobile phones. The GSM described a digital, circuit-switched network optimized for full duplex voice telephony. This was expanded over time to include data communications, first by circuit-switched transport, then packet data transport via GPRS (General Packet Radio Services) and EDGE (Enhanced Data rates for GSM Evolution or EGPRS). Further improvements were made when the 3GPP developed third generation (3G) UMTS standards followed by fourth generation (4G) LTE Advanced standards.

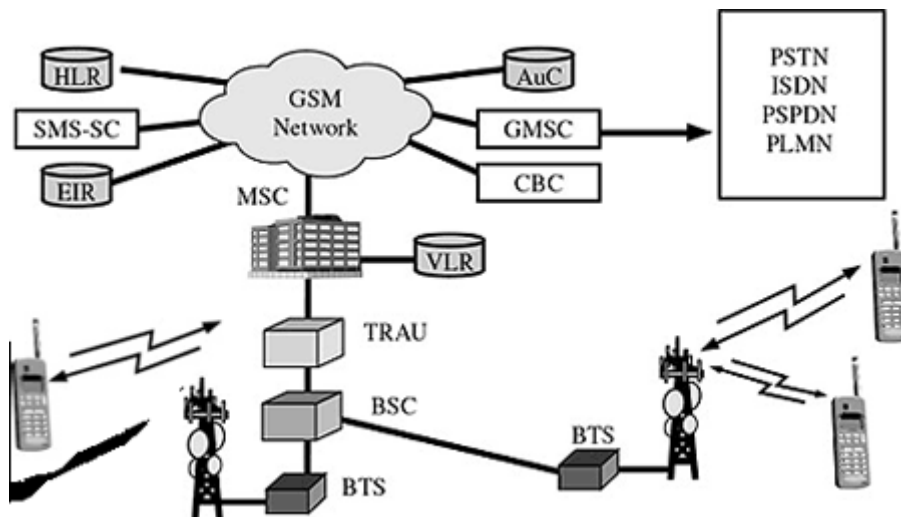


Fig 4: The GSM Network

The MS and the BSS communicate across the Um interface, also known as the air interface or radio link. The

BSS communicates with the Network Service Switching center across the A interface.

GSM network areas:

In a GSM network, the following areas are defined[8]:

- **Cell:** Cell is the basic service area: one BTS covers one cell. Each cell is given a Cell Global Identity (CGI), a number that uniquely identifies the cell.
- **Location Area:** A group of cells form a Location Area. This is the area that is paged when a

subscriber gets an incoming call. Each Location Area is assigned a Location Area Identity (LAI). Each Location Area is served by one or more BSCs.

- **MSC/VLR Service Area:** The area covered by one MSC is called the MSC/VLR service area.
- **PLMN:** The area covered by one network operator is called PLMN. A PLMN can contain one or more MSCs.

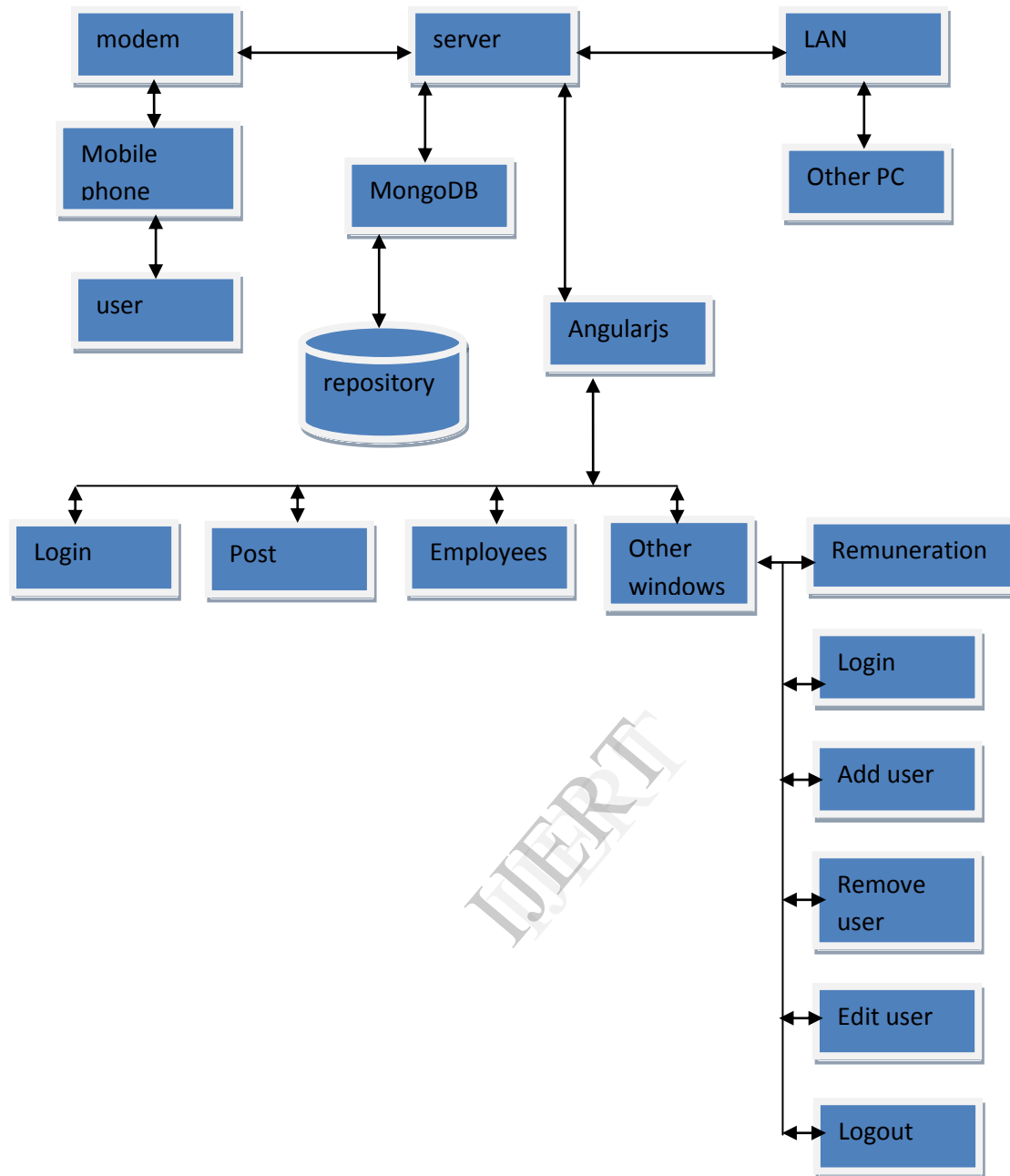


Fig 2: Block diagram of the system

Fig 2 is a block diagram of the new Knowledge Management System. It comprises of a user who needs the knowledge, he uses his phone to access it, sends the syntax for upload/download. It is sent and it passes through a network to Modem. AT Commands in the Server interprets the input from the modem and performs the task in the server. A code written in JavaScript authenticates the input by checking it on the MongoDB. JavaScript also returns the reply through a chrome browser on the Server. A LAN connection is needed if other computers are to connect to the Server. Angularjs is an interface between the

server and the other windows, It is an open-source JavaScript framework, maintained by Google, that assists with running single-page applications. Its goal is to augment web-based applications with model-view-controller (MVC) capability, in an effort to make both development and testing easier.

CONCLUSION

Employees in a corporate bank will work well if they manage their knowledge (and better still through a knowledge management system) that they use to perform tasks within and outside the organization. Banks are emerging everywhere nowadays. Any banking organization that manages the knowledge of its employees well outperforms its competitors. Now knowledge Management System is a tool most organisations cannot do without. In the future, there are other features that will help manage knowledge well like the use of camera and finger printing while accessing knowledge.

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