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A Review: Comparative Study of Content Based and Collaborative Filtering Approach

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ABSTRACT

As the information on the web is increasing, it is becoming difficult for users to choose the right option. So recommendation systems are developed to guide the users in selecting the best option. In this paper we did comparative analysis of recommendation approaches i.e. content based and collaborative filtering approach in which we mainly focused on which approach outperforms other and under what situations, what are the major application areas and the research challenges faced in this domain.

Keywords: Recommendation System, Content-Based, Collaborative Filtering, Hybrid Recommendation Systems, E-Commerce.

I. INTRODUCTION:

As we have to select options from huge set of data, so recommendation systems are becoming popular day by day and they are mainly designed to filter out the most relevant information according to user's need. This is possible by storing the user's information such as his reviews can be analysed like ratings given by user, comments given, how user interacts like clicks, time-spent on a particular page etc. By maintaining the user profile, most suitable items are recommended to the users according to user's interest. Now a day's recommendation Systems are applicable in numerous domains such as movies, books, videos, music, friends, news, and restaurants etc. For better utilization of recommendation systems, efficient recommendation approaches have been implemented. The broad categories of recommendation systems are content-based, collaborative filtering and hybrid-based approach. Collaborative Filtering Approach is further divided into three categories Memory Based/Neighbourhood Approach, Model Based and Hybrid Approach which is shown as below in fig 1:

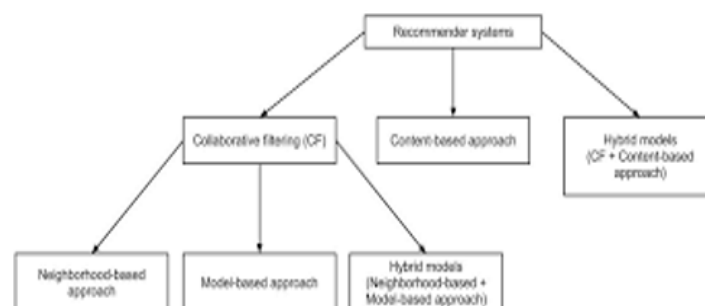


Fig.1: Classification of Recommendation Systems

II. CONTENT BASED FILTERING APPROACH

The two main approaches [1] which are used in the design of the recommendation systems are:

- Content-Based Filtering.
- Collaborative Filtering.

Content Based Filtering is the technique which mainly analyses the items that are previously rated by the user and then predict the user interest based on already those rated items. So in this way system recommends the items that best fit to the user. This example can help in better understanding of content-based filtering like if one user wants to purchase some product and if that product is not available then recommendation systems will recommend similar product on the basis of items information already stored. The major advantage of this approach is that using this approach, recommendation systems start recommending as soon as the information of items is available as no user input is required to recommend in this approach. But the main limitations of this approach are firstly if a user is new to the system i.e. new user then sufficient information of user about its interests will not be available then it is difficult to recommend the items accurately. Secondly, this approach has to match up the profile which is build from user interests and items.

Work-Flow of Content-Based Filtering Approach

The flow of content-based filtering approach is as follows:

The flow of item-based collaborative filtering^[2] is as follows:

- Finding the similarity among the items: The first step in this approach is to find the most similar items which can be computed using Pearson Correlation Coefficient or Cosine Distance Similarity methods.
- After finding the similarity between the items, top n items are selected that are having the highest similarity.
- Then prediction is computed as weighted average on the user's ratings on the most similar items.

III. COLLABORATIVE FILTERING APPROACH

The second approach which is used in the design of recommendation systems is collaborative filtering. Collaborative filtering [2] is the process of filtering the information from very large data-sets according to user taste. But the main assumption which collaborative filtering assumes that if one user has similar taste as some other user then it is more likely to say that these two users can have same taste on some other issue. Example of collaborative filtering include as if one user like some book of particular subject then recommendation systems can recommend the similar books or related videos too of the same subject according to the similar users interest who liked the same book in past. The major advantages of

this approach are that this approach does not require any substantial information about products or users as recommendation is done on the basis of other user's experience and recommendations done by them in the past. The major limitations of collaborative filtering approach is that this in approach initially ratings of the users are required so that recommendation can be done by finding the similarity among users i.e. this approach is user-dependent. Secondly if the user is new then it is quite difficult to recommend as user has not gone through the rating process earlier, this is known as cold- start problem.

Work-Flow of Collaborative Filtering Approach

The flow of collaborative filtering approach is as follows:

- Firstly the user rates the items i.e. shows his preferences in the specific domain.
- Then the system matches the user's ratings with other users which help in finding the similar users.
- Now the products are recommended to that specific user according to the ratings done by the similar users.

IV. COMPARISON OF CONTENT BASED AND COLLABORATIVE FILTERING APPROACH

The major difference between content-based filtering and collaborative filtering is that collaborative filtering approach do not use any actual information of item rather this approach is based on preference patterns of other users whereas content based filtering approach uses the actual information of the item. In content based approach, the major drawback is that too much similar items are recommended to the user, so he never gets a chance to explore other options whereas in collaborative filtering approach, those items are recommended which are similar to other user's interests so user gets chances of exploring different products. The cold-start problem i.e. new user problem [4] exists in both approaches as if user is new to the system then in case of content-based approach, his past choices will be unknown to the system, so it will be difficult to recommend the items accurately and similarly in collaborative filtering approach, if user is new to the system then it is difficult to find similar users as his interests are unknown and finding the similar users is the basic principle of collaborative filtering. The major advantage of content based filtering is that there is no new item problem as if this item is of interest to any user, then it will be in consideration for recommendation but new item problem exists in collaborative filtering approach as if this new item is not rated by large number of users, then this new item has less chances for being in consideration for recommendation.

V. RELATED WORK

Now a day, recommendation systems have become so popular that it is applicable in numerous domains such as movies, music, news, friends, books etc. In this section related work in this domain has been elaborated.

Music Recommendations

Gideon Dror [5] in his work on music recommendations uses Yahoo's data as music dataset which contains million of users, thousands of musical items and millions of ratings. All musical categories of items are linked together within a defined taxonomy. A mechanism of timestamp is involved due to which session analysis of user activities is possible which helps in determining the exact order in which ratings were given. As collaborative technique suffers from cold-start and long tail problem so a novel method is designed by using music taxonomy information. The model used is matrix factorization which involves temporal analysis of user ratings and item popularity trends. As user preferences and popularity of music will change with time so modelling of temporal dynamics with collaborative filtering (CF) models helps in getting better results.

Seok Kee Lee [6] in his work on recommending music for mobile devices confesses that explicit ratings as done in traditional collaborative techniques to collect user preferences is a limitation as compared to implicit ratings because of poor interfaces and high telecommunication costs in mobile web environment. So a new collaborative filtering method with ordinal scale based implicit ratings is proposed. To keep record of implicit preferences information mobile web usage mining technique is used by using web log data. But this information can be insufficient so to handle this consensus model can be the solution which addresses the problem of aggregating preferences of users into a compromised preference. This methodology is implemented in real mobile web environment and results show that the performance of this methodology is better than traditional methodology of collaborative filtering approach.

Products Recommendation

Hui Li [7] in his work focus on recommending the products the user by mitigating the sparsity problem generally encountered in collaborative filtering approach. The traditional collaborative filtering approach uses user-item matrix as the base which consists of ratings done by various users on different items to predict the products. But as there are large numbers of users, and we need to find the most similar users so there is extreme sparsity of users rating data. So in this a new approach has been developed to find the similar users by first refining the user ratings data first so that sparsity problem can be reduced to certain extent. Though various approaches have been developed to overcome sparsity problem such as clustering technique, weighted co-clustering technique multilayered semantic social network model, bi-clustering collaborative filtering technique. But this proposes a new technique that introduces the concept of attribute deduction and neighbour domain i.e. computing the distance to all other users in the rating matrix. So this approach is more scalable as compared to existing approaches. But the further work can be carried out by taking into consideration the factors that impact the customer feelings as customer satisfaction is the major requisite for recommendation systems.

Gal Oestreicher [8] in his work mainly focus on the long-tail problem of collaborative filtering approach i.e. there might be some items which are not rated by the users so they remain unnoticed and user is unaware of such items. To solve this problem a new approach is designed for linking recommendation networks to the long tail by connecting the position of products to the relative demand and revenue within their respective categories. In such a network having large number of links, firstly the position of the product is measured using Google's Page Rank. Then average influence of the network is associated with the relative demand and revenue using Gini's coefficient derived from the Lorentz's curve.

News Recommendation

Jiahui Lui [9] in his work on news recommendations analyses the user's log and based on this developed a Bayesian Framework and predict the news which user would like to read. The major challenges in existing algorithms are firstly as in collaborative filtering approach items are predicted on user's past behaviour but news are generated within short span of time so they must be reached to users timely. But using existing algorithm they will not reach until rated by users. Secondly, all users cannot be treated equal as most popular news can be flashed to maximum users even he is not interested in watching that news. So solution to these problems is that user's profile should be generated on the basis of his reading interest. The main issue is that user interest may change over time so system should be able to keep the updated profile to reflect the changes in interest. In future all the factors such as user profile, time spent, short term interest according to event or long term interest like in which kind of news the user is generally more interested can be combined to improve the news recommendations.

VI. COMMON RESEARCH CHALLENGES

- **Data Sparsity [3]:** As dataset is very large and user-item matrices are sparse in nature then it is difficult to predict the recommendations accurately.
- **Scalability:** As number of users and items are growing day by day then traditional collaborative filtering systems will suffer from scalability problems. As in some systems it is needed to make recommendations for users immediately then in such cases highly scalable collaborative filtering systems are required.
- **Synonyms:** This refers to that similar items may have different names so this problem is not being resolved by recommendation systems i.e. it treats the products differently which reduces the performance of recommendation systems.
- **Gray Sheep:** This refers to those users whose opinions or interests do not agree with other users. So such types of users are not benefitted from the design of recommendation systems.

- **Shilling Attacks:** This problem arises among competitors when they just rate their own items and give negative ratings for the competitors so such type of practice should be prevented while designing the recommendation systems.
- **Cross-Domain:** As majority of the recommendation systems are designed to recommend the items in a single domain like last.fm suggests only music compositions, it would be better if recommendation systems can recommend in multiple domains like in addition to music compositions according to user's interest, relevant movies can also be recommended.
- **Group Recommendations:** When a number of users are involved then it is difficult to recommend the items in such a way that it can satisfy all the users to the maximum extent.
- **Long Tail Recommendations:** There might be some products which may remain unrated and due to this, users will never be aware of such products so design of recommendation systems must be done in such a way that this problem can be handled efficiently.
- **Less Reliable:** It can be the case that some unauthorized users rate the items which just reduces the performance of the recommendation systems.

VII. CONCLUSION

In this paper we discussed about how recommendation systems have gained popularity, comparative study of recommendation approaches have been done with their major advantages and limitations, application areas of this domain have been elaborated and research challenges in which further work can be carried out to better utilize the efficiency of recommendation systems have been discussed. The further work can be carried out in these aspects of implementation of recommendation approach in different domains.

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Benefits of Superseding Public Internet with MPLS VPNS for Cloud Inter Connectivity

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ABSTRACT

The age of virtualization is upon us where the internet (and cloud) has given us unprecedented access to resources around the globe. Indebted to the revolution of cloud, we are able to access our resources from any location and from any device at any time across the globe. Thus cloud has empowered businesses and operations.

However, accessing these resources over the public internet which is shared by billions of users is a risky endeavor and the data stored over the cloud is susceptible to security breaches by masqueraders. This paper concentrates on suggesting the increase in adoption of MPLS VPNs which provide a highly secure method of sharing data over the cloud and minimize the risk of security contraventions.

Keywords: *Multi Protocol Label Switching, Virtual Private Network, Cloud, Private Line, VLAN, SSL etc.*

I. INTRODUCTION:

The cloud provides solutions for businesses and individuals to virtualize their operations and stay connected to corporate resources spread across the globe. The cloud is full of unexplored possibilities and has the potential to further revolutionize our internet experience.

A. The current cloud scenario (business perspective)

The global cloud services have been proliferating at an extraordinary rate as businesses and individuals are moving from the traditional setup to a cloud based approach. The global cloud services business is currently at \$125 billion (approx.) and is expected to grow at over twenty percent till the year 2020 to reach \$170 billion dollars. These figures delineate what a significant role cloud plays in today's industry and how it is affecting today's businesses.

B. The problem

Today, most of the companies have their resources hosted on the cloud. Accessing these critical resources (secure information about the company's administration, clients, revenue, business etc)

through the public internet which is shared by billions of other users can have a deleterious effect as they are susceptible to being intercepted by hackers.

In order to optimize the operations running over the cloud, it is imperative to eradicate these security obstacles and move to a more secure form of communication. The MPLS VPN provides a high performance network enabled cloud technology with unparalleled speed, flexibility and security.

If an organization has multiple business locations that need to communicate, they require network connections that go beyond their corporate boundaries. They need to incorporate a service provider into the scenario who can facilitate this conveyance of data.

C. Point to point private lines

Instead of sharing resources over the internet, some businesses opt to establish their own private lines which connect one location to another. These companies may opt for the following kinds of lines - T1 lines, DS3 connections, Ethernet over copper, fiber optic Ethernet or SONET.

The advantage of private lines is that they are dedicated for one's private use, low in latency jitter & packet loss and they ensure high grade network security.

Although this may seem like an excellent choice for connecting to remote locations together in order to facilitate orderly transmission of the data, this method of disseminating data can be very expensive as each location would require its own link (or a switch or router to communicate between sites). In addition to this, as the number of business sites increases, it becomes difficult to set up more number of private links.

The high cost of private lines for multiple locations and long distances, along with greater complexity in handling the inventory calls for a more effective technological convention for interconnecting company resources.

D. Internet VPNs

The internet offers an inexpensive solution to this hurdle as it is ubiquitous, provides easy access and is extremely cost effective. The internet provides superlative connectivity and seems like a natural solution for connecting company locations.

However the use of the internet poses the threat of security (it is probably the least secure network available) as it is easily accessed by everyone and anyone, which means there isn't a dedicated corridor for data transmission which means anyone who can tap into the data stream can access all this secure information.

By subsuming the internet for connection we are also putting the performance characteristics at a risk as the internet is a public resource and thus the secure data has no priority over the rest of the data over the internet. The system is self routing, so we are incognizant about the route that the packets take and thus oblivious to the path that the secure company information is taking. While the internet may provide seamless operations for common internet applications such as email, web browsing or file transfers; It can cause real headaches for highly interactive or real time processes such as called services, VoIP telephone calls and video conferencing.

II. MPLS VPN : THE SOLUTION

The panacea to the aforementioned problem of using the public internet is by using an MPLS connection.

MPLS (Multi Protocol Layer Switching) which can handle all kinds of multifaceted protocols ranging from Ethernet to TDM uses a proprietary technology to route data known as label switching.

Label switching is a system to encapsulate each packet into a special label which contains the information about source, destination and priority. The label is added when the packet enters the network and removed when it leaves. While on the network, only the label is used to forward packets. The IP content of the packet is ignored; this is equivalent to the internet VPN process and thus MPLS networks are known as MPLS VPN for that reason.

Security is provided by the network being privately run, accessible only to subscribers. It is difficult to tap into the MPLS network as there are no public access points and because of the proprietary label switching process which doesn't depend on internet protocol.

From a security perspective, the data may be encrypted before handing over to the MPLS network.

As MPLS networks are operated by major telecommunication carriers on their own fiber optic networks, they are conscientiously engineered to provide sufficient resources to handle the traffic users. This gets rid of the network congestion and latency & jitter issues. Also the data traffic can be elevated to

a priority delivery status such that the highly sensitive voice and data communications are not affected by large files transferring at the

same time. This means that an MPLS network significantly ameliorates the performance aspect of the communication.

Although the MPLS connection is more expensive than simply using the internet for accessing the cloud, it provides a far more reasonable price than multiple dedicated private lines for each location. With the MPLS VPNs provided by the telecomm provider, the user only pays for the bandwidth used for each location. For a reasonable price, the customer is able to secure a high performance solution which helps secure and dedicated transfer of data.

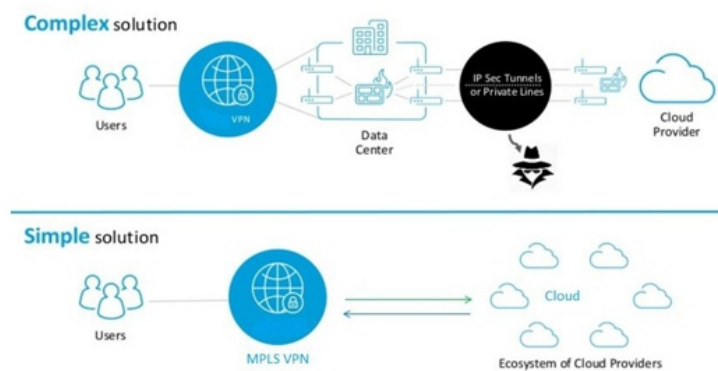


Fig 1: Represents the contrast between the traditional connections which might go through a data center causing hairpin connection problems, whereas through the MPLS it follows a direct end to end path from user to cloud

III. WORKING

MPLS VPNs can be used as a cloud network enablement (CNE) technology that joins with cloud solution provider (CSP) computing services to deliver a managed, end-to-end solution via the network. It provides a highly secure direct connection between a virtual private network (VPN) and the cloud resources, which creates an integrated cloud computing environment.

The existing MPLS VPN is extended (VPN, Enhanced VPN, IP-Enabled Frame Relay, or MPLS PNT) into the cloud service via application programming interfaces (APIs). As a result, it combines the scalability and dynamics of the cloud with the network security inherent in private virtual environments.

The cloud service is enabled to function as another node on the MPLS VPN network and supports mobile VPN integration and common security policies for mobile and wire line end points. Because they're integrated, the network and computing resources expand and contract in tandem, on demand, to rapidly accommodate workload changes.

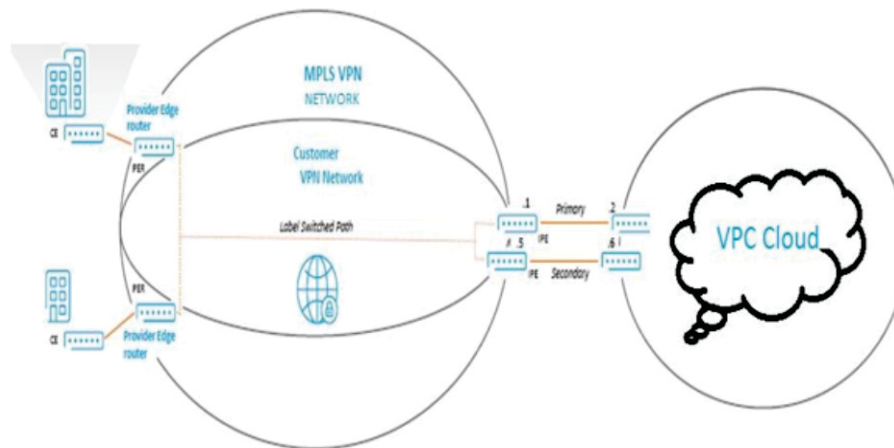


Fig 2. Shows how CE and PE routers are connected to VPC cloud over MPLS network.

The telecomm providers which provide the MPLS infrastructure have a colossal fiber network on which the MPLS infrastructure is supported.

The customer sides are connected to the MPLS network through the customer edge and provider edge routers. An AVPN (label switched) network is employed which has no resources riding over the public internet. The data from the CE and PE take the shortest path over the MPLS network to the infrastructure provider end through the cross connects. The VPN follows network provisioning to add sites on the customer network, which might be done programmatically with the help of APIs.

Once a VLAN is established, it sets up a BGP (Border Gateway Protocol) pairing session. Two redundant peering connections are established by sub netting the IP space provided by the customer network as primary and backup links.

This physical connectivity is orchestrated by software through a self service portal (enterprise side) which allows user to connect to his destination using VLAN.

Meet-me-points (an interface) are created across the globe with cloud service providers. The application programming interfaces (APIs) are used to pre-integrate the cloud service and the private network, on which the selected cloud solution providers' data center is an endpoint. By extending the VPN all the way to the cloud service, our patented networking technology separates the VPN traffic from other cloud traffic—down to the virtual LAN (VLAN) and virtual machine (VM) level.

IV. FEATURES & BENEFITS

A) Enhanced Security: As MPLS VPNs operate by establishing a direct tunnel between user and cloud end points, the data is highly secure as compared to being exposed to the susceptible public internet.

B) Performance: MPLS VPNs reduce latency by up to fifty percent and enhances agility. Due to the dedicated tunnel, it also provides high bursting capability. Moreover as a secure dedicated path is established, the end user is cognizant how the data packets will flow as opposed to the internet where the route taken by packets is completely unknown.

C) Scalability: The VPN may be upgraded or downgraded to match the customer's bandwidth requirement. The customer pays only when the service is used and for the amount of bandwidth used.

D) Cost: Although the MPLS connection is more expensive than using the inexpensive public internet, it provides a great cost advantage over private lines and data centers which require huge cost inlays.

E) Centralized Routing: In addition to this, since the MPLS VPNs are monitored by the telecommunication provider, the customer does not need to worry about the routing as it follows an automated centralized routing.

V. COMPANIES OFFERING MPLS VPNS

Currently the MPLS VPNs are being offered by AT&T (AT&T Netbond), Verizon (Service Interconnect), and Sing Tel (Cloud Interconnect).

A few CSPs such as Microsoft (Microsoft Express Route) and Amazon (Direct connect) also provide these services.

VI. CONCLUSION

The aforementioned paper calls for a growth in adoption of MPLS VPNs over the public internet, especially for large corporations which contain sensitive information over the cloud. MPLS VPNs is a boon which encompasses the benefits of both a public cloud and a private cloud.

ACKNOWLEDGMENT

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Design of Spatio-Temporal Patterns as a Query Mechanism using Data Mining

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ABSTRACT

The process of discovering meaningful new correlations, patterns and trends by sifting through large amounts of data stored in repositories and by using pattern recognition technologies as well as statistical and mathematical techniques. The exploration and analysis of large quantities of data in order to discover meaningful patterns and rules. The nontrivial extraction of implicit, previously unknown, and potentially useful information from data Our world is changing at an increasing pace causing the validity intervals of information to shrink. Therefore the change of information becomes important information itself—an important information resource that should be exploitable by query language. Beyond data mining that often serves the purpose of identifying interesting objects in special or spatiotemporal data sets, queries are of interest that find out about relationships between objects once they have been identified. In the realm of spatiotemporal database this means to find out, in particular, about the changes the objects and their relationships undergo. Moreover many applications require not only the detection of one single change, but rather look for sequences of changes describing particular developments.

Keywords: *Data Mining, Spatio-Temporal Mining, Spatio Temporal Patterns*

I. INTRODUCTION:

We propose the concept of spatiotemporal patterns as a systematic and scalable concept to query developments of objects and their relationships. Based on our previous work on spatiotemporal predicates, we outline the design of spatiotemporal patterns as a query mechanism to characterize complex objects behaviors in space and time.

Spatiotemporal patterns can be applied in many different areas of science, for example in geosciences, geophysics, meteorology, ecology and environmental studies, study of climatic changes.

EXISTING SYSTEM

Existing spatiotemporal database systems and query languages offer only basic support to query changes of data. Most of these systems allow the formulation of queries that ask for changes at particular

time points. It is often very difficult changes. In other words, existing query languages do not offer a systematic, scalable concept to query developments of objects and relationships; instead they require the user to encode these by a number of individual conditions.

It also requires the formulation of additional side conditions. Moreover, this approach does not work in queries for arbitrary numbers of changes.

Spatiotemporal patterns enable the formulation of queries about complex object developments their integration into query languages allow the formulation of queries that are currently not possible. Moreover, spatiotemporal patterns can also simplify the formulation of queries that are possible with existing languages.

PROPOSED SYSTEM

The intervals for which certain pieces of information remain valid become shorter and shorter. Therefore, the change of information becomes important information itself an important information resource that should be exploitable by query languages. In the area of temporal data bases this issue has been addressed for quite some time. Availability of spatio. Temporal Data.

- Meteorology: all kinds of weather data, moving storms, tornados, developments of high pressure areas , movement of precipitation areas, changes in freezing level, droughts.
- Biology: animal movements, mating behavior, species relocation, and extinction.
- Crop Sciences: seasonal grasshopper infestation, harvesting, soil quality changes, land usage management.....
- Geophysics earthquake histories, volcanic activities and prediction.

Many Human-Related Activities are Related to Changes in Spatial Information as well

- People: Movements of terrorists/criminals/spies, movement of people in emergency situations, pedestrian patterns/habits...
- Cars/trucks/taxis : tracking, rerouting, fleet management,
- Urban planning, parcel management, development of social areas, urban
- Economics, tourism planning, bus routes,....
- Crime/disaster prevention : Risk area analyses, resource allocations (police, health care, fire stations
- History : Country expansions, reunifications , tribe movements,
- Military : missile tracking, troop movements,
- Planes/ships : routes, detours,

Data Mining

Data mining is a system of searching through large amounts of data for patterns.

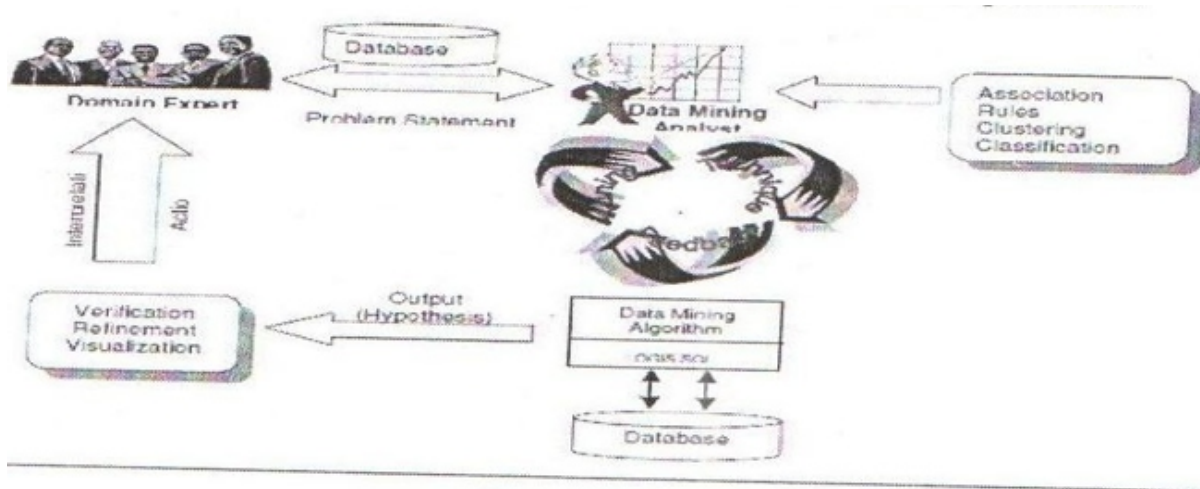


Fig. 1: A Data Mining Process

Spatio - Temporal Patterns

Regular structures in space and time, in particular, repeating structures, are often called patterns. Patterns that describe changes in space and time are referred to as spatiotemporal patterns.

One important characteristic of change in spatial data that makes it interesting for data processing by scientists and others; interesting phenomena are those that are not random but rather follow certain rules. In other words, applications are interested in spatial data changes that exhibit a certain regular structure.

Limitation of Existing System

One goal of spatiotemporal database research is to enable the intelligent use of the collected data, a main problem is that of extracting relevant and useful information from the data.

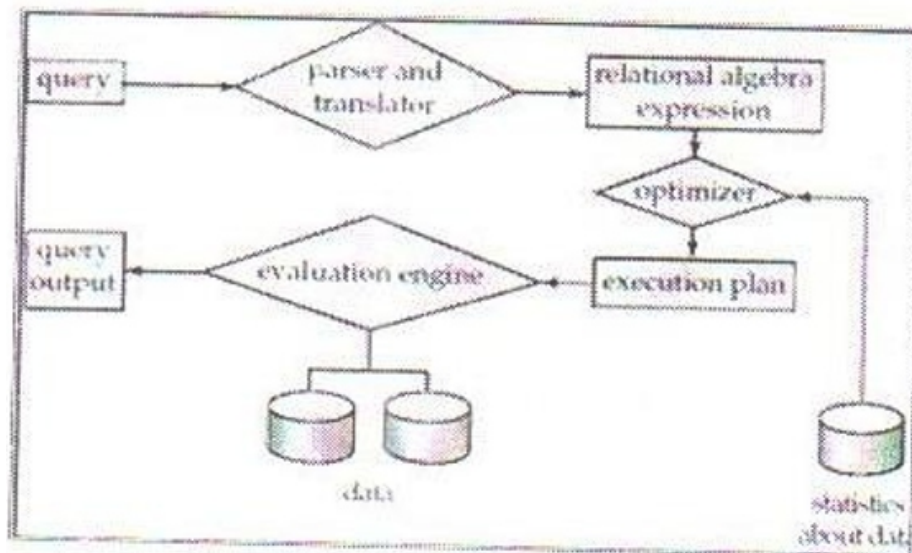
- There are two areas of database research addresses two different aspects of the problem Data mining which is also sometimes referred to as knowledge discovery is concerned with the discovery of patterns in large data sets.. In particular, spatiotemporal data mining has the goal of identifying interesting structures and patterns in spatiotemporal data sets.
- Query languages work on data that is well structured and that is stored in rather fixed formats obeying schema definitions and possibly additional integrity constraints. The distinctive feature of query languages (compared to Data mining) is the assumption that the knowledge in a database is already present, whereas the goal of data mining is to discover it. Query languages are used to find out further relationships among objects.

Design of Spatiotemporal Patterns as a Query Mechanism

Spatiotemporal predicates allow the formulation of many queries in a rather direct way of expressing spatiotemporal relationships directly on attributes of the involved objects.

- How can the notion of spatiotemporal predicates be generalized without compromising their current useful applications ?
- What is the suitable query language to specify aggregations over spatiotemporal predicate results?
- How the earlier version different from the proposed one?
- Is a spatiotemporal pattern providing a way to describe hierarchical or nested spatiotemporal predicates?
- Whether we can use recursive grammar or regular expression?

General Query Processing



Parsing and Translation

Translate the query into its internal form. This is then translated into relational algebra.

- Parser checks syntax , verifies relations

EVALUATION

- The query – execution engine takes a query –evaluation plan, executes that plan, and returns the answers to the query.
- A relational algebra expression may have many equivalent expressions
- For example

$$\sigma_{balance < 2500}(\prod_{balance}(account)) \text{ is equivalent to } \prod_{balance}(\sigma_{balance < 2500}(account))$$

Spatio-Temporal Approach

We have introduced a concept of spatiotemporal patterns that can be employed in query languages to express queries about the development of spatiotemporal objects and their relationships. To help coping with the complexity, we believe that providing effective access to spatiotemporal data through expressive query languages is an important step to help scientists and ordinary users to exploit the information that is contained in fast growing spatiotemporal data sets. Of the query language we also sketched the design of a visual query language that makes the expressiveness of spatiotemporal patterns accessible to a large group of users.

Research need in response to the problem is to develop mechanisms to test and validate spatiotemporal data mining results, particularly that test the validity of spatial and temporal relations, and to reconcile discrepancies in data.

SCALABLE INCREMENTAL PROCESSING OF CONTINUOUS SPATIO-TEMPORAL QUERIES

Hence we are presenting a scalable and incremental framework for continuously evaluating continuous spatio-temporal queries. The scalability is achieved by employing a shared execution paradigm for continuous spatio-temporal queries. With the shared execution, queries are indexed in the same way as data. Thus, evaluating a set of concurrent continuous spatio-temporal queries is reduced to a join between a set of moving objects and a set of moving queries. Incremental evaluation is achieved through computing only the updates to the previously reported answer/ We have Three Classifications of Queries

- Stationery Queries
- Moving Queries
- Predictive Queries

VISUAL QUERY MECHANISM

Spatiotemporal predicates allow the formulation of many queries in a rather direct way by expressing spatiotemporal relationships directly on attributes of the involved objects. The more advanced queries that require spatiotemporal patterns quickly tend to become quite complex. Moreover, the fast growing set of available spatial and spatiotemporal data and its wide dissemination through the internet increases the class of possible users for these data. Offering ordinary users access to spatiotemporal data is therefore becoming a more and more important issue that can be addressed by developing a visual query language and a corresponding user interface. In particular, it is important to make data base accessible to users without formal training in databases and query languages, such as scientists, administrators or other end users. In many cases, these users do not have the time or are not willing to learn formal query

From this point of view, even spatiotemporal predicates embedded into a query language like STQL.

A visual notation can express relationships in many cases implicitly where textual notations require the explicit application of operations and predicates.

For Example

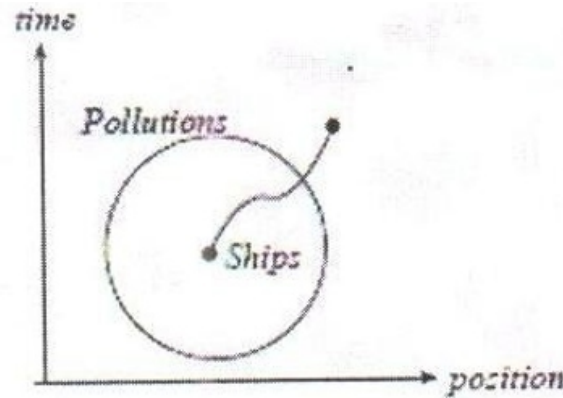


Fig. 1.2: Visual Specification of the Leaves Predicate

The picture describes the following query and can be automatically translated into it.

```
SELECT sname, pname
FROM shipsf, Pollutions
WHERE Pos (Inside meet Disjoint) Reg
```

To extend the developed visual query notation (and the user interface) to cope with more general forms of spatiotemporal predicates and patterns, a number of issues have to be addressed. A refinement of the visual query in Figure 1.2 that is obtained by adding a constraint on the time the ship needed to leave the pollution region. We can express this by projecting two points onto the time axis and adding a condition to it. The resulting visual query asks only for those ships that have left the region within 30 minutes, see Figure 1.3.

This visual query will then be translated into the following STQL query.

```
SELECT sname, pname
FROM Ships, Pollutions
WHERE Pos(For(<30 min, Inside) meet Disjoint) Reg
```

Two other useful extensions are to express numerical spatiotemporal predicates and to allow for hierarchical specifications. To use numerical spatiotemporal we need additional visual elements to refer to numerical spatiotemporal operations like Distance to be able to express numerical constraints on

developments. In order to be able to express general spatiotemporal patterns that require nested sequence conditions we need a mechanism to refer to visual specifications from within other specifications.

CONCLUSION & DISCUSSIONS

Existing spatiotemporal data models and query languages offer only basic support to query changes of data, in particular, although these systems often allow the formulation of queries that ask for changes at particular time points, they fall short of expressing queries for sequences of such changes.

We have introduced a concept of spatiotemporal patterns that can be employed in query languages to express queries about the development of spatiotemporal objects and their relationships. To help coping with the complexity of the query language we also have sketched the design of a visual query language that makes the expressiveness of spatiotemporal patterns accessible to a large group of users.

We believe that providing effective access to spatiotemporal data through expressive query languages is an important step to help scientists and ordinary users to exploit the information that is contained in fast growing spatiotemporal data sets.

FUTURE WORK

Spatiotemporal patterns can be applied in many different areas of science, for example, in geosciences, geophysics, meteorology, ecology and environmental studies. Since users in the in these areas typically do not have extended formal computer training. It is often difficult for them to use advanced query languages. A visual notation for spatiotemporal patterns can help solving this problem. In particular, since spatial objects and their relationships have a natural graphical representation, a visual notation can express relationships in many cases implicitly where textual notations require the explicit application of operations and predicates. Future work on the visualization of spatiotemporal predicates, we will sketch the design of visual language to formulate spatiotemporal patterns.

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A Comparative Analysis of SQL Server and Inter Base Server

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ABSTRACT

Data storage, information management and subsequent retrieval constitute one of the ultimate goals in Computing Technology. Choosing the right Database Management System depending on the operation of the Establishment cannot be over emphasized. To select the right server for an application, two things to be considered are how data will be accessed and modified in the application, and how the server will behave in a data access or update situation.

This research work compares two Database Management Systems with different architecture; Inter base server with multi generational architecture and SQL server with classical architecture. The analysis was based on Execution time (Insert time, Update time and Delete time), using Delphi 6 programming language as the platform and Open Database Connectivity (ODBC) as the Application Programming Interface (API).

Results obtained revealed that insert time in SQL server was in the range of 95343 μ s to 3783171 μ s when the record size ranged from 10,000 to 1,000,000 which almost doubled the insert time for Inter base server. Update time for SQL server is about twice that for Inter base for number of records between 10,000 and 100,000, but about three to six times for higher number of records. The delete time for SQL server was about 5 times that of the Inter base server.

Keywords: ODBC, Multi generational Architecture, Classical Architecture, DBMS, SQL Server and Interbase server.

1.0. INTRODUCTION

Data provide the basis for advancements and developments in every field of study. Therefore, choosing the appropriate database management system that facilitates the ways we store, manage and process these data is very important. Due to many shortcoming of file system, people scaled to database systems. Database is a collection of logically related data. It is a source, where data are store in an arbitrary manner to facilitate arbitrary access of the stored.(Bukhres et al, 1993). Database technologies are different techniques use in implementing different database Management system. Thus, database is not only representing significant infrastructure for computer applications, but they also process the transactions.(Mullen et.al, 1995)

There are different categories of database management system. It ranges from Local database technologies to Remote database technologies.(Zhao et. al, 998). Database Management systems were developed based on two different architectures, they are classical architecture and multi generational architecture. This research work focus on two remote database technologies, which are Inter base server database management system from multi generational architecture and Microsoft SQL server database management system from classical architecture. This research provides a quantitative and qualitative analysis of the selected technologies.

2.0. RELATED WORK

(Todd, 2003), in his paper title “Interbase, what sets it apart” concluded that the most significant different between inter base and other database servers is its multi- generational architecture which is also called versioning architecture. This provides very rapid crash recovery since there is no log file to process. In (Best software, 2005), “MAS200 for SQL server introduction and overview” concluded that Microsoft SQL server is a road tested, industry standard database fully equal to the task of running mission-critical business application than any other database servers.

(Mohan, 2004), in his work “Performance Measurement and analysis of Database Interface Technologies: JDBC, EJB (CMP2.0) and Oracle Toplink” analyzed the most suitable Application Programming Interface by subjecting the three interface technologies into stress testing.

To meet the service levels demanded by your users, your database-based application needs to deliver high performance and scalability. In addition, it requires complete data availability, which includes fault tolerance, service uptime, and throughput. In short, performance and service uptime are the two most important criteria to ensure an application operates at expected levels.(MySQL Technical White Paper, 2005)

3.0. MATERIALS AND METHODS

Detailed study of Inter base server and Microsoft SQL server was carried out, and the evaluation criteria which is common to both DBMS(Execution time; insert time, delete time and update time) were examined and model. In order to evaluate the effectiveness and efficacy of the two DBMS, data were generated and populated in the order of between Ten thousand Records to One million records in each data base. The two DBMS were then subjected to a test and monitored.

The hardware specification used for the experimentation is as given in table 1 below. Table1 Hardware Specification

Hardware Specification	
RAM	512
Operating System	Window XP, SPII
Microprocessor	Pentium IV, 2.4 GHZ
Platform	Delphi

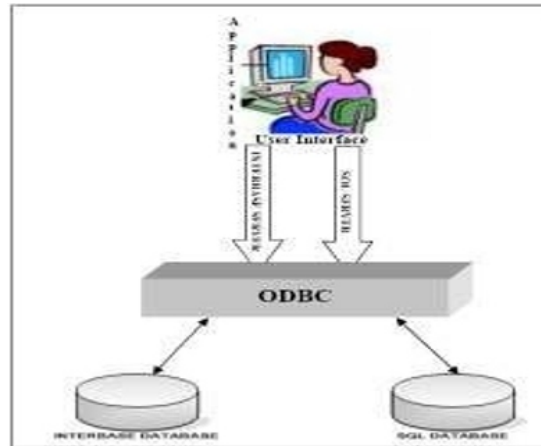


Figure 1.0 The Conceptual Framework of the designed system

Application User Interface: This is design phase that access the database via the ODBC. Delphi 6

Programming language is used as the platform. The analysis was performed by building an application that connects via ODBC to Inter base server and SQL server. The application is menu driven. it requires supplying the amount of data to be populated by each database driver. Upon supplying the data then the system is executed to perform the analysis. The application user interface design is given in figure 2.

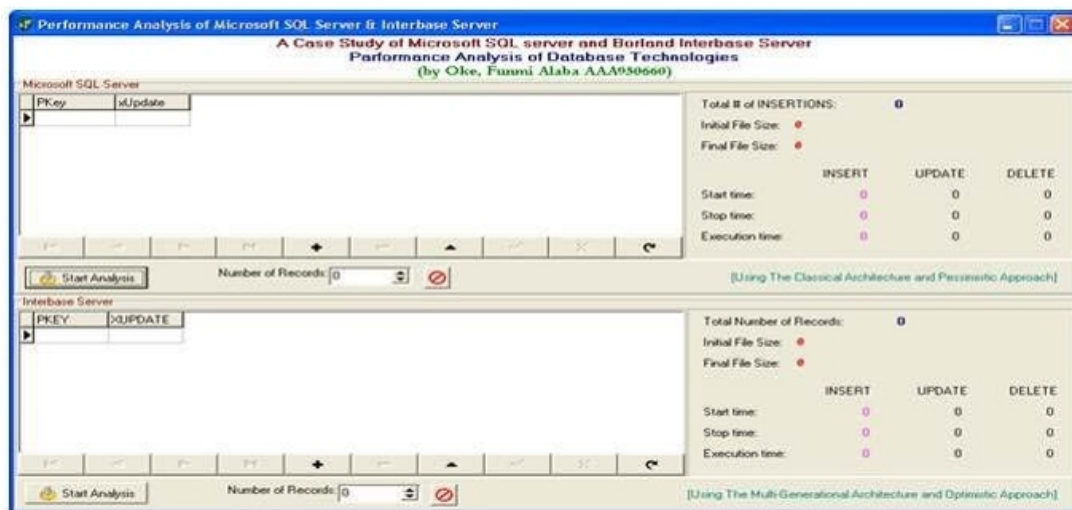


Figure 2.0 The Application Interface Designed for the Analyses

ODBC: Open Database connectivity is used as the Application programming interface between the front end (Delphi) and each back end (Inter base and SQL). It has benefits of ubiquitous connectivity and platform-independence. It provides the standard of ubiquitous data access because hundreds of ODBC drivers exist for a large variety of data sources. ODBC operates with a variety of operating systems and drivers exist for non-relational data such as spreadsheet text and XML files

Inter base Database server: This is the inter base file used to connect to the Inter base database Inter base is a Database Engine that has memory footprint, programming and cost concerned. It allows implementation of Stored Procedures, Blobs, Database events and distributed processing; Inter base requires Windows 95/98/Me/NT/2000/XP/2003Server, or IB/Firebird Server

SQL Database server: This is the SQL file used to connect to the SQL database It is a relational database management system (RDBMS). This is also known for its support for many data types, scalability, simplicity and efficiency. It is a remote server that has support for client server and distributed computing. It also requires Windows 95/98/Me/NT/2000/XP/2003Server, or IB/Firebird Server.

RESULTS

Table 2.0. Execution Time for Inter base Server and SQL Server

No of Record	TYPE OF SERVER					
	INTERBASE SERVER			SQL SERVER		
	Insert	Update	Delete	Insert	Update	Delete
10,000 Start time(μs) Stop time(μs)	6:47:18	6:48:54	6:50:26	6:45:09	6:46:01	6:46:47
50,000 Start time(μs) Stop time(μs)	7:00:26	7:05:02	7:08:49	7:10:50	7:12:05	7:12:57
100,000 Start time(μs) Stop time(μs)	7:38:11	7:46:33	7:54:05	75:08:30	8:10:20	8:10:48
500,000 Start time(μs) Stop time(μs)	8:14:58	8:57:57	9:22:09	11:20:06	12:30:14	12:32:22
1000,000 Start time	9:27:23	10:21:08	10:47:35	12:50:14	2:35:06	2:38:13

The table 2 shows the results of the analysis for Inter base and SQL servers. The two DBMSs were populated with varying number of records ranging between 10,000 records and 1,000,000 records. The system was monitored and start time and stop time were recorded to get the execution time for both Inter base and SQL database management systems. Execution time for each Database management system was analyzed so as to know how each behaved in update, insert and delete execution time. Figure 3.0 and figure 4.0 shows graphical representation for Inter base server and SQL server respectively.

INTERBASE SERVER

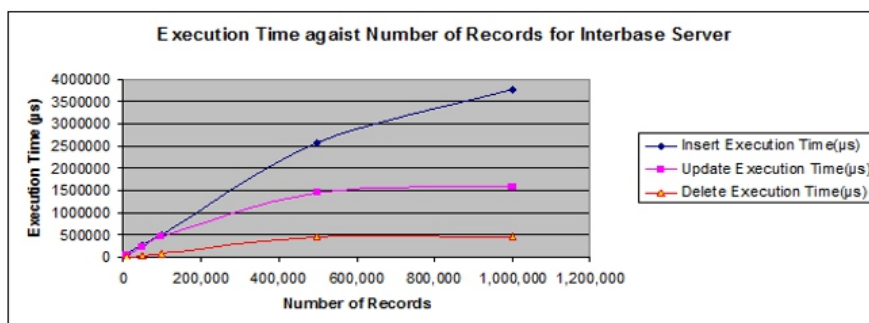


Figure 3.0 Graph of Interbase Database Server Execution Time

For Interbase server, Delete time execute faster than both Update and Insert time, while Update time is faster than Insert time.

SQL SERVER

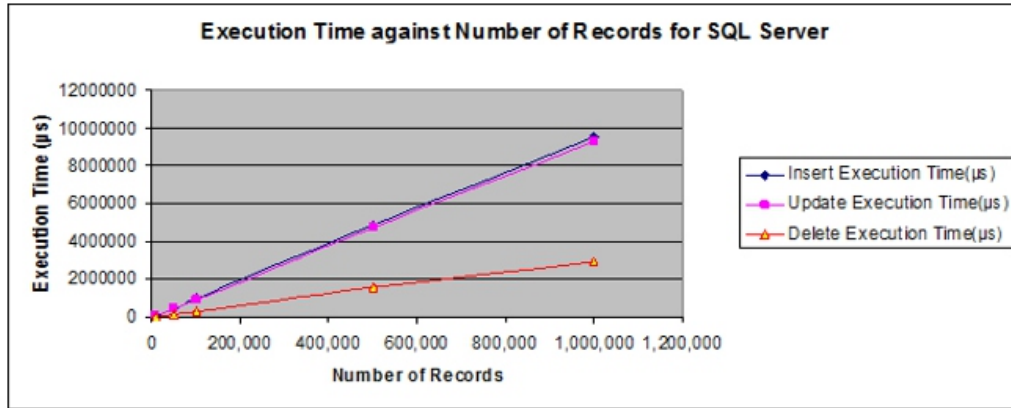


Figure 4.0 Graph of Microsoft SQL Database Server Execution Time For SQL server, Update and Insert execution time were almost the same in fastness while Delete time execute faster than both Update and Insert time.

SQL SERVER VS INTER BASE SERVER.

From the result gotten in table 2.0, the execution time (Insert, Delete and Update) from each of the database server were compared and analyzed with each other, figure 5.0, figure 6.0 and figure 7.0 show the graphical representation for insert time, update time and delete time for both Inter base and SQL servers respectively.

INSERT EXECUTION TIME (SQL VS INTER BASE)

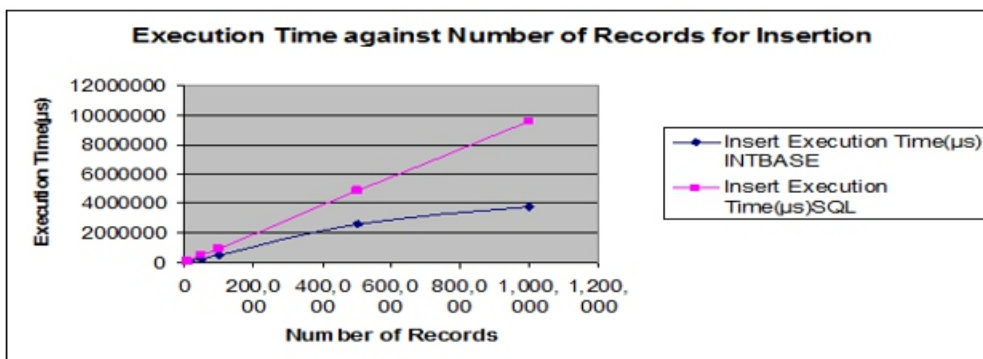


Figure 5.0 Insert execution time against number of records for both Databases

From figure 5.0 that shows the comparison analysis for Insert execution time for Interbase and SQL Servers, it was found out that Insert time in SQL server was in the range of 95343 μs to 3783171 μs

the record size ranged from 10,000 to 1,000,000 which almost doubled the insert time for Inter base server. Therefore, insert execution time in Inter base is faster that insert execution time in SQL.

UPDATE EXECUTION TIME

Figure 6.0 shows the comparism analysis for Update execution time for Interbase and SQL Servers.

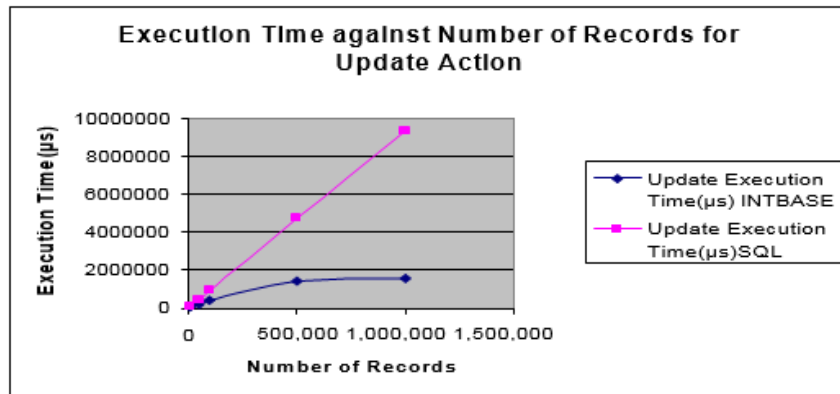


Figure 6.0 Update Execution time against number of records for both Databases

Update time for SQL server is about twice that for Inter base for number of records between 10,000 and 100,000, but about three to six times for higher number of records. Therefore, Update Execution time in Inter base is faster than Update Execution Time in SQL Server.

DELETE EXECUTION TIME

Figure 7.0 shows the comparism analysis for Delete execution time for Inter base and SQL Servers The delete time for SQL server was about 5 times that of the Inter base server.

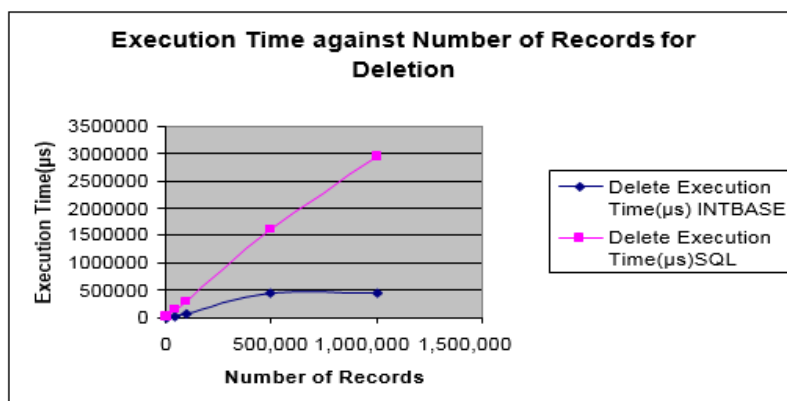


Figure 7.0 Delete Execution time against number of records for both Databases.

Delete Execution Time in Inter base is faster than Delete Execution Time in SQL Server.

Delete Execution Time in Inter base is faster than Delete Execution Time in SQL Server.

RESULTS DISCUSSION

Inter base server with multi generational architecture and SQL server with classical architecture were analyzed based on Execution time (Insert time, Update time and Delete time), using Delphi 6 programming language as the platform and Open Database Connectivity (ODBC) as the Application Programming Interface (API). Results obtained revealed that insert time in SQL server was in the range of 95343 μ s to 3783171 μ s when the record size ranged from 10,000 to 1,000,000 which almost doubled the insert time for Inter base server. Update time for SQL server was about twice that for Inter base for number of records between 10,000 and 100,000, but about three to six times for higher number of records. The delete time for SQL server was about five times that of the Inter base server.

Moreover, the results revealed in the two database management systems considered, delete execution time is the fastest, followed by update execution time then insert execution time.

CONCLUSION

SQL and Inter base database management systems are good database systems widely used in computing because of the possibilities of services they offer. Therefore, to select the right server for an application, the following must be understood; how data will be accessed and modified in the application developed? and how the server will behave in each data access, update, and insert situation. It was found out that the database server with multi generational architecture (Interbase) performed better in terms of execution time to database server with classical architecture (SQL).

With this result, System procurers can make a more informed decision in choosing appropriate database management system from the option considering the benchmark used to evaluate them.

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Analysis of Value Creation of Electronic Banking in Nigeria

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ABSTRACT

This paper examines trends of banking habit in Nigeria across banking regimes of regulation and deregulation. The current position assessment is hinged on historical perspective of banking development in Nigeria, from independence to date. Relevant secondary data covering 1960 to 2010 were collected from Central Bank of Nigeria annual reports; the descriptive trend analysis suggests static behavior across the monetary policy regimes. For the success of the cashless Nigeria program, caution should be exercised in rushing the program until measures are in place to encourage and push fast the banking culture change.

INTRODUCTION:

The emerging global economy of the twenty-first century where business is conducted over the Internet (i.e. 'e-business') with its dynamic and rapidly emerging competitive characteristics, promises new avenues for wealth creation. The integration of information and communications technology (ICT) in business has revolutionized relationships within organizations and those between and among organizations and individuals. Specifically, the use of ICT in banking is expected to encourage greater customer participation through enhanced services quality and round the clock availability.

With these web-based business developments, there must be distinction between the known traditional markets and the global electronic marketplace in the value creation chain. It should easily be discerned, through increased customer participation reflected in the reliance on banking services in the businesses value chains. This change should also be reflected in the banking structure in terms of branch expansion and deployment of new technology.

It is therefore important to analyze the banking system in Nigeria and ask the question whether or not, has the adopted e-business in banking enhance value creation in the industry; has the new conditions shifted the market's traditional banking habit to the technology based ones? Answering these questions is critical since information and communication revolution is the major globalization challenges facing developing countries, given their relatively underdeveloped information infrastructure. Policy-makers, business executives and academics are increasingly concerned about their society's competitiveness in the emerging information economy.

In this regard, this research analyses banking culture changes through high quality services generated by technology. It is a share the belief that with the right cultural change, ICT can help enhance value creation which will in turn lead to higher levels of social, economic and political development.

The work is organized in five sections. Section 2 presents the historical context of the Nigerian banking development and some theoretical framework. The methodology of the research is contained in section 3. The analysis in form of current position assessment is in section 4; while the conclusion is in the final section of the document.

EVOLUTION OF BANKING CULTURE IN NIGERIA

The pre-Structural Adjustment Programme (Pre-SAP) development in Nigeria banking sector can be captured in three phases: namely; the era of laissez faire banking (1892 - 1952), the era of limited banking regulations (1952-1958), the period of prudential Regulations and Control (1959-1985). The 1892-1951 was called the era of “free banking” due to absence of control because with a mere registration under the companies' ordinance, a bank was established. Banking in this era was dominated by foreign banks; namely, the African Banking corporation (1892) now First Bank of Nigeria; the Colonial Bank which predated the former Barclays Bank (1917) and presently Union Bank; and the British and French Bank (1948) which became United Bank for Africa (UBA) in 1961. The reason for their existence was not for financial intermediation, but to serve the cash needs of the colonial government and the multinationals (Haruna, 2008).

Therefore, indigenous banks were subsequently established to support local entrepreneurs and grow the banking culture. But thereafter, most analysts believe these indigenous banks were ill-equipped in terms of capital, management adequacies and customer foci, as such had little impact in the market.

The massive bank failure (1952-1958), widespread fraud and banking abuse led to the enactment of the first Banking Ordinance (legislation) in 1952 to introduce some controls into the Nigerian banking scene. For instance, the Ordinance stipulated that to operate banking business, the following conditions must be fulfilled:

1. An authorized capital of £50,000 out of which £25,000 must be fully paid-up.
2. Creating 20 percent reserve funds out of profits until the sunk funds offsets the paid- up capital.
3. Maintenance of satisfactory level of liquidity to meet up customers demand.
4. Directors' unsecured loans should not exceed £600.

These measures further exposed the weakness of the then indigenous banking structure as many of the local banks could not satisfy these simple conditions. Consequently, all the indigenous banks established in the country during this period failed. This means reliance, once more, on the foreign banks that had no quest to develop the banking culture.

However, the period 1958-1986 can be referred to as the era of consolidation because it improved and consolidated on the gains of the Banking Ordinance period. The period began with the enactment of the Central Bank of Nigeria Act of 1958 to establish the Central Bank of Nigeria (CBN). This act empowered the CBN to promote and integrate the Nigerian financial system through outlining regulatory measures to effectively stem the tide of bank failures. The Banking Act of 1969 empowered the CBN to exercise its power in maintaining monetary and financial stability in the economy.

Nonetheless, the CBN concentrated in control and monitoring instead of developing the banking culture. In spite of the intensity of control, the banks were circumventing the controls by creating products that are off-balance sheet items to hide relevant information about their operations thereby expanding interest rate spreads (IRS) (Haruna, 2010). In an attempt to get the growing number of banks to comply with the rules, the regulatory authorities diverted more of its resources to the enforcement compliance with credit ceilings and related direct controls, leaving the people with poor perception of banking.

Deregulation became inevitable mid 1980s with the sole aim of stabilizing the economy and increasing banking activities through reduced IRS. During this period, the Nigerian banking system witnessed more changes than any other sector of the economy. At the commencement of the deregulation, the number of privately owned banks operating in the country grew tremendously as a result of the ensuing ease of entry into the field of banking and foreign exchange (FX) arbitrage opportunities. For instance the number of banks increased 200% from 41 in 1986 to 120 in 1993; while total number of branches rose by mere 72% from 1,394 to 2,397 within the same period indicating presence of one branch bank for FX gains (Haruna, 2010).

Deregulation initiatives also brought into operations a number of strategic institutional changes in the banking sector. The take-off of the Nigeria Deposit Insurance Corporation (NDIC) in 1989 was to support and protect expected increase in financial intermediation in the money market. Others include the Peoples Bank of Nigeria (PBN) introduced in 1989, and the Community Banking Scheme in 1990. The establishment of Nigeria Import and Export Bank (NEXIM), Discount Houses, Bureaux De Change, Mortgage Banking institutions, etc are all part of the institutional changes.

According to Umoh (2003), in spite of all the institutional and structural changes interest rate policy was inconsistent; hence from on-set the key element of encouraging banking services patronage is lost. Overall, a stable feature of the market was that of widening spread because the banks were only willing to increase lending rates while holding the deposit rates low (Fakiyesi 1996). In fact the rising negative real interest rate within this period explains the great disintermediation experienced up to 1986 (Fakiyesi, 1996; Hesse, 2007). Thus instead of enhancing financial deepening, the policies led to narrowing of the sector.

It became apparent in late 1990s and early 2000 that many banks appeared to have abandoned their essential intermediation role of mobilizing savings and inculcating banking habit at the household and micro enterprise levels. The apathy of banks towards small savers, particularly at the grass-root level, has not only compounded the problems of low domestic savings and high bank lending rates in the country, it has also reduced access to relatively cheap and stable funds that could provide a reliable source of credit to the productive sectors at affordable rates of interest.

It was under this context that the government sought to improve the situation by increasing the sizes of the banks. It was expected that a consolidation initiative would help reverse the ugly situation. But historically and structurally the sector remained highly concentrated with 10 largest banks accounting for 50% of the industry's total assets and liabilities. Branches are also concentrated in few urban centers, thereby delimiting capacity for deposit mobilization, and leading to less efficient and high cost of financial intermediation.

Another important feature is that the banking system has maintained its pre-liberalization characteristic of non-market determined financial intermediation by engaging in rent seeking practices as means of survival (Soludo, 2004). Thus with focus tilted towards the non-real sectors of the economy through FX arbitrage forgetting loanable assets, the vicious cycle of need to cover gaps continued to expand the intermediation costs, further delimiting the gains of liberalization and banking culture.

The costs expanded further given the leakages of cheaper funds controlled by the informal market as measured by the size of currency outside the banking system. For instance, at any time there was about N400 billion currency outside the banking system (CBN reports, various). Current policy of cashless transaction is aimed at arresting this problem. Since the scheme is expected to usher in an innovation in the payment system, it is relevant to conduct a context analysis of the policy intent with a view of identifying key issues that would enhance the transition and policy effectiveness.

CURRENT THEORY OF FINANCIAL INTERMEDIATION

Poor banking habit truncates financial intermediation through diversion of potential deposits and current account floats from the banking system. Current theories of the economic role of financial intermediaries (such as banks) build on the economics of imperfect information that began to emerge during the 1970s. Financial intermediaries thus assist the efficient functioning of markets, and any factors that affect customer response to their services have significant macroeconomic effects in the economy.

There are two strands in the literature that explain the existence of financial intermediaries. These are the one emphasizing provision of liquidity; and the other hinges on the financial intermediaries' ability to transform the risk characteristics of assets. In both cases, financial intermediation can reduce the cost of channeling funds between borrowers and lenders, leading to a more efficient allocation of resources.

These are central to banking culture development since once an economy is averse to dealing with banks, the identified linkage between surplus and deficit sectors of the economy will be impaired. Stiglitz and Weiss (1981) suggests that the illiquidity of assets provides both the rationale for the existence of banks. Poor banking habit is caused by a shift in expectations. When normal benefits are known and not stochastic, banks will be able to attract customers and to provide optimal risk sharing by converting illiquid assets into liquid liabilities.

Adverse selection increases the likelihood that deposits and patronage in general will be entrusted to a bank with less than expected services, while moral hazard is not easily identifiable from the banking customer angle as is the case of lower the probability that a loan will be repaid. As a result, potential banking customer may choose to work outside the banking system no matter the cost of transactions.

In summary, the perception and behavior of financial intermediaries play an important role in financial markets in terms of developing customer expectation towards banking services. They reduce the cost of channeling funds between relatively uninformed depositors to uses that are information-intensive and difficult to evaluate, leading to a more efficient allocation of resources. As specialists in collecting information, evaluating projects, monitoring borrowers' performance and risk sharing, their ability to identify factors that hinder customers from accessing their services is central to completeness of intermediation

processes. Adverse shocks to the information structure, or to these firms' collateral or equity levels, or to banks' ability to lend, may all impact on firms' access to credit and hence to investment and output.

METHODS OF ANALYSIS

Developmental descriptive research method is used to obtain information concerning the current status of banking habit in Nigeria. In attempt to describe "what exists" in form of current position assessment with respect to some macro variables and customer attitude, trend analysis is used. The methods involved the survey of the trends of core indicators of customer participation in banking markets overtime. The variables chosen are money supply (MS), currency in circulation (CIC), currency outside the banking operations (COB), banking clearing activities (including demand deposits) and treasury activities.

As the work is not empirical, secondary macro data were accessed from the CBN numerous bulletins. The trend is observed in such a way by generating ratios that will give a clear direction of improvement of habitual changes year by year. This is more significant given the banking development context analysis in section 2. That is, it is a rational expectation to see a huge change when the industry transited from control regimes to a free market system. To make this very obvious, the trend analysis compartmentalized the observation into pre-liberalization (1960-1985) and post liberalization (1986-2010).

RESULTS AND DISCUSSION

Reform of the Payments System: Issues and Challenges

Central to this research, is the reform to the payments system. The payments system plays a crucial role in any economy as a channel of inter-sector, inter-industry and inter-company financial resource flows in promoting economic growth. Understandably, the Central Bank of Nigeria (CBN) accorded the payments system due priority in its reform agenda of the financial system. Thus, the CBN in partnership with other stakeholders embarked on extensive reforms of the payments system to enhance its safety, efficiency and reliability. This effort culminated in the introduction of institutional arrangements, operational mechanisms, interrelated IT infrastructure and instruments that are expected to gain wide acceptability among service consumers in the banking industry.

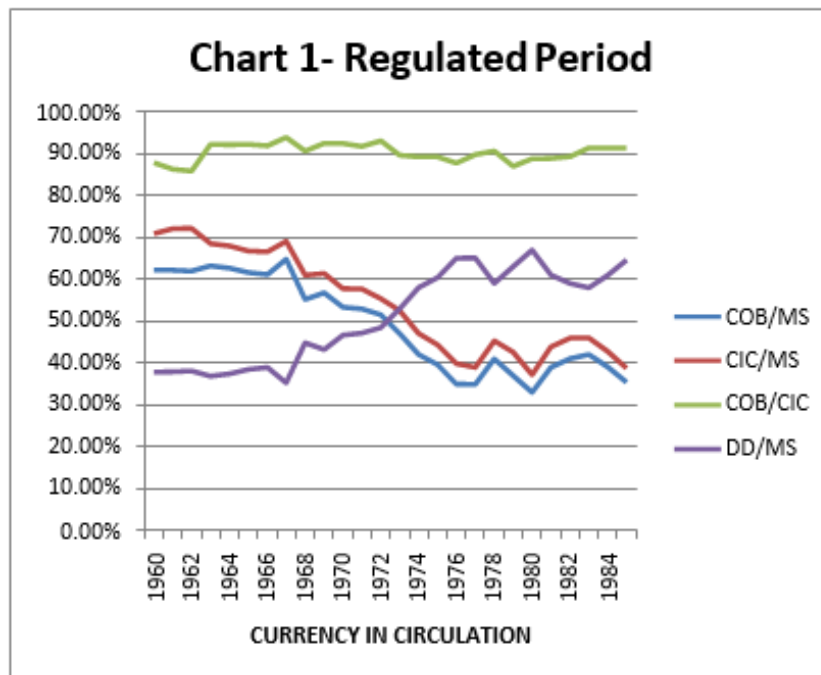
The emerging payment system in Nigeria is part of forward linkages of financial liberalization and the quest for integration with the rest of the world. The architecture culminated in developments in payments framework, regulations, infrastructure and information and communications technology. It is with the great expectations of changes in the banking habits that the following results are analyzed to see the new banking channels (Internet banking; ATMs; Branches, Mobile banking, Call center, Email, Mail) have indeed brought consumers more into the banking services.

Transactions outside the Banking Operations

As stated in section 2 under context of Nigerian banking development, over N400 Billion is always outside the banking system. It is expected that the payment system reform should change the pre-regulation trend. Tables 1a and 1b capture the ratios relevant to the analysis of currency in circulation (CIC) and currency outside the banking system (COB)

Table 1a: CIC Regulated Period				
	COB/MS	CIC/MS	COB/CIC	DD/MS
1960	62.19%	70.84%	87.78%	37.81%
1961	62.16%	72.06%	86.27%	37.84%
1962	61.93%	72.13%	85.86%	38.07%
1963	63.16%	68.51%	92.19%	36.84%
1964	62.61%	67.93%	92.17%	37.39%
1965	61.57%	66.76%	92.22%	38.43%
1966	61.07%	66.51%	91.82%	38.93%
1967	64.80%	69.03%	93.88%	35.20%
1968	55.19%	60.93%	90.57%	44.81%
1969	56.79%	61.40%	92.49%	43.21%
1970	53.37%	57.74%	92.44%	46.63%
1971	52.90%	57.67%	91.72%	47.10%
1972	51.54%	55.39%	93.04%	48.46%
1973	47.08%	52.53%	89.64%	52.92%
1974	41.99%	47.06%	89.23%	58.01%
1975	39.56%	44.35%	89.20%	60.44%
1976	34.97%	39.85%	87.74%	65.03%
1977	34.92%	38.91%	89.74%	65.08%
1978	41.01%	45.27%	90.57%	58.99%
1979	37.01%	42.56%	86.96%	62.99%
1980	33.01%	37.19%	88.76%	66.99%
1981	38.95%	43.85%	88.83%	61.05%
1982	41.03%	45.95%	89.29%	58.97%
1983	42.05%	46.01%	91.39%	57.95%
1984	39.08%	42.79%	91.33%	60.92%
1985	35.38%	38.73%	91.35%	64.62%
Source: CBN Bulletin (Various)				

The trend analyses are captured on charts 1 and 2.



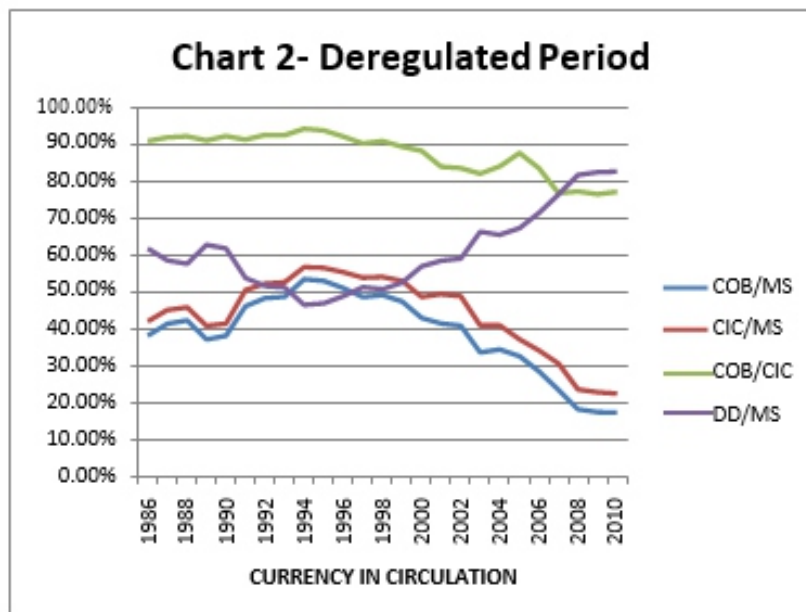
Comparing the regulated with deregulated, not very change has occurred. That is while the trend for regulated current account balances (i.e. demand deposits – DD) to money supply (MS), currency in circulation (CIC) to MS and currency outside banking COB to MS were rising; COB ratio to CIC remained flat. This indicates that the impact of money supply seen is segmented possibly as source of public sector finance instead of private sector spending. Thus, there were no significant changes in peoples' behavior towards banking their excess cash over the length of the period banking were regulated.

	COB/MS	CIC/MS	COB/CIC	DD/MS
1986	38.18%	42.01%	90.90%	61.82%
1987	41.45%	45.11%	91.88%	58.55%
1988	42.34%	45.93%	92.20%	57.66%
1989	37.16%	40.82%	91.03%	62.84%
1990	38.18%	41.40%	92.22%	61.82%
1991	46.17%	50.59%	91.27%	53.83%
1992	48.38%	52.29%	92.52%	51.62%
1993	48.71%	52.69%	92.45%	51.29%
1994	53.49%	56.77%	94.21%	46.51%
1995	53.05%	56.57%	93.77%	46.95%
1996	51.05%	55.41%	92.13%	48.95%
1997	48.64%	53.91%	90.22%	51.36%

1998	49.19%	54.11%	90.91%	50.81%
1999	47.43%	53.06%	89.40%	52.57%
2000	42.97%	48.69%	88.25%	57.03%
2001	41.47%	49.41%	83.93%	58.53%
2002	40.89%	48.95%	83.55%	59.11%
2003	33.63%	40.98%	82.06%	66.37%
2004	34.46%	41.02%	84.02%	65.54%
2005	32.64%	37.23%	87.68%	67.36%
2006	28.54%	34.17%	83.53%	71.46%
2007	23.51%	30.61%	76.80%	76.49%
2008	18.22%	23.58%	77.27%	81.78%
2009	17.46%	22.83%	76.48%	82.54%
2010	17.34%	22.47%	77.19%	82.66%

Source: CBN Bulletin (Various)

Not very much difference is observed post-liberalization. In fact there were some deterioration in the COB/MS, CIC/MS, DD/MS trends up 1993, with COB/CIC trend remain flat consistent with the regulation trend. After 1993, all the noticed deteriorations reversed with main trend of interest COB/CIC sluggishly falling, an indication of marginal gain in changes in the banking habits. This 'sticky' behavior is suggestive of appraisal of socio- cultural issues of potential customers in order to improve their participation.



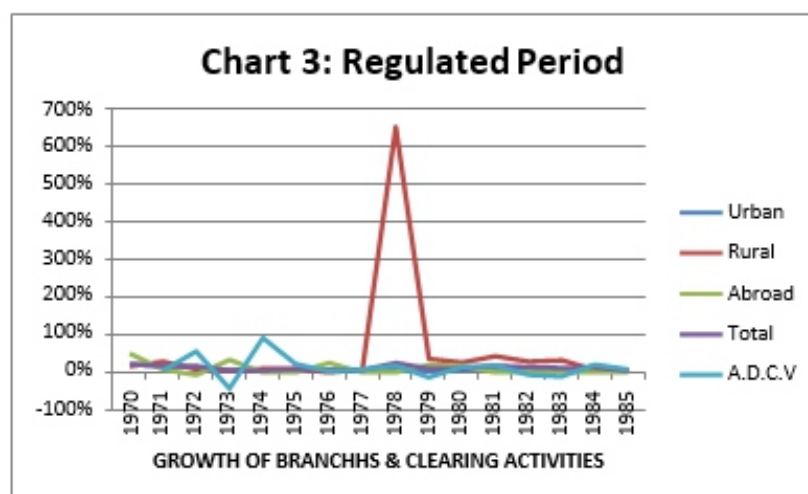
Branch Network

The current drive in e-banking is aimed at facilitating interaction in banking processes. The 'market' place had been the bank branches. The branch network growth is an indication of how customer perception changes over time.

Table 2a: Branch & Growth of Clearing Activities					
Regulated Period					
	Urban	Rural	Abroad	Total	A.D.C.V
1970	21%	17%	50%	21%	
1971	16%	29%	8%	17%	5%
1972	16%	8%	-7%	15%	55%
1973	5%	3%	33%	5%	-43%
1974	5%	10%	0%	5%	91%
1975	8%	9%	0%	8%	22%
1976	6%	0%	25%	6%	3%
1977	6%	8%	0%	6%	7%
1978	8%	654%	0%	25%	18%
1979	4%	36%	20%	9%	-13%
1980	6%	26%	17%	10%	14%
1981	10%	43%	0%	17%	18%
1982	9%	28%	0%	14%	-7%
1983	3%	32%	0%	12%	-11%
1984	17%	6%	0%	13%	20%
1985	4%	4%	0%	4%	7%

Source: CBN Bulletin (Various)

In this study, we trended the annual growth rates of the industry first for the regulated (table 2a) to observe the changing culture over time.

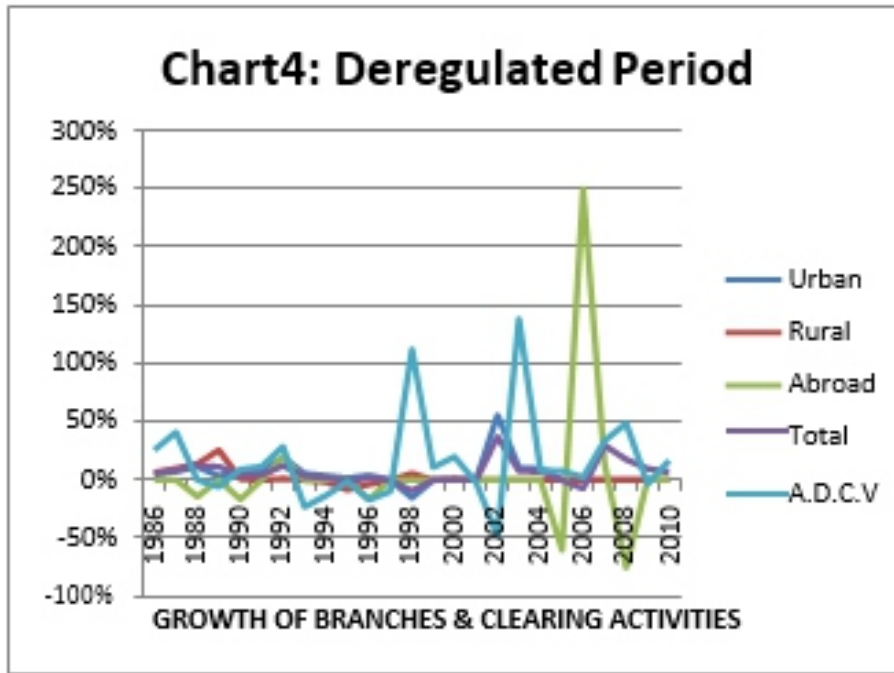


Consistent with COB analysis, branching policy of the banks remained flat throughout the period. The only jump in the rural branching came out government policy push of the 70s. Immediately the minimum that was enforced was reached the growth trend reverted to the traditional flat trend. No-growth average daily clearing volume (ADCV) is very consistent with cash transaction analyzed under COB.

Again, the post 1986 development is no different. The oscillation noticed on ADCV is more of deviation likely because of the government participation in the clearing system.

Table 2b: Branch & Growth of Clearing Activities					
Deregulated Period					
	Urban	Rural	Abroad	Total	A.D.C.V
1986	5%	7%	0%	5%	26%
1987	8%	10%	0%	8%	41%
1988	12%	14%	-14%	12%	0%
1989	3%	26%	0%	11%	-6%
1990	7%	1%	-17%	5%	9%
1991	7%	0%	0%	4%	12%
1992	19%	1%	20%	12%	29%
1993	5%	0%	0%	4%	-23%
1994	4%	-2%	0%	2%	-13%
1995	2%	-8%	0%	-1%	-2%
1996	4%	-4%	-17%	2%	-17%
1997	0%	0%	0%	0%	-10%
1998	-15%	6%	0%	-9%	112%
1999	0%	0%	0%	0%	11%
2000	0%	1%	0%	0%	20%
2001	0%	0%	0%	0%	-2%
2002	56%	0%	0%	37%	-48%
2003	10%	0%	0%	8%	138%
2004	10%	0%	0%	8%	8%
2005	0%	0%	-60%	0%	8%
2006	0%	0%	250%	-7%	2%
2007	0%	0%	14%	30%	34%
2008	0%	0%	-75%	18%	49%
2009	0%	0%	0%	10%	-3%
2010	0%	0%	0%	7%	17%

Source: CBN Bulletin (Various)



The trend generally, is consistent with poor banking habit.

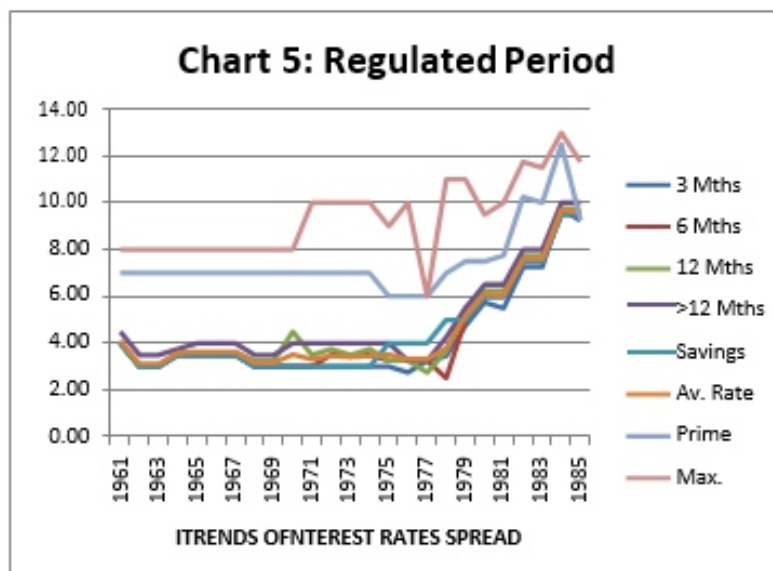
Cost of Financial Intermediation

One factor that may be responsible for pushing people to concentrate on cash transactions is costs of banking operations. To measure this cost, the interest rate spread (IRS) trend is observed through the departure of average interest rate and the maximum lending rates within both the regulated and deregulated periods under review.

Regulated Period								
	3 Mths	6 Mths	12 Mths	>12 Mths	Savings	Av. Rate	Prime	Max.
1961	4	4	4	4.5	4	4.1	7	8
1962	3	3	3	3.5	3	3.1	7	8
1963	3	3	3	3.5	3	3.1	7	8
1964	3.5	3.5	3.6	3.75	3.5	3.57	7	8
1965	3.5	3.5	3.6	4	3.5	3.62	7	8
1966	3.5	3.5	3.6	4	3.5	3.62	7	8
1967	3.5	3.5	3.6	4	3.5	3.62	7	8
1968	3	3	3.25	3.5	3	3.15	7	8
1969	3	3	3.25	3.5	3	3.15	7	8
1970	3	3	4.5	4	3	3.5	7	8
1971	3	3	3.5	4	3	3.3	7	10
1972	3	3.5	3.75	4	3	3.45	7	10

1973	3	3.5	3.5	4	3	3.4	7	10
1974	3	3.5	3.75	4	3	3.45	7	10
1975	3	3.25	3.25	4	4	3.5	6	9
1976	2.75	3.25	3.25	3.25	4	3.3	6	10
1977	3.25	3.25	2.75	3.25	4	3.3	6	6
1978	3.45	2.5	3.65	4.25	5	3.77	7	11
1979	4.75	5	5.5	5.5	5	5.15	7.5	11
1980	5.75	6	6.25	6.5	6	6.1	7.5	9.5
1981	5.5	6	6.25	6.5	6	6.05	7.75	10
1982	7.25	7.5	7.75	8	7.5	7.6	10.25	11.8
1983	7.25	7.5	7.75	8	7.5	7.6	10	11.5
1984	9.75	9.5	9.75	10	9.5	9.7	12.5	13
1985	9.25	9.5	9.75	10	9.5	9.6	9.25	11.8

Source: CBN Bulletin (Various)

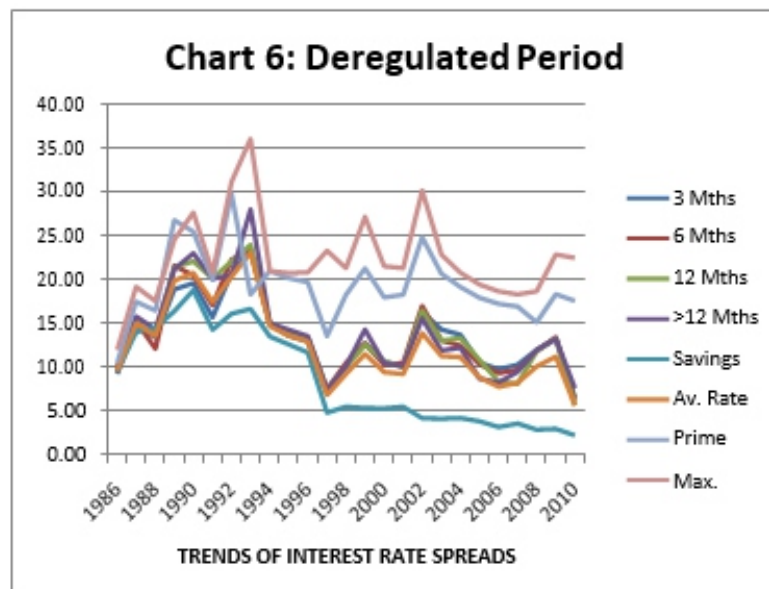


Though pictorially, the IRS appear to be narrowing towards the end of the period, empirical studies (for instance Haruna, 2008 among others) have indicated that the IRS is still high with consequence of discouraging banking businesses. The rising cost of financial intermediation is more obvious when the post liberalization trend is studied.

Regulated Period								
	3	6	12	>12	Savings			
	Mths	Mths	Mths	Mths		Av. Rate	Prime	Max.
1986	9.25	9.5	9.75	10	9.5	9.6	10.5	12
1987	14.9	15.3	15.1	15.8	14	15.02	17.5	19.2
1988	13.4	12.1	13.7	14.3	14.5	13.6	16.5	17.6
1989	18.9	21.6	21.4	21.2	16.4	19.9	26.8	24.6
1990	19.6	20.5	22.1	23	18.8	20.8	25.5	27.7

1991	15.7	17.1	20.1	20.1	14.29	17.46	20.01	20.8
1992	20.8	22.3	22.1	20.5	16.1	20.36	29.8	31.2
1993	23.6	23.3	24	28	16.66	23.11	18.32	36.1
1994	15	15	15	15	13.5	14.7	21	21
1995	13.6	13.7	14	14.3	12.61	13.62	20.18	20.8
1996	12.9	13.2	13.4	13.6	11.69	12.96	19.74	20.9
1997	7.04	7.49	7.46	7.43	4.8	6.84	13.54	23.3
1998	10.2	10.5	9.98	10.1	5.49	9.25	18.29	21.3
1999	12.7	12.8	12.6	14.3	5.33	11.53	21.32	27.2
2000	10.6	10.3	10.7	10.4	5.29	9.45	17.98	21.6
2001	10.2	10.5	9.98	10.1	5.49	9.25	18.29	21.3
2002	16.3	17	16.5	15.6	4.15	13.9	24.85	30.2
2003	14.3	13.1	13	11.9	4.11	11.28	20.71	22.9
2004	13.7	12.5	13.3	12.2	4.19	11.18	19.18	20.8
2005	10.5	10.4	10.8	8.68	3.83	8.85	17.95	19.5
2006	9.75	9.33	8.35	8.26	3.14	7.77	17.26	18.7
2007	10.3	9.74	8.1	9.49	3.55	8.23	16.94	18.4
2008	12	11.9	11.8	12	2.84	10.09	15.14	18.7
2009	13.3	13.5	13.3	13.2	2.94	11.24	18.36	22.9
2010	6.52	6.22	5.67	7.58	2.21	5.64	17.59	22.5
Source: CBN Bulletin (Various)								

While the lending rates maintain a smoothed upward trend, the average deposit rates a downward trending.



This will no doubt not encourage banking business. Evidence that the non-cash culture is not market induced; cost avoidance strategy to sustain above non-banking culture from potential bank customers will always be employed. It is also clear that an understanding of the nature of aggregate national savings behavior is critical in designing policies to promote savings, investment and growth.

CONCLUSION

Globally, banking is entering a new era of communication technology. Setting out a clear strategy is becoming more difficult as regulatory and political intervention changes the market structure, without much regard to banking cultural setting. Banks remain under enormous pressure not only restore public confidence in the role that they play in society after any waive of financial crisis, but to be seen to be converting those averse to banking businesses on an increasing basis. As banks respond to these structural pressures across markets and strive to obtain a competitive advantage, the challenge remains to keep the customer experience and wider brand perceptions central to all strategic thinking.

In this regard, the efforts towards cashless operations in Nigeria might be consistent with the global trend, but caution should be exercise in rushing the program until measures are in place to encourage and push fast the banking culture change. Evidently, the market history suggests that the Nigerian banking culture is far from being developed.

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