CHAPTER - I

INTRODUCTION

1.1 General Background

1.1.1 Origin and Evolution of Bank:

The word 'Bank 'derives from the Italian word 'Banco' which refers to the bench on which the banker would keep its money & his records. The traces of rudimentary banking are found in Chalden Egyptian and Phoenician history. (Singh, 2005:5)

According to Growth Crowther, there are three ancestors of banking who contributed in the growth & development of banking. They are a) merchant, b) money lenders and c) Goldsmiths.

Bank of Venice was the first public institution, was established in Venice, Italy in 1157 A.D. There after 'Bank of Barcelona' & 'Bank of Genoa' in 1401 A.D & 1407 A.D. were established for local citizens and foreigners with the target to exchange money, receive deposits & discounts bills of exchange. Then after that bank of Amsterdam was established to meet the needs of merchant of the city which created a campaign for depositors to receive a kind of certificate entitling them to withdraw their deposits within six months, which later on developed as cheque in the modern banking that started after united States of America introduced banking act in 1883 A.D. So, this trend of banking began to increase and spread all over the world. (Singh,2005:5)

In Nepal there was no organized banking system before 1994 B.S. and few money lenders carried out all the monetary transaction people had done their financial transaction with local money lender or landlords who charged high interest rate. Economic liberalization policies of Government of Nepal led to a dozen of commercial banks actively playing in the financial market of the kingdom.

In early India, the religious book namely 'Manu' contains references regarding deposits, pledges, policy of loan and rates of interest. The banking service in those

days largely meant only money lending. The complicated mechanism of modern banking was not known to them.

Meaning & Definition of Bank

The word 'bank' is used in the sense of a commercial bank. A Bank is an institution which deals with money and credit generally, bank accepts deposits from business institutions and individuals, which is mobilized into productive sectors mainly business and consumer lending. At present context, bank is not only confined to accepting deposits and disbursing loan. Nowadays, most of the bank may be engaged in different types of functions such as remittance, exchange currency, joint venture, underwriting, bank guarantee and discounting bills etc.

Bank is a financial intermediary because of accepting deposits and granting loans. Banks are the most important sources of short- term working capital for business. In modern banking system, when businesses and consumers must make payments for purchases of goods and services, more often they use bank provided cheques, credit or debit cards, or electronic accounts connected to a computer network.

In fact, a modern bank performs such a variety of functions that it is difficult to give a precise and general definition of a bank. Some important definitions for the banks given by different personalities are as follows.

According to A. C. Hart, "A banker or bank is a person or company carrying on the business of receiving money and collecting drafts for customers subject to the obligation of honoring cheque drawn upon them from time by the customers to the extent of the amounts available in their current accounts." (Radhashwami and Bashudevan, 1976:510)

As per Banking resolution Act of India-"Banking means the accepting for the purpose of lending or investment of deposit of money from the public repayable on demand or otherwise and withdraw able by cheque, draft or otherwise."

According to G. Crowther "A bank is an institution which collects money from those who have it spare or who are sharing it out of their income and lends this out to those who require it ."

As per Horace white White-"Bank is a manufacture of credit and machine for facilitating exchange."

As per Kent –"A bank is an organization whose principle operations are concerned with the accumulation of the temporarily idle money of the general public for the purpose of advancing to other for expenditure."

As per U.S. Law - "Any institution offering deposits subject to withdrawal on demand and making loans of a commercial or business nature of the bank."

Banks main purpose is to support the economic growth, agriculture growth, commercial growth of the country. So we can say Bank is a financial institution offering deposits subjects to withdrawal on demand and making loans of a commercial or business nature.

According to commercials Bank Act 2031 "A commercial bank means bank which deals in exchanging currency, accepting deposit giving loans and doing commercial transactions."

Oxford Advanced Learners' Dictionary of Current English defines that bank is an establishment for keeping money and values safely, the money being paid out on the customer's order (by means of cheques).

Similarly a definition is given in Encyclopedia, the World Book, America "A bank is a business organization that receives and holds deposits of funds from others and makes loans or extends credit and transfers funds by written orders of deposits." (Radhashwami and Bashudevan, 1976:512)

Thus, a bank means financial institution established for the transaction of money. It deals from public and lends money to the borrowers as a loan. It also creates credit and exchanges the foreign currency. It is established to fulfill certain objectives such as to facilitate public economic interest, to advance loans for the development of agriculture, industries and trade and to provide banking services to the public.

Liquidity Management

Liquidity means allocation of funds in close relation to their respective sources. Liquidity is the status and part of the assets which can be used to meet the obligation in the commercial banks. Liquidity can be viewed in terms of liquidity stored in the balance sheet and in terms of liquidity available through purchased funds.

Liquidity is the ability of a bank to pay cash to depositors on demand. It is the arrangement and the allocation of funds in such a way that can be drawn immediately without any loss of principle.

At present, there is no secured investment opportunity for the Nepalese commercial banks. The banks are facing the problem of vague liquidity in term of monetary firm. The idle money does not make any return. Therefore, the high liquidity may cause of low profitability and inefficient performance of the overall Banking sector. It may cause failure of banking performance in long term.

High liquidity is not good for the commercial Banks and the crisis of liquidity too is not good. How much liquidity exists in the economy in a particular period depends on the policy of the central bank, the commercial banks, common people and the government. The directives made by the central bank to fix the standard of money. What amount of money the commercial bank should keep as liquid assets or give loan and advance, or more much amount is to be invested.

Liquidity refers to the Conversion of assets into Cash. Commercial Bank has to maintain satisfactory level of liquid assets that are easy to sale at market price with less transaction cost. A Commercial Bank holds Liquid assets balance in the form of currency, Bank balance, marketable securities and other assets immediately converted into cash. But these can be invested for some period to earn interest than to keep idle cash balance. In order to determine the optional investment in liquid assets, a commercial bank must weigh the benefits and costs of holding these various liquidity assets balance; the determination of an optional liquid assets balance reflects the classic risk return trade off facing the commercial

bank. Effective cash management calls for a careful balancing of the risk and return aspects of cash management.

1.1.2 Commercial Banks in Nepal

Commercial banks are very important for the development of national economy. They accept public saving as deposits and advance them as loans to the persons, business organizations and government when they required. The development of commercial banks is in increasing trend after the restoration of democracy in 1990A.D. The first commercial bank is Nepal Bank Limited that was established in 30 Kartik 1994 B.S (1937 A.D.). And the second is RBB established in 10/10/2022 B.S.

After a long period of establishment of these two banks, NABIL Bank is the first commercial bank from the private sector. This is the first joint venture bank of Nepal also. There after many other joint venture and non joint venture banks were set up under the Commercial Bank Act, 2031and Company Act, 2053.Now, Thirty one Commercial banks are operating in the country. From Bhadra, 2058 B.S. to Ashadh 2059 B.S. no applications were accepted for the establishment of new commercial banks. The door is opened now for the establishment of commercial banks with new policy relating to commercial bank issued by Nepal Rastra Bank considering that banking of entrance is not favorable in the liberal and market oriented economic environment and to create the competitive environment. Thus, it is expected that the numbers of commercial banks will be increased in future (NRB, Banking Prabardhan, 2059:7). According to new policy issued by NRB, the paid up capital of new opening commercial bank at national level must be Rs. 2000 million.

If the newly opened bank is joint venture with foreign bank or financial institution, it is permitted to open new commercial banks with head office at Kathmandu valley contracting three years management with 67% investment of foreign such institution, the ratio of ownership of share will be 7:3 between founder and public respectively.

There are many functions of commercial banks and the principal functions are as follows:

a) To accept deposit
b) To provide loans and advances
c) To create credits
d) To perform agency function
e) To carry out utility functions.

The commercial bank and banker has its own right and duties. The rights are mentioned point-wise as follows (Radhashwami and Bashudevan, 1976:513):

a) Banker enjoys a general lien over customer's securities in his possession.
b) He has an implied right to change a reasonable commission for his service and interest upon loans.
c) He has the right of set-off like any other debtors.
d) He has the right to appropriate payment as per the rules laid down in Clayton's case.
e) Banker need not seek out the creditor to make the payment. It is the creditor who should demand payment.

Similarly, the duties of banker are as follows:

a) To receive his customer's money and cheques and other instruments for collection.

f) To repay the customer's deposit on the presentation of customer's mandate known as the cheque.

b) To maintain secrecy in respect of customer's account and affairs.
c) To give a reasonable notice before closing a customer's account.

1.2 Statements of the Problem

Since objective of the commercial banks is wealth maximization and the achievement of organizational objectives contributes to the national economy, it is

important to determine the factors affecting the liquidity and its management. This study will try to find out the liquidity position of commercial banks.

It seems to be not only general public but also university graduate in commerce and economics cannot calculate the effect of liquid fund in the economy and various banks are suffering from this problem.

More especially the study is expected to answer the following research questions:

) Whether the commercial banks are managing liquidity in existing practice or not?

) The main causes of increasing/decreasing liquidity in commercial banking sector?

) Whether the liquidity position is affected by the political, social and economic factors?

) Whether the liquidity related to security problem or not?

) Whether the liquidity increases in lacking of secured investment opportunities or not, or any relationship between security and liquidity?

) Any necessity to reform in regulations?

) Better way to make optimal management of liquidity in commercial banks.

1.3 Significance of the Study

Commercial Banks are always guided by the objective of profitability. All financial decisions of commercial banks are for the betterment of shareholders' wealth. There should be an effective system of funds allocation in order to safeguard the banks from the danger of liquidity. An appropriate level must be achieved between them. The study ponders to find out whether commercial banks are alert or not in this regard and possible situations where the banks need additional liquid funds.

A few studies have been made on the liquidity management in commercial banks. Most of the studies made up to present on capital market are related to financial performance, investment, capital structure analysis, dividend policy, risk and return etc. but non of the research have yet been made on the core perspective of the liquidity and its management. So the present study will be of substantial importance for investors, planners, researchers, professionals, executives and students to meet their personal and organizational objectives. This study intends to help the national

economy through mobilization of idle capital of average Nepalese in productive sectors to accelerate the economic growth and to reduce dependency on foreign assistance and loan.

This study will help regulatory authority to find out liquidity management of the commercial banks. It will be a reference to the concerned personnel and researchers. This study will also show and suggest the available investment opportunities satisfying both objectives (liquidity and profitability) of commercial banks.

1.4 Objectives of the Study

Holding liquid assets and utilizing in proper investment project is one of the major decision functions of commercial banks and other financial institutions. Hence, the main objective of this study is to examine and   analyze liquidity position and its management in Nepalese commercial banks. To fulfill this main objective following supportive objectives have been formulated:

a) To analyze financial ratios and liquidity trend of NIBL, HBL and NABIL,
b) To analyze Liquidity profile of NIBL, HBL and NABIL,
c) To analyze the problem of liquidity management in Nepalese commercial banks,
d) To identify factors affecting the liquidity position and its management in Nepalese commercial banks,
e) To examine the effectiveness of liquidity management in Nepalese commercial banks,
f) To provide suggestions and recommendations about liquidity management in commercial banks.

1.5 Introduction of Sample Banks

In this study three sample banks are taken into consideration for the study on the basis of quota sampling among thirty one commercial banks in Nepal. A brief introduction of the sample banks is given here to become familiar with the organizations' background and their performances:

1.5.1 Nepal Investment Bank Ltd (NIBL)(www.nibl.com.np)

Nepal Investment Bank Ltd. (NIBL), previously Nepal Indosuez Bank Ltd., was established in 1986 as a joint venture between Nepalese and French partners. The French partner (holding 50% of the capital of NIBL) was Credit Agricole Indosuez, a subsidiary of one tiohe largest banking group in the world.

With the decision of Credit Agricole Indosuez to divest, a group of companies comprising of bankers, professionals, industrialists and businessmen, has acquired on April 2002 the 50% shareholding of Credit Agricole Indosuez in Nepal Indosuez Bank Ltd.

The name of the bank has been changed to Nepal Investment Bank Ltd. upon approval of bank's Annual General Meeting, Nepal Rastra Bank and Company Registrar's office with the following shareholding structure.

A group of companies holding 50% of the capital. Rashtriya Banijya Bank holding 15% of the Capital. Rashtriya Beema Sansthan holding the same percentage. The remaining 20% being held by the General Public (which means that NIBL is a Company listed on the Nepal Stock Exchange).

NIBL is offering 365 days services by establishing 40 branches over different parts of Country. Its main products are deposits, Ezee Saving, E-banking, Premier Banking, ATMs, NTC bill payments, Loans and Advances, Vehicle Loans, Credit Cards, Debit Cards which can be used in India, Safe Deposit Lockers, Remittance, Tele-banking, Export credit, Any Branch Banking, Trade finance etc.

Mission Statement

To be the leading Nepali Bank, delivering world class service through the blending of stat-of-the art technology and visionary management in partnership with competent and committed staff, to achieve sound financial health with sustainable value addition to all our stakeholders. We are committed to do this mission while ensuring the highest levels of ethical standards, professional integrity, corporate governance and regulatory compliance.

1.5.2 Himalayan Bank Limited (HBL)(www.hbl.com.np)

Himalayan Bank was established in 1993 in joint venture with Habib Bank Limited of Pakistan. Despite the cut-throat competition in the Nepalese Banking sector, Himalayan Bank has been able to maintain a lead in the primary banking activities- Loans and Deposits.

Legacy of Himalayan lives on in an institution that's known throughout Nepal for its innovative approaches to merchandising and customer service. Products such as Premium Savings Account, HBL Proprietary Card and Millionaire Deposit Scheme besides services such as ATMs and Tele-banking were first introduced by HBL. Other financial institutions in the country have been following our lead by introducing similar products and services. Therefore, we stand for the innovations that we bring about in this country to help our Customers besides modernizing the banking sector. With the highest deposit base and loan portfolio amongst private sector banks and extending guarantees to correspondent banks covering exposure of other local banks under our credit standing with foreign correspondent banks, they believe they obviously lead the banking sector of Nepal. The most recent rating of HBL by Bankers' Almanac as country's number 1 Bank easily confirms our claim.

All Branches of HBL are integrated into Globus (developed by Temenos), the single Banking software where the Bank has made substantial investments. This has helped the Bank provide services like 'Any Branch Banking Facility', Internet Banking and SMS Banking. Living up to the expectations and aspirations of the Customers and other stakeholders of being innovative, HBL very recently introduced several new products and services. Millionaire Deposit Scheme, Small Business Enterprises Loan, Pre-paid Visa Card, International Travel Quota Credit Card, Consumer Finance through Credit Card and online TOEFL, SAT, IELTS, etc. fee payment facility are some of the products and services. HBL also has a dedicated offsite 'Disaster Recovery Management System'. Looking at the number of Nepalese workers abroad and their need for formal money transfer channel; HBL has developed exclusive and proprietary online money transfer software- HimalRemit^{TM}. By deputing our own staff with technical tie-ups with local exchange houses and banks, in the Middle East and Gulf region, HBL is the

biggest inward remittance handling Bank in Nepal. All this only reflects that HBL has an outside-in rather than inside-out approach where Customers' needs and wants stand first. Currently it has been serving through 23 Branches

1.5.3 Nabil Bank Limited (NABIL)(www.nabilbank.com.np)

Nabil Bank Limited, the first foreign joint venture bank of Nepal, started operations in July 1984. Nabil was incorporated with the objective of extending international standard modern banking services to various sectors of the society. Pursuing its objective, Nabil provides a full range of commercial banking services through its 19 points of representation across the kingdom and over 170 reputed correspondent banks across the globe.

Nabil, as a pioneer in introducing many innovative products and marketing concepts in the domestic banking sector, represents a milestone in the banking history of Nepal as it started an era of modern banking with customer satisfaction measured as a focal objective while doing business.

Operations of the bank including day-to-day operations and risk management are managed by highly qualified and experienced management team. Bank is fully equipped with modern technology which includes ATMs, credit cards, state-of-art, world-renowned software from Infosys Technologies System, Banglore, India, Internet banking system and Telebanking system. Currently it has been serving through 43 Branches

1.6 Limitations of the study

As the study is being carried out in a partial fulfillment of the requirements for the degree of Master of Business Studies, it possesses a number of limitations of its own kind. Some of the basic limitations of the study could be illustrated as follows:

a) Simple statistical techniques followed by financial models have been used in the analysis.
b) Only secondary both data will be used in the study.
c) The study has covered only the past five years data from 2004/05 to 2008/09.

d) The study is concerned not only in quantitative but also qualitative aspects.

e) Only three banks are taken into account to enhance the comparative study out of 31 commercial banks.

1.7 Organization of the study report

The ongoing research report is divided into five main chapters. Chapter 1 of this study report covers the introduction of study. This chapter contains general background of the study, statement of problem, significance of study, objectives of the study, introduction of sample banks, limitations of the study, and organization of the study. Specifically, the main objective of this chapter is to fix and enumerate the horizon of the subject under study. Chapter 2 of the report is devoted for review of literatures. The fundamental conceptual review and discussion about theoretical framework along with the review of related scholarly works on liquidity are the major facets of this chapter. Accordingly, this chapter is divided into four sections. Beginning with theoretical review of liquidity, in first section, second section is assigned to itemize review of policies in liquidity management. Section three is devoted to review of previous studies. Section four of this chapter is research gap about the Chapter 2. Chapter 3 attempts to deal about the methodological aspect of the research. It highlights the research design, population and sample, data collection technique, and data analysis procedures. Chapter 4 concentrates on presentation and analysis of data. This chapter attempts to answer the research questions. The exploration of respective facts and figures is the main purpose of this chapter. Finally, chapter 5 has been assigned for the summary of the study, conclusion, and implications for future researches. This chapter summarizes the overall aspects of the study and has been attempted to draw conclusions along with recommendations for the future research issues.

CHAPTER-II

REVIEW OF LITERATURE

There are numerous literatures on this subject written by authors and researchers. Some of the works have reviewed here.

2.1 Theoretical Review

2.1.1 Meaning of Liquidity

Bhandari (2004) in his book "Banking and Insurance" defines that "Liquidity is the status and part of the assets that can be used to meet the obligation in the commercial banks. Liquidity can be viewed in terms of liquidity stored in the balance sheet and in terms of liquidity available through purchased funds."

Radhashwami and Bashudevan (1976) in their book "A Text Book of Banking" stated that "Liquidity means a matter of maintaining what the bank has promised to pay the depositors - cash. In order to fulfill the promise, primary reserves are the first drawn on to satisfy depositors. In the banking system primary reserves are known as legal reserve and working reserves. The term is economic rather than accounting concept. Legal reserves are the requirement of monetary authority. Bank management, student of banking studies and monetary authority are referring the other names for primary reserve to designate certain ideas and concept regarding banks' assets. Primary reserves include non-earning assets such as cash in vault, the deposits carried out by banks with correspondent banks and central bank, and cash items. The cash items represent cheques held or in process of collection by the banks. The objective of primary reserves in banking system is maintaining liquidity and solvency."

W. Reed (2002) in his book "Commercial Bank Management" states that "The amount of liquidity that a commercial bank or the commercial banking system should maintain is one of the basic problems of the bank management. If too much liquidity is maintained, it means that the bank and the banking system are foregoing income. Too, little, however, may be fatal not only to an individual bank but to the commercial banking system as a whole, the financial structure of the country, and the economy of

the nation. Too little liquidity and the demands of the depositors in the form of 'runs' on the banks are like oil and water, they do not mix well."

Shrestha and Bhandari (2004) in their book "Financial Markets and Institutions" states that "Liquidity means allocation of funds in close relation to their respective source."

According to NRB act 2058, "Liquidity denotes the money in use, in the current account, saving account, fixed account and the money in margin account of the economics system" But, definition is not made by the Nepal Rastra Bank Act 2058/2002, the Commercial Bank Act 2031(1974) and the Financial Company Act 2042 (1985). But the definition about what "liquid assets" means is found in the acts. Liquid assets means, the cash balances of the bank, the balance held by a bank in the Nepal Rastra Bank and liquidity appeared in economy.

The commercial banks or financial institutions should keep the stock of liquid asset according to the ratio of liability of deposit fixed by the bank. Section 25 of the Finance Company Act, 2042 (1985), reads as follows for the purpose of this section the term liquid assets means the assets mentioned as follows:

1) Nepalese bank notes and currencies deposited in the company.
2) Deposits of the company in the bank or any other commercial banks.
3) Bonds of Government of Nepal.
4) Any other assets as specified by the bank from time to time.

For the first time, the NRB has implemented the monetary Policy by issuing the rules of credit control in 31st Shrawan 2031 B.S. (1974). This rule has defined the liquid asset of the commercial banks. It had regarded liquid asset at the cash stock of the commercial banks, short-term security and short bills. It is clear from it that the liquid assets mean the cash and the assets, which can be converted immediately in the time of need.

Liquidity management is a tough task to be discharged by the management of every business entity. Managing liquidity for a bank involves having enough cash on hand and being able to borrow cash at reasonable cost in order to meet cash needs exactly when they arise. A bank's need for liquidity – immediately spendable funds-

can be viewed within a demand – supply framework. The most pressing demands for spendable funds come from two sources: customers withdrawing money from their deposits, and credit requests from customers the bank wishes to keep either in the form of new loan requests, renewals of expiring loan agreements or drawings upon exiting credit lines.

To meet the foregoing demands for liquidity, banks can draw upon several potential sources of supply. The most important source normally is receipt of new customer deposits, both from newly opened accounts and from new deposits placed in existing accounts. Another important element in the supply of bank liquidity comes from customers repaying their loans, which provides fresh funds for meeting new liquidity needs, as do sales of bank assets, especially marketable securities from the bank's investment portfolio. These various sources of liquidity demand and supply come together to determine each bank's net liquidity position at any moment in time.

The significant exposure of banks to liquidity pressures arises from several sources. First, banks borrow large amounts of short-term deposits and reserves from individuals and businesses and from other lending institutions and then turn around and make long term credit available to their borrowing customers. Thus, most banks face some imbalances between the maturity dates on their assets and the maturity dates attached to their liabilities.

Rarely, will incoming cash flows from assets exactly balance the cash flowing out to cover liabilities.

2.1.2 Liquidity Management Model

Kharel(2008) in his thesis "Liquidity Management of Finance Companies of Nepal" described "Liquidity is the most sensible and crucial aspect of banks. The financial manager should have adequate knowledge of surrounding environment for proper management of cash and liquidity portion of a bank." The firm maintains less cash balance more than it needs, the firm may loose many opportunities If the firm maintains a high level of cash balance it will have a sound liquidity position but forego the opportunity to earn interests. Thus, the firm should maintain an optimum cash balance. Cash is the most important liquid assets for the operation of the business

house. It is the basic input needed to keep the business running in a continuous basis. The term cash includes coins, currency and cheque held by the firm and balances in

a) Baumol's Model for Cash Balance

In view of minimizing the opportunity cost of holding cash and maximizing the return on the available funds, the cash balance should be maintained at a minimum level and the fund which is not required for immediate use be invested in the marketable securities. Baumol model is one of the methods that can be used for this purpose.

Baumol Model is based on the assumption that:

1) Cash is used at constant rate

2) The firm is able to forecasts its cash needs with certainty.

3) The firm's cash payment occurs uniformly over a period of firm.

4) The opportunity cost of holding cash is known and it does not change over time.

5) The firm will incur the same transaction cost whenever it converts securities to cash.

Under this Model Optional Cash Conversion size C* $X\sqrt{\dfrac{2bt}{i}}$

Where,

b = Fixed transaction cost per transaction

t = total cash need over the period

i = opportunity cost period

C* = Optimal cash conversion size

Given its assumption, the model prescribes an optimal size of cash balance and the optimal size of account of borrowing. What matter for a firm is the total of opportunity cost and the transaction cost? Therefore, the objective of this model is to minimize the total cost. The figure below shows the relationship between the average size of cash balance and various costs associated with cash maintenance.

Hence Baumol has conducted that minimum size is the amount of cash that is enough to start with at the beginning of the period to meet the cash need of that period transaction.

b) **The Miller-Orr Model:**

Due to high opportunity cost, all liquidity need should not be maintained in cash that bears no returns. It is necessary to maintain cash balance for transition and compensation balance requirement but he liquidity need for the other purpose doesn't need to be in cash. Therefore any financial institution can take advantage by appropriately balancing the available funds between cash and loan investment. The size of cash needs depends on the pattern and degree of regulating of inflows and outflows. Hence Miller had developed model know as Miller Model, which takes into account the realistic pattern of cash flow and prescribes which and how much to transfer format to investment account vice-versa. This model is based on the assumption that daily net cash flows receipt minus payment is random in size as well as in the matter of negative or positive flow. Hence this model set range of high and low limits within which cash balance is allowed to Fluctuate and set the target cash balance between these two limits.

Mathematically the model is set as follows:

Under this model return point (Z) $X3\sqrt{\dfrac{3b\dagger^{2}}{4i}}$

Where,

b = Fixed transaction cost per transaction

= Variance of daily weakly cash flow

i = Daily/weakly interest rate on marketable securities

Z = Collection return point

L = Minimum cash balance

2.1.3 Importance of Liquidity

The following statements capture the importance and interactions of liquidity and confidence:

Howard (1983) in his book "Commercial Bank and Financial Management" focuses that "Liquidity always comes first: without it a bank doesn't open its doors; with it, a bank may have time to solve its basic problems."

"Our whole financial system runs on confidence and not much else when you get down to it. What we've learned is that when confidence erodes, it erodes very quickly."

Bhandari(2004) in his book "Banking and Insurance" explains that A bank can't be run without liquidity. The Nepal Rastra Bank from time to time changes the legal provision about the liquidity. The compulsion that the commercial banks should keep the cash in their various funds shows the importance of liquidity. The commercial banks and financial institutions should maintain the balance of cash fund in required quantity that the law and rules made by the Nepal Rastra Bank. The importance of the liquidity is considered very sensitive because if it cannot maintain the liquidity, it has to pay fine. The commercial banks financial institutions should keep the stock of liquid assets in the ratio of their deposit liability, as fixed by the Nepal Rastra Bank. The central bank can give the interest with the rate fixed by the bank from time to time to the amount in the fund. The importance of liquidity is briefly described in point wise as follows:

a) To Meet the Expenses for the Bank's Daily Administrative Work

A bank is a legal person. It can't run without, cash stock. The transaction of bank is related to the money. Many types of expense go on taking place in the bank daily. With the lack of expenses, it is nearly impossible for the bank to do its transaction. So the liquidity is necessary for daily expenses that it is spent in an administrative function. The administrative expenditure can't be fulfilled without liquidity. Hence Liquidity is importance for the banks.

b) To Pay all Sorts of Deposit

A bank opens the current, saving and fixed account for its customer's and accepts the deposit from the customers. According to the nature of the deposit, the banks should pay in the time when the customers ask. The liquidity needs for it. It can't pay the deposit without liquidity. That is why liquidity is necessary for the payment of all types of deposits.

c) To Maintain Liquidity to Meet the Cash Fund Ratio and Legal Liquidity Ratio

The commercial banks should keep 5.5% Cash Reserve Ratio to accounts in the Nepal Rastra Banks' account in their own name. In addition to it, there are some small funds in the bank. There, is an obligation on a bank to keep cash (money) in such fund. Therefore, to fulfill all these demands or to keep (maintain) the balance, liquidity is necessary.

d) To Control the Economic Fluctuation and to Keep Safe from the Risk

It can't be said, there will be the same situations of transactions in the bank and the bank will always remain in balanced condition. There will be effect of internal and external circumstances in the nation. Such conditions may have effect on economic sector. The commercial banks too can't remain safe from the effect of economic sector. There is necessity of liquidity to keep the bank free from such economic rise and fall or economic crisis. The bank should maintain some liquidity of some certain percent cash fund to keep safe from such situations.

e) To Fulfill the Demand of the Debtor

A bank provides loan to debtors and earns income from it. Many kinds of people come to the banks with the purpose of loan. After the loan is granted, the bank is obliged to give the loan is granted, the bank is obliged to give the loan to the debtor. Therefore, there is necessity of liquidity in bank to provide fresh loan to the debtors.

f) To Gain Trust or Faith

A bank has a great responsibility because of the financial institution that does monetary transactions. It must gain trust in its banking transaction. For this, a bank should do many types of functions. It has to pay attention to the time and the will of customers, to provide the banking services. For the name and fame, a bank should earn the trust. There must be liquidity to gain trust, from the public including other sectors.

g) To Provide Security to the Banks

A bank is a sensitive institution because it is an institution of banking transaction. Hence, the deposits are deposited in different types of account of common people, industrialists and businessmen. Apart from it, the bank itself invests the cash in different sectors. The cash as a form of loan can be distributed in different sectors from the bank. So, the bank is regarded as a sensitive and important institution. Such institutions can be saved from the various risks at any situation. Hence, to provide all kinds of security to the bank, the liquidity is necessary.

2.1.4 Principles or Theories of Liquidity Management

There are apparent conflicts between objectives of liquidity, safety and profitability relating to a commercial bank. Economists have tried to resolve these conflicts by laying down certain theories from time to time. These principles or theories, in fact, govern the distribution of assets keeping in view these objectives. They have also come to be known as the theories of liquidity management which are discussed as under:

2.1.4.1 Commercial Loan Theory or Real Bills Doctrine

This theory is evolved in early 1920s. (Joseph F. Sinkey 1983: 240.) The real bills doctrine states that a commercial bank should advance only short-term self-liquidating productive loans to business firms. Self-liquidating loans are those, which are meant to finance the production, storage, transpiration, and distribution. When such goods are ultimately sold, the loans are considered to liquidate themselves automatically.

Such short-term self-liquidating productive loan passes three advantages. First, they posses liquidity that is why, they liquidate themselves automatically. Second, since they mature in the short run and are for productive purposes, there is no risk of their running into bad debts. Third, being productive such loans earn income for the banks.

2.1.4.2 Asset Conversion or the Shiftability Theory

This theory is developed in second half of 1940s. (Sinkey 1983: 240.) H.G. Moulton, who asserted that if the commercial banks maintain a substantial amount of assets that can be shifted on to the other banks for cash without material loss in case of necessity, then there is no need to rely on maturities, propounded the shiftability theory of bank liquidity. According to this view, an asset to be perfectly shiftable must be immediately transferable without capital loss when the need for is immediately transferable without capital loss when the needs for liquidity arise. But in a general crisis requires that all banks should possess such assets, which can be shifted on the central bank, which is the lender of the last resort. This theory has certain elements of truth.

But it has its weakness. First, mere shiftability of assets does not provide liquidity to the banking system. It entirely depends upon the economic circumstances. Second, the shiftability theory ignores the fact that in times of acute depression, the shares and debentures can't be shifted on to others by the bank. In such a situation, there are not buyers and all who possess them want to sell them. Third, a single bank may have shiftable assets in sufficient quantities but if it tries to sell them when there is a run on the bank, it may adversely affect the entire banking system. Fourth, if all the banks

simultaneously start shifting their assets, it would have disastrous effect soon both the lenders and borrowers.

2.1.4.3 The Anticipated Income Theory

Bhandari (2004) in his book "Banking and insurance" states that The anticipated income theory developed by H.V. Proch in 1950 on the basis of the practice of extending term loans by the USA commercial banks. According to this theory, regardless of the nature and character of a borrower's business, the bank plans the liquidation of the long-term loan from the anticipated income of the borrower. A term loan is for a period exceeding one year and extending to less than five years. It is granted against the hypothecation of machinery, stock and even immovable property. The bank puts restrictions on the financial activities of the borrower while granting this loan. At the time of granting a loan, the bank takes into consideration not only the security but the anticipated earnings of the borrower. In fact, the anticipated income is the main consideration.

This theory is superior to the real bills doctrine and the shiftability theory because, it fulfills the three objectives of liquidity, safety and profitability. Liquidity is assured to the bank when the borrower saves and repays the loan regularly in installments. It satisfies the safety principle because the bank grants a loan not only on the basis of a good security but also on the ability of the borrower to term-loan and is assured of a regular income. Lastly, the term-loan is highly beneficial for the business.

2.1.4.4 The Liabilities Management Theory

This theory was developed in late 1960s and early 1970s.(Sinkey; 1983:240) According to this theory, there is no need for banks to grant self-liquidating loans and keep liquid assets because they can borrow reserve money in the money market in case of need. A bank can acquire reserves by creating additional liabilities against it, form different sources. These sources include the issuing of time certificates of deposit, borrowing from other commercial banks borrowing from the central bank, raising of capital funds by

issuing shares, and by Ploughing back of profits. We discuss these sources of bank briefly:

i) Time Certificates of Deposits:

Time certificates of deposits are negotiable in the money market. So a bank can have access to liquidity by selling them in the money market. But there are two limitations. First, if during a boom, the interest rate structure in the money market is higher than the ceiling rate set by the central bank, time deposit certificates can't be sold in the market. Second, they are not dependable source of funds for the commercial banks. Bigger commercial banks are at an advantage in selling these certificates because they have larger certificates, which they can afford to sell at even low interest rate. So the smaller banks are at a disadvantage in this respect.

ii) Borrowing from Other Commercial Banks:

A bank may create additional liabilities by borrowing from other banks having excess reserves. But such borrowings from banks having excess reserves are only for a very short duration, for a day or week at the most. The interest rate of such borrowings depends upon the prevailing rate in the money market. But borrowings from other banks are only possible during normal economic conditions. In abnormal times, no bank can afford to lend to others.

iii) Borrowing from the Central Bank:

Banks also create liabilities on themselves by borrowing from the central bank of the country. They borrow to meet their liquidity needs for short term and by discounting bills form the central bank. But such borrowings are relatively costlier than borrowing from other sources.

iv) Raising Capital Funds:

Commercial banks acquire funds by issuing debentures. But the availability of funds through this source depends on the amount of dividend or interest rate, which the bank is prepared to pay. Usually the banks are not in a position to pay rate higher than paid by manufacturing and trading companies. So they are not able to get sufficient funds from this sources.

v) Ploughing Back of Profit:

Another source of liquid funds for a commercial bank is the ploughing back of its profits. But how much it can get from this source will depend upon its rate of profit and its dividend policy. It is larger banks that can depend on this source rather than the smaller banks.

2.1.5 The Demand for and Supply of Bank Liquidity

A bank need for liquidity-immediate spendable funds-can be viewed within a demand supply framework. What activities give rise to the demand for liquidity inside a bank and what source can the bank rely upon to supply liquidity when spendable funds are needed are to be considered sincerely. For most banks, the most pressing demands for spendable funds come from two sources:

(1) Customers withdrawing money from their deposits, and

 (2) Credit requests from customers the banks wishes to keep, either in the form of new loan requests, renewals of expiring loan agreements, or drawings upon existing credit lines.

Other sources of liquidity demand include paying off obligations arising from bank borrowings, such as loans the bank may have received from other banks or from the central bank (i.e., the Federal Reserve, Central Bank). Similarly, payment of income taxes or cash dividends to the bank's stockholders periodically gives rise to a demand for immediately spendable cash.

To meet the foregoing demands for liquidity, banks can draw upon several potential sources of supply. The most important source normally is receipt of new customer deposits, both from newly opened accounts and form new deposits placed in

existing accounts. These deposit inflows are heavy the first of each month as business payrolls are dispensed, and they may reach a secondary peak toward the middle of each month as bills are paid and other payrolls are met. Another important element in the supply of bank liquidity comes from customers repaying their loans, which provides fresh funds for meeting new liquidity needs, as do sales of bank assets, especially marketable securities, from the bank's investment portfolio. Liquidity also flows in from revenues generated by selling non-deposit services and from borrowings in the money market.

These various sources of liquidity demand and supply come together to determine each bank's net liquidity position at any moment in time.

When the bank's total demand for liquidity exceeds its total supply of liquidity (i.e. Lt <0), management must prepare for a liquidity deficit, deciding when and where to raise additional liquid funds. On the other hand, if at any point in time the total supply of liquidity to the bank exceeds all of its liquidity demands (i.e. Lt>0), management must prepare for a liquidity surplus, deciding when and where to profitably invest surplus liquid funds until they are needed to cover future liquidity demands. Liquidity has a critical time dimension. Some bank liquidity needs are immediate or nearly so. For example, several large CDs may be due to mature tomorrow, and the customers may have indicated that they plan to withdraw these deposits rather than simply rolling them over into new deposits. Sources of funds that can be accessed immediately, such as borrowing reserves from another bank, must be used to meet these near-term liquidity pressures.

Longer-term liquidity demands arise from seasonal, cyclical, and trend factors. For example, liquid funds are generally in greater demand during the fall and summer coincident with school, holidays, and customer travel plans. Anticipating these longer-term liquidity needs, bankers can draw upon a wider array of alternative sources of funds than is true for immediate liquidity needs, such as selling off accumulated liquid assets, aggressively advertising the bank' current menu of deposits and other services, or negotiating long-term borrowings of reserves from other banks. Of course, a bank need not meet all demands for liquidity by selling assets or borrowing new money. For example, just the right amount of new deposits may flow in, or loan repayments from borrowing customers may occur very close to the date

that new funds are needed. Timing is critical to liquidity management: bankers must plan carefully how, when, and where needed liquid funds can be raised.

Most liquidity problems in banking arise from outside the bank as a result of the financial activities of its customers. In effect, customer's liquidity problems gravitate towards their banks. If a business is short on liquid reserves, for example, it will ask for a loan or draw down its deposit balances, either of which will require the firm's bank to come up with additional funds. A dramatic example of this phenomenon occurred in the wake of the worldwide stock market crash in October 1987. Investors who had borrowed heavily to buy stock on margin were forced to come up with additional funds to secure their stock loans. They went to their banks in huge numbers, turning a liquidity crisis in the capital market into a liquidity crisis for banks.

Ross (2002) in his book "Commercial Bank Management" he states the essence of the liquidity management problem for a bank may be described in two succinct statements:

1. Rarely are the demands for bank liquidity equal to the supply of liquidity at any particular moment in time. The bank must continually deal with either a liquidity deficit or a liquidity surplus.
2. There is a trade-off between bank liquidity and profitability. The more bank resources are tied up in readiness to meet demands for liquidity, the lower is that banks' expected profitability (other factors held constant)

Thus, ensuring adequate liquidity is a never-ending problem for bank management that will always have significant implications for the bank's profitability. Liquidity management decision cannot be made in isolation from all the other service areas and department of the bank.

Moreover, resolving liquidity problems subjects a bank to costs, including the interest cost on borrowed funds, the transactions cost of time and money in finding adequate liquid funds, and an opportunity cost in the form of future earnings that must be forgone when earning assets are sold in order to help meet a bank's liquidity needs. Clearly, management must weigh these costs against the immediacy of the

institution's liquidity needs. If a bank winds up with excess liquidity at any time, its management must be prepared to invest those excess funds immediately to avoid incurring an opportunity cost from idle funds that are not generating earnings for the bank.

From a slightly different vantage point, we could say that management of bank liquidity is subject to the risk that interest rates will change (interest rate risk and the risk that liquid funds will not be available in the volume needed by the bank (availability risk). If interest rates rise, financial assets that the bank plans to sell to raise liquid funds, such as government bonds, will decline in value, and some must be sold at a loss. Not only will the bank raise fewer liquid funds from the sale of those assets, but the losses incurred will reduce bank earnings as well. Then, too, raising liquid funds by borrowing will cost more as interest rates rise, and some forms of borrowed liquidity may no longer be available to the bank. If the lenders of liquidity perceive a bank to be more risky than before, that bank will be forced to pay higher interest rates to borrow liquidity, and some lenders will simply refuse to make liquid funds available at all.

2.1.6 Why Bank Face Liquidity Problem

It should be clear from the foregoing discussion that banks face major liquidity problems. The significant exposure of banks to liquidity pressures arises from several sources.

First, banks borrow large amounts of short-term deposits and reserves from individuals and businesses and from other lending institutions and then turn around and make long term credit available to their borrowing customers. Thus, most banks face some imbalances between the maturity dates on their assets and the maturity dates attached to their liabilities. Rarely will incoming cash flows from assets exactly balance the cash flowing out to cover liabilities.

A problem related to the maturity mismatch situation is that banks hold an unusually high proportion of liabilities subject to immediate payment, such as demand deposits, NOW accounts, and money market borrowings. Thus, banks must always stand ready

to meet immediate cash demands that can be substantial at times, especially near the end of a week, at the first of each month, and during certain seasons of the year.

Another source of liquidity problem is the bank's sensitivity to changes in interest rates. When interest rates rise, some depositors will withdraw their funds in search of higher returns elsewhere. Many loan customers may postpone new loan request or speed up their drawing on those credit lines that carry lower interest rates. Thus, changing interest rates affect both customer demand for deposits and customer demand for loans, each of which has a potent impact on a bank's liquidity position. Moreover, movements in interest rates affect the market values of assets the bank may need tom sell in order to rise additional liquid funds, and they directly affect the cost of borrowing in the money market. Beyond these factors, a bank must give high priority to meeting demands for liquidity. To fail in the area may severely damage public confidence in the institution. We can imagine the reaction of bank customers if the teller windows and teller machine had to be closed one morning because the bank was temporarily out of cash and could not cash cheques or meet deposit withdrawals (as happened to a bank in Montena several years ago, prompting a federal investigation). One of the most important tasks of a bank's liquidity manager is to keep close contact with the bank's largest depositors and holders of large unused credit lines to determine if and when withdrawals of funds will be made and to make sure adequate funds are available.

2.1.7 Factors Affecting Needs of Bank Liquidity

Singh and Khadka (2058) in their book "Banking and Insurance" they described basically need of bank liquidity is affected by the following factors:

A) **External Environmental Factors**

1. **Prevailing Interest Rate:** If bank interest is high, the demand of cash is low that why there will be low liquidity needs.
2. **Saving and Investment**: High level of income and saving produce low level of liquidity and high level of investment produce high level of liquidity needs.
3. **Growth and Slackening Position of the Financial Market:** Growth and progress of economic and financial market produce low level of liquidity

needs but opposite to this slackening position of economic and financial market produces high level of liquidity needs.

B) Internal Environmental Factors

1. **Lending Policy of Bank: High level of liquidity requires to the bank if it** has adopted a long term or mid term loan policy. Otherwise low level of liquidity requirement is applicable for the short-term investment policy adopting bank.

2. **Management Capacity:** low level of liquidity needs to high-risk bearing and capable risk handling management. Other high level of liquidity needs for risk averter and relatively low capable or inefficient management.

3. **Strategic Planning and Fund Flow Situation:** Liquidity needs is affected by bank's investment policy, strategic planning and objectives. It is also affected by the funds flow situation and lending policy. If the bank has collected more amount in current account relatively there will be high level need of liquidity otherwise there is low level of need of liquidity. It depends on maturity matching of assets and liability of banks.

2.1.8 Criterion for Measuring Bank Liquidity

Bahandari(2004) in his book "banking and Insurance" he states that "It is very important to study criteria for measuring bank liquidity. The bank liquidity is the most important aspect of a bank. If there is less bank liquidity, the bank can't be run. If there is much liquidity, the bank should bear great loss economically. Both high liquidity and low liquidity are not good omen for the bank. The bank should be able to keep the liquidity in balance. This is very difficult task." However the bank liquidity can be measured by the following criterion:

a) **Deposit Investment Ratio**

We can measure the liquidity by the deposit investment ratio. The depositors deposit the cash in the current, saving and fixed accounts. The bank receives the most liquidity as deposit. The bank invests the capital collected by deposit in various profitable and productive sectors in the form of loan by earning much profit from it. The bank has the nature of paying lower interest to the

depositors and taking higher interest from the place it invested. And the bank doesn't invest all the cash as loan. Apart from the deposit invested, the bank also has other cash. We can find out the criteria of liquidity from it.

b) Investment in Assets

The criteria of measuring liquidity in a bank, depends on the type of asset, which the bank has made investment. The bank doesn't waste cash stock received from different source of capital. The bank can invest the money, it possesses in different types of assets: such as house land for the bank and other permanent sorts of assets. In such condition, the bank has low liquidity because the investment made in such nature of assets needs much cash. And the bank gains income very low from such nature of assets. But in contrast to it, if the bank has invested in the share of various companies, the investment in government securities and treasury bills and in the debentures of different business institution, bank liquidity is abundant. In this way, the investment that the bank did can be used as the criteria of measuring liquidity.

c) Cash Reserve Ratio (CRR)

The cash Reserve Ratio too can be taken as criteria of measuring bank liquidity. The commercial bank should maintain the cash reserve ratio as fixed by the central bank by opening as account in central bank and also should maintain the statutory liquidity ratio, in its own treasury. It changes from time to time. We can measure the bank liquidity from this too.

d) Profitability

The bank should be able to earn income from the medium of investment because it is a legal person. The objective of the bank is intensified with the concept of gaining profit. The bank should invest its money to gain the profit. The bank can invest in various ways. A great lead of cash is deposited in a bank form different accounts as deposit. The bank invests as loan, the cash fund and the cash collected from other various sources. In addition to it, the bank spreads it investments in various profitable sectors. The bank provides various banking services to its customers. The bank becomes successful if it

generates income from such all investments and functions. But the bank certainly provides little interest to the account holders who deposit the money in the bank. We can guess the liquidity from the profit of a bank has gained.

e) **Investment in Loan**

The bank distributes loans in different sectors. The source of loan investment is important for the various sources of income of the bank. It is an important to know what short of loan and how much loans the bank has distributed, while the bank distributes the loan. If the bank is intensified with the concept of gaining profit, the bank flow loans on a long term and mid term basis. If it has paid its attention to the safety, it invests in short term loan. If a great deal of amount is invested in the short-term loan, bank retains high liquidity. If it has invested in long term, mid term, there is lower liquidity. Thus, loan investment too can be the criteria of measuring the liquidity.

f) **Structure of Bank**

The organizational structure of a bank: i.e. division, sub division, branches too gives speculation of bank liquidity. If the structure of the bank is in single nature, there is higher liquidity in the bank. If the banks have many branches liquidity is lower because the liquidity remains scattered in different branches and sub ranches. In this way, we can find out the bank liquidity from the structure and the organization structure of a bank.

g) **Position of Business**

The business organization, institution and companies have special role in the rising and falling of a bank's investment. If the bank is in the position of profit in investment the investors come to the bank with the proposal for loans. The bank too invests by evaluating the business, its investment time and situation. On the contrary to it, the bank goes on lessening the loan, if the position of business time and situation is not good. If the business environment is good, liquidity remains low. If the business environment is not good, liquidity remains high in the bank. In this way the position of business can be the medium to guess the criteria of measuring liquidity.

2.1.9 Strategies for Liquidity Management in Existing Practice

Bhandari (2004) in his book "Banking and Insurance" states "Nepal Rastra Bank implements monitory policy to extend or narrow the loan flowing capacity of commercial banks to manage the liquidity foreign capital and internal loan are the main reason of liquidity growth. It becomes impossible for the central bank to control the growth of the forcing capital by the implementation of the monetary policy. The central bank use its monetary policy with its internal loans because the main sources of flowing internal loans are the commercial banks and they use the monetary policy as a main device of managing liquidity. In managing the liquidity, the central bank pays attention mainly in two aspects."

a) Not to make less liquidity which is necessary for the commercial banks to run their transactions.

b) To save the economy from the sustainable effect, that causes to arise, the high liquidity and the liquidity crisis.

The commercial banks should attract the deposit because it is called the raw materials of banking without which the commercial bank can't run. A decision to the effect that in which sector the deposit shall be flowed is important. The amount of the current account is the most important liability for commercial banks. But, it should return immediately at the time of demand. So, there must be a liquid fund. Though the, loan and advance are the most profitable sector in the side of asset, it is not be recovered at the time of demand. Therefore, to make arrangements for liquid assets from its own assets, to give loan, to fix the quantity of investment and to make the coordination between the assets and liquidity are the most important factor for a commercial bank. The central bank too pays attention to this fact while giving the instruction about liquidity to the commercial banks. In preparing the strategy of liquidity management, the bank should consider many factors. If the banks fail to prepare a good strategy, at can be an in fortunate event for the bank. Bake liquidity has a great importance. Therefore, bank should set the following strategies for the management liquidity.

a) Strategy Relating to Deposit

The bank can allow opening current, saving and fixed accounts for its customers. Common people, organization and institution in the banks according to their need, they can deposits the cash. Such cash may be accumulated in a great deal as deposit in the banks. The banks should do all works like determination of how much money will be deposited, which account and what interest rate shall be maintained for which deposit and fixing of minimum and maximum period of the deposits. To set the strategy of liquidity it can analyze the amount accumulated as deposit. It is an internal matter of banks to set up their strategy for the management of liquidity from this the bank may get success in its goal.

b) Strategy Relating to Investment

The bank can't invest if there is scarcity of liquidity. But the bank should invest to gain profit. For this purpose, the liquidity is necessary. The commercial banks are established with the objective of earning profit. So, the bank can't meet its goal in lack of liquidity. Keeping the stock, a bank needs, daily liquidity, the bank should set the strategy to invest the rest of the cash fund.

c) Strategy Relating to Reserve Fund

A bank should deposit money in different funds. There is some fund in which it should compulsorily deposit cash. If it can't deposit the amount these funds, it will have to face a disaster. It should be able to manage liquidity well to save itself from such disaster. It establishes a reserve fund. Some percent of amount gained from profitability is kept in this reserve fund. The bank should set a strategy on such subject as how much cash is to be kept in a bank from the amount of such reserve and how much is to be flowed as investment.

d) Strategy Relating to Dividend

A bank distributes some dividend from profit to its shareholders. But if it lacks liquidity it can issue share certificates instead of distribution of cash. But the

bank management should understand that whether such condition prevail in the bank or not. If there is scarcity of liquidity, it should precede the strategy of distributing the share certificates. It is better to set the strategy of distributing the cash, if there is adequate liquidity in the bank.

e) **Strategy Relating to Capital**

After a bank is established, it needs capital for its operation. It can open another branch or sub branches. It may need a lot of capital for this. In such condition, the bank can collect a capital by issuing its shares and debenture. Somehow, it lessens the problem from liquidity. The bank should adopt a strategy whether it should issue the shares, debenture or not.

In this way, the bank can carry out a healthy transaction by adopting abovementioned strategies for management of liquidity. There is also a provision to pay fine, if the cash stock is less than prescribed by the Nepal Rastra Bank. Hence the management of liquidity is really significant aspect for the banks for the purpose of maintaining liquidity in balance.

2.1.10 Lines of Defense

Bhandari (2004) in his book "Banking and insurance" expands that "The manner in which these two apparently conflicting principles of liquidity and profitability are happily reconciled to the maximum benefits, calls for sound judgment and business acumen on the part of a banker, which come only after considerable experience."

Experienced and successful bankers strike a golden mean by so arranging their various assets (advances, investment, etc) in different proportions of liquidity and profitability, that they do not find much difficulty in meeting their various commitments even during the periods of crises. The arrangement of assets in the order of rising profitability and diminishing liquidity is known as "Lines of Defense".

a) First Line of Defense

The first and foremost line of Defense is "cash" on hand. The quantum of cash kept by a bank any time depends on the statutory requirements as well as factors based on experience. Cash offers complete liquidity but little or no return.

b) Second Line of Defense

Call loans-overnight loans or loans repayable on a few days notice-are made to selected fellow bankers within limits of safety and are highly liquid. The rate of interest is usually low except when the money market is tight, say, in the busy season.

c) Third Line of Defense

The third line of Defense is the "bank's own investment". If the investments are judiciously made, keeping the four main principles viz; safety, yield, marketability and stability in view, and if suitable changes in the portfolio are made from time to time, as warranted by monetary conditions, this can be one of the strongest lines of Defense. Most of the investments of commercial banks are in the form of government securities. A small portion is also held in debentures and shares of first class companies.

d) Fourth Line of Defense

The fourth line of Defense is bills purchased and discounted from first class parties. They arise out of genuine trade transactions and should not be accommodating bills. An accommodation bill is a bill to which a person puts his name to accommodate another person without receiving any consideration. The retirement of demand bills on presentation maturity makes this mode a strong and valuable line of Defense.

e) Fifth Line of Defense

The fifth line of Defense is advances, in the order of diminishing liquidity, and rising profitability, come regular advances (most of which are repayable 'on demand') comprising loans, cash credits, and overdrafts to different types of customers, different industries and profession, small borrowers, trade, agriculture and government and semi-government corporations. The strength of all advances as well

as their effectiveness in the promotion of the economic progress of the community depends upon certain should principles of good lending followed by experienced bankers the world over.

Peter S. Ross (2002) in his book "Commercial Bank Management" he describes the following strategies for liquidity management.

a) Assets Liquidity Management (or Asset Conversion) Strategies:

The oldest approach to meeting bank liquidity needs is known as 'asset liquidity management'. In its purest form, this strategy calls for storing liquidity in the form of holdings of liquid assets, predominantly in cash and marketable securities. When liquidity is needed, selected assets are sold for cash until the entire bank's demands for cash are net. This liquidity management strategy is often called asset conversion because liquid funds are raised by converting non-cash assets into cash. Assets liquidity management is "reliance on liquid assets that can be readily sold for cash to meet a bank's liquidity needs.

This strategy is used mainly in smaller banks that find it a less risky approach to liquidity management than relying on borrowings. But assets conversion is not a cost - less approach to liquidity management.

b) Borrowers Liquidity (liability) Management Strategies:

Liability management reliance upon borrowed funds to meet a bank's liquidity needs. In the 11960s and 1970s, many banks, led by the largest in the industry, began to raise move of their liquid funds through borrowings in the money market. This borrowed liquidity strategy - often called purchased liquidity or liability management-in its purest from calls for borrowing enough immediately spendable funds to cover all anticipated demands for liquidity.

Borrowing liquid funds has a number of advantages. A same can choose to borrow only when it actually needs, unlike storing liquidity in assets where a storehouse of at least some liquid assets must be held at all times, lowering the banks' potential return because liquid assets usually have such low yields. Then too using borrowed funds permits a bank to leave the volume and composition of its assets portfolio unchanged

if it is satisfied with the assets it currently holds. In contrast, selling assets to provide liquidity shrinks the size of a bank as its total holdings decline.

The principle sources of borrowed liquidity for banks include large negotiable CDs, federal funds borrowings, repurchase agreements (in which securities are sold temporarily with an agreement to buy them back), Euro currency borrowings, and borrowings at the discount window of the central bank in each nation or region.

This strategy is used most extensively by the largest banks, which often borrowed close to 100 percent of their liquidity needs. It is the most risky approach to solving bank liquidity problems (but also has the highest expected return) because of the volatility of money market interest rates and the rapidity with which the availability of credit can change. Often banks must purchase liquidity when it is most difficult to do so both in cost and in availability. The banks borrowing cost is always uncertain; which adds greater uncertainty to the banks' net earnings. Moreover, a bank that gets into financial trouble is usually most in need of borrowed liquidity, particularly because knowledge of the banks' difficulties spreads and depositors being to with draw their funds. At the same time, other financial institutions become less willing to lend to the troubled bank due to the risk involved.

c) **Balance (assets and liability) liquidity management strategies:**

The combined use of liquid assets holdings (asset management) and borrowed liquidity (liability management) to meet a bank's liquidity needs is knower as balanced liquidity management strategy (liability management) to meet a banks' liquidity needs is knower as balance liquidity management strategy. Due to the risks inherent in relying on borrowed liquidity and the costs of storing liquidity in assets most banks compromise in choosing their liquidity management strategy and liability management. Under this strategy some of the expected demands for liquidity are stored in assets (principally holdings of marketable securities and deposits at other banks), while other anticipated liquidity needs are bank stopped by advance arrangements for lines of credit from correspondent banks or other suppliers of funds. Unexpected cash needs are typically met from near term borrowings. Longer-term liquidity needs can be planned for and funds to meet them parked in short term and

medium term loans and securities that will roll over into cash as those liquidity needs arise.

Peter S. Ross has sketched following four guidelines for effective "liquidity management:"

First, the liquidity manager must keep track of the activities of all funds using and funds raising departments within the bank and co-ordinate his or her department's activities with theirs. Whenever the commercial loan department grants a new credit line to a customer, for example, the liquidity manager must prepare for possible drawings against that line.

Second, the liquidity manager should know in advance, whenever possible, when the bank's biggest credit or deposit customers plan to withdraw their funds or add to their deposits. This allows the manager to plan ahead to deal more effectively with emerging liquidity surpluses and deficits.

Third, the liquidity manager, in co-operation with senior management and the board of director, must make sure the banks' priorities and objectives for liquidity management are clear. In the recent past, a banks' liquidity position was of the assigned top priority when it come to allocating funds. Liquidity management has generally been relegated to a supporting role compared to a banks' number or priority - making loans and supplying other fee generating services to all qualified customers. The bank should grant all profitable loans, leaving to the liquidity manager the task of finding sufficient cash to fund them.

Forth, the bank's liquidity needs and liquidity decisions must be analyzed on the continuing basis to avoid both excess and deficit liquidity positions.

Excess liquidity that is not reinvested the same day it occurs results in lost income for the bank, while liquidity deficits must be dealt with quickly to avoid dire emergencies with hurried borrowings or sales of assets, resulting in excessive losses for the bank.

2.1.11 Predicting Bank's Liquidity Needs

Vaidya (2001) in his book "Banking and Insurance Management" developed Different methods predicting bank's liquidity requirements. The estimation depends upon the nature of the bank; it's operational coverage and the movement of the economy etc. Some of the mostly used methods are sources and uses of funds approach, the structure of funds approach and the experience indicator approach. Each method is based on some specific assumptions. Each of the methods for the prediction of liquidity needs is discussed as follows:

a) The Sources and Uses of Funds Approach:

The estimation of bank's liquidity can be done by the help of its sources and uses of funds. Bank liquidity rises- as a result of deposit increase or decreases in demand for loans or loans outstanding or vice versa. Whenever sources and uses of liquidity do not match, the back has a liquidity gap indicated by the total gap of funds either favorably or unfavorably. Once the bank notices such gap, it will have ample time to decide for managing both position and negative liquidity gap in order to make more accurate, the bank must forecast the loans and deposits for given a period of liquidity planning period. Secondly, the bank must also assess the change in the loan and deposits for the planning period. The bank uses several statistical techniques for judging the required amount of liquidity. The liquidity need can be calculated by the help of the following formula:

Liquidity need for the future period = Estimated change in total loan – Estimated change in total deposit and non deposit liabilities.

b) The Structure of Fund Approach

It is also one of the methods of predicting banks liquidity requirement. It indicates the likely change in deposits and loan over a period of time based on the analysis of trend of both on the past. It is simply the analysis of sources of funds to find out the probability of withdrawals over a period. For example,

the interest sensitive funds are highly volatile i.e. the bank must e prepared to fulfill its payment even at the present level. Similarly large accounts known as vulnerable funds of which the substantial portion is likely to withdraw at any time which must be analyzed thoroughly by bank for its liquidity maintenance and finally, stable funds are the most secured funds for the bank for which the bank can maintain some percentage of its funds for liquidity.

C) Experience Approach

Many banks estimate liquidity management based on experience and the economic movement. There are some indicators monitored continuously by the bank management so as to define the problem need for liquidity for a bank over a period of time. Some indicators are deposits to total assets, liquid securities to total assets, risk less assets to deposit assumption ratio etc. All these ratios assist the bank one way or the often to find out the net liquidity requirement of the bank. These ratios will be playing role directly or indirectly in fund management.

2.2   Review of Policies in Liquidity Management

2.2.1 Cash Reserve Ratio (CRR)

The reserve provision of certain percentage of deposit in own vault and certain percentage with Nepal Rastra Bank is known as CRR. The CRR rate depends on the monetary policy of NRB and it is modified time to time as per the requirement of economy. It is a tool of monetary policy. Nepal Rastra Bank had started to declare CRR from 1 Ashwin 2023. Now the CRR rate is 5.5% for the fiscal year 2065/066.

2.2.2 Provision to Minimize Liquidity Risk

Commercial banks should separate its assets and liabilities based on time interval of maturity period in order to minimize the liquidity risk. Commercial banks shall be liable to report this liquidity profile to the Banking Inspection and Supervision department and Bank Management department quarterly (i.e. the end of Ashwin, Poush, Chaitra and Ashadh).

The time interval of maturity period is calculated as follows: (www.nrb.org.np, Directive No.5/2061-62, 2(2).)

1. 0-90 days maturity period assets and liabilities
2. 91-180 days maturity period assets and liabilities
3. 181-270 days maturity period assets and liabilities
4. 271-365 days maturity period assets and liabilities
5. More than 1-year days maturity period assets and liabilities

Provision for having infinite maturity period assets and liabilities:

a) Out of total current deposit core deposit and compensating balance should be included in the more than one-year maturity period time interval.
b) Current deposit is considered as core deposit.
c) Saving deposit is considered as long-term liabilities and included in more than one-year maturity period interval.
d) The commercial banks should calculate the difference of interval-wise assets and liabilities. The cumulative difference may be positive or negative.

2.2.3 Practice of Liquidity Management in Nepalese Commercial Banks

As per Bank Byabsthapan Paripatra; 059/82 Nepal Rastra Bank (NRB) is the regulatory body of the banking industry. NRB issues the rules and regulations to facilitate the banking operation in Nepal like other regulations. There is a regulation for maintaining liquidity by commercial banks. Revision in monetary policy and operational procedure is continuation from time to time. The regulation is called Cash Reserve Ratio (CRR). It is directly related to the liquid assets of commercial banks. The regulation specifies the cash reserve ratio of commercial to central bank and its own vault to operate day-to-day operation (transaction). It is a policy instrument of central bank for money supply. Money supply is a variable of monetary policy through which the bank plans to maintain adequate liquidity in the economy. It changes as per the requirement of the economy. According to the central bank's regulation, commercial banks need to consider the following rule to calculate CRR:

Total deposit means current, saving and fixed deposit account as well as call money deposit and certificate of deposit (CD). For this purposes, deposits held in convertible foreign currency, Employee guarantee amount and Margin account would not be included.

a) Fixed deposit means a deposit in local currency accepted with a condition to repay on completion of stipulated time period.
b) Current and saving deposit means all deposit accounts other than fixed deposit.
c) Cash in vault shall include only the local current and foreign currency (except clearing cheque)

A complete procedure for compliance lest is in place. Failure in any respect under the regulation is liable to pay penalty at a very high rate of interest. As per Bank Byabsthapan Paripatra; 059/82, Procedures for compliance test are as follows:

a) The cash reserve requirement shall be examined on a weekly basis.
b) Only the balance held in ordinary account with NRB shall be eligible for inclusion in cash reserve. Balance held with NRB in special accounts opened for specific purpose and foreign currency accounts shall not be included for this purpose.
c) Any amount of local currency fund transfer meant to be credited in the account with NRB and lying in transit shall be included in the balance held with NRB.
d) The cash reserve requirement shall be examined against the average weekly balance of deposit liabilities of immediately preceding 4th week. In case of full holiday in the preceding 4th week, the average deposit of immediately preceding 5th week shall be considered.
e) For the purpose of calculation of weekly average of total deposit, cash balance in vault and balance held with NRB, the total aggregate amount of daily balance form Monday through Friday should be divided b five. In case a holiday falling in the week, the balance of the preceding day shall be considered as the balance for the day.
f) In case of full holidays during the entire week, cash reserve requirement for the week shall not be calculated.
g) For the purpose, all branches offices of the bank shall constitute as one unit.
h) The central bank monitors that the regulation is followed or not.

2.3 Review of Previous Studies

2.3.1 Review of Independent Studies

The following independent studies have been viewed during the study:

2.3.1.1 Foreign Context

In foreign context following independent case studies viewed during the study.

2.3.1.1.1 Liquidity Planning at Small Banks:

Sinkey (1983:263) his book "Commercial Bank and financial Management" focuses that "In 1977 McKinney an American researcher contends that the greatest potential for small banks to improve their funds management through quantitative methods is in better planning of their liquidity positions." He claims that the liquidity needs of small banks can be determined accurately enough using worst-case analysis. This technique employs baseline trend to estimate future loan demand and deposit supplies. Given these estimates, the banks objective is to use stored liquidity or liability management liquidity or both to meet its funds requirements. The worst-case scenario forecasts the bank' greatest liquidity need by projecting maximum loan demand and minimum deposit supplies. The difference between these projections represents the worst-case liquidity need of the bank. In the worst-caste analysis a ceiling trend is employed on variables that use bank funds (i.e., loans) and a floor trend on variables that provide bank funds (i.e. deposits). By reversing this procedure (i.e., by applying a floor trend to uses and a ceiling trend to sources), a bank can project what its most-liquid position is expected to be (i.e., the one resulting from minimum loan demand and maximum deposit supplies). The most-liquid and least-liquid projection represents upper and lower bounds for a bank's liquidity planning. By carrying the analysis one step further, it is easy to construct a most likely situation. This can be accomplished by fitting a trend line to the data using regression analysis or by carefully plotting the data and drawing in the trend line.

The three situations described as three types of trends: (1) upward, (2) downward, and (3) level. In each of the situations, the upper and lower bounds represent a range within which future values of the variable are expected to lie. Based

upon historical experience or statistical evidence, some degree of confidence will be associated with the upper and lower boundaries (i.e., a 95 percent confidence interval). Of course, this does not mean that some future value cannot punch through the ceiling or floor.

2.3.1.1.2 Continental's Liquidity Crisis: An Electronic Cash-Out

Sinkey (1983:244) his book "Commercial Bank and financial Management" focuses that "In 1984 the Bank of America made a research report and concluded that the liquidity crisis and subsequent bailout of Continental Illinois National Bank and its holding company, Continental Illinois Corporation, dominated the financial news continental Illinois had a reputation as an aggressive lender." In addition, it (and other large banks) had purchased (what turned out to be bad energy loans from Penn Square Bank of Oklahoma City, a 1982 failure. As a result, Continental lost both financial and reputational capital, which eventually shook the confidence of large uninsured creditors and precipitated a run on the bank.

The run on Continental was a silent by deadly one- an electric one in which billions of dollars of hot money "impulsed" out of the bank. For the seven day period ended May 17, 1984, which was the height of the crisis, Continental required an infusion of $8 billion to stop its electronic hemorrhaging. Continental's liquidity crisis represents, at the extreme, the risks of aggressive liability management. Without a substantial foundation of core deposits (i.e., stable local deposits), Continental was vulnerable to an electronic or silent run. Once the marketplace, in the form of uninsured creditors, lost confidence in Continental's creditworthiness, the stage was set for the electronic run to being. The liquidity crisis, collapse, and bailout of Continental in 1984 caused liability managers to rethink their assumption regarding the availability of purchased funds. Prior to Continental's problems, the working assumption was that funds would always be available, especially in the international area. However, even a guarantee by the FDIC of all of continental's liabilities could not stop the silent electronic run on the banks.

2.3.1.1.3 Bank of New England's Liquidity Crisis:

Sinkey (1983:245) his book "Commercial Bank and financial Management" focuses that "On January 6, 1991, the OCC declared the Bank of New England (and two affiliated banks insolvent. The story of its failure and liquidity crisis goes like this (Clarke [1991] and Lohr [1991] provide details): Through aggressive lending in the 1980s, Bank of New England developed a large concentration of commercial real estate loan-ventures that seemed like positive net-present-value projects at the time. In 1989, however, as the New England economy turned sour, cash flows from the projects dries up, and the banks' loan quality, earnings, and stock price plunged. Institutional providers of funds such as mutual funds, pension funds, corporations, and other banks began a silent run on the bank. The runoff in liabilities forced Bank of New England into the Fed's discount window. To get out of the Fed' window, the bank had to sell assets, cut employees, and draw on Treasury tax-and-loan accounts. As the economy continued to deteriorate in 1990, the situation worsened. Press coverage of the bank's problems (e.g., the announcement of up to a $450 million loss for the fourth quarter of 1990) and of the insolvency of a private insurance fund in Rhode Island worried small (insured) depositors to the extent they began withdrawing money. In two days (January 4-5), the bank lost almost $1 billion in deposits, On January 6(Sunday); the bank was closed, opening the next day as a bridge bank under the supervision of the FDIC."

In his statement before the senate Banking Committee on January 9, 1991, (former) Comptroller Clarke stressed that his office had closely supervised Bank of New England for almost two years before its failure. The supervision included installing new management, asset sales and cost reductions, suspension of dividends, and attempts to recapitalize the bank. He concluded that the salvage attempt had failed because of "the severity of the economic downturn in New England" nevertheless; the original managers put the bank in a vulnerable position by betting too heavily on commercial real-estate loans. A more diversified loan portfolio would have given the bank more time; whether it would have saved it can't be answered. A report by the General Accounting Office (GAO [1991] concluded that Bank of New England failed because of three factors:

1. Liberal lending practices

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2. Poorly controlled growth
3. Concentration in commercial real-estate loans in a severely declining regional economy

Should the OCC have stopped the Bank of New England from concentrating its loan portfolio in commercial real estate? No, because in the final analysis, we do not want bank regulators determining how credit it allocated. What we do want is a deposit-insurance system that prevents high-risk banks from being subsidized by low-risk ones and ensures that the costs of bank failures are not foisted on taxpayers.

2.3.1.2 Nepalese Context

There are very few independent studies in finance in Nepalese perspective. On the core concept of liquidity management and factors affecting to liquidity position in the commercial banks, very negligible studies have been made. During the study the following independent studies have reviewed about liquidity management in Nepalese commercial banks:

For the liquidity management, Dr. Pokharel and Gautam, (2004) in their book "Fundamental of Financial Management" have given some conceptual ingredients. An attempt should be made to accelerate collections and handle disbursement so that maximum liquidity is available. Collection liquidity is accelerated by means of concentration banking, a lock box system and other specific pick plans. A firm can reduce its liquidity balance by adopting quicker mechanism of transferring fund. The optimal level of liquidity depends upon the predictability of future liquidity flows, their volatility, fixed cost of security transaction and the carrying cost of holding liquidity; that is interest rate foregone and marketable securities.

Dr. Pradhan (2004) on his research "Financial Management Practices in Nepal" for which he carried out a survey of 78 enterprises. Through his research he found some of the major features of the Nepalese financial management. According to him "The most important one appeared to be maintaining good relation with stockholder. The finding reveals that banks and retained earnings are most widely used financing sources. Most enterprises do not borrow from one bank only and they do switch between banks to banks whichever offers best interest rates. Most

enterprises find that banks are faxable in interest rate. Among the bank loan, bank loan of less than one year are more popular in public sector where as banks loan of 1-5 years are more popular in private sector. In period of light money, the majority of private sector enterprises fell that bank will treat all firms equally while public sector does not feel so. Similarly, he concluded that the majority of enterprises in traded sector find that bank's interest rate is just right while the majority of non-traded sector find that the some is one higher side".

Dr. Yuvaraj Khatiwoda, newly appointed Governor in Nepal in Annapurna Post daily (2010) accused commercial banks, "At present situation Nepalese banking sector is facing liquidity problem due to their own causes such as high investment on unproductive sector i.e. real estate, involve in competition to increase market share and in bonus distribution" he adds "directors of commercial banks creates big problem but the situation is in controllable, NRB is going to make policy to solve it".

2.3.2 Review of Related Thesis

There are numerous thesis reports for the partial fulfillment of masters of Business Administration, master of Business studies and masters in Arts in T.U. Among those thesis reports some are related to the performance, investment and liquidity in Nepalese commercial banks. Very few thesis reports are related to liquidity management in Nepalese commercial banks. Some of those unpublished thesis reports are viewed here.

Poudel (2002) in his thesis entitled "A Study on Liquidity and Investment Position of Joint Venture Commercial Banks in Nepal", the study had based on the special reference to the Everest Bank Ltd and NABIL Bank ltd. The major findings from the study were:

) There is no standard and uniform rate or ratio for maintaining liquid assets by the commercial banks. The manager may decide to maintain an appropriate level of liquid assets based on his own judgment.

) Liquidity Management decision should be made based on the relation to the source of funds and statutory obligation. Nature of a source of fund may vary with the other. Like there are demand deposit and time deposit bearing different

natures. Demand deposit has nature of high turnover. Therefore it requires high level of liquid assets to support withdrawals. Since the 80-90 Percent of funds of commercial banks is deposit, the proportion of demand deposit to total deposit liability largely determined the level of liquid fund.

) The banks do not have constant and consistent liquidity and investment policy. Both the banks are adopting discretionary fund management approach. The banks are adhering to theory of shiftability while investing on marketable securities, especially on government securities. Anticipated income approach is also adopted in case of long-term loans.

There are various active external factors affecting liquidity position of the banks, the deposit liability in the latest two year has increased substantially. Therefore, it is suggested to conduct a study to find the reason behind over increasing trend of deposit of the banks.

Chaulagai (2009) in his thesis report entitled **"Cash & Liquidity Management of Commercial Banks in Nepal"**. His main objective was comparatively examined and analysis the liquidity position and cash management practices of SBL and NIBL.

The major findings of his study were:

Liquidity management is one of the most important parts of every financial institution. Liquidity is the most sensible and crucial aspect of the bank, which is often compared to lifeblood of the human being. Lack of adequate liquidity is often one of the first signs that a bank is in serious financial trouble and lead to the loss of public faith upon banks. Thus, ensuring adequate liquidity is a never-ending problem for the bank management that will always have significant implications for the bank's profitability. After analyzing the sample bank NIBL and SBL. Both banks have very low liquidity position because the both current and quick ratios are below the standard. Both banks cannot pay short-term liability at the time of its creditor's demand. It may create difficult situation in future. So, both banks should keep sufficient level of current and quick assets to maintain its liquidity position. The investment positions of SBL and

NIBL, out of its total deposit are not satisfactory because the investment to total deposit ratio are too much low. The study shows minimums of total deposits are used

for investment. So, it is recommended that both banks should have to give priority to invest in profitable investment opportunity than providing maximum unsecured loan. Both bank used very high proportion of debt in its capital structure. The NIBL have very high debt to total assets. Similarly, SBL have also very high debt to total assets. So, this indicates the very poor and critical financial condition of both banks. The ratio of NIBL is very critical than SBL. So, both banks should either increase its own equity capital or decrease debt financing of present situation. Both bank have provided more loan and advance from its saving, fixed, and total deposit. So, both banks should review its loan policy.

Giri (2005) in his thesis entitled, "Investment & Liquidity Management of Insurance Companies". The main objective of the research is to analyze the investment pattern, liquidity management, trend of profit of the insurance companies. The major findings from his study were:

Most of the insurance companies are investing in government securities & debenture, share of other companies' securities, bank& finance companies' fixed deposit a/c; they are found not investing in real estate and mutual fund. So, he suggests insurance companies to search for new area of profitable investment like in real estate and mutual fund, which are other profitable sectors. He further states that all insurance companies seem to be risk avoiding while making their investment. Therefore they are making secured investment with lower rate of return. Thus they are suggested to change their investment policy. Finally, he recommends the insurance companies to introduce the portfolio management system to increase their earning form investment without increasing the degree of risk but through the diversification of risk.

Sapkota (2004), in his thesis entitled, "A Study on Fund Mobilizing Policy of Standard Chartered Bank Ltd in Comparison to Nepal Bangladesh Bank Ltd and Himalayan Bank Ltd" having main objectives to examine the fund mobilizing policy adopted by three joint venture banks viz. SCBNL, NBBL and HBL and the way these banks mobilized their funds during five year study period i.e. from 1998/99 to 2003/2004.

He found the overall condition of SCBNL seems in satisfactory position in comparison to NBBL and HBL. In other words, he recommends that banks are strongly recommended to provide information about its services, facilities and

extension of their services towards rural areas. These three banks are recommended to increase cash and bank balance to meet the need of investment and demand of loan and advances. And banks are to be investing its funds in the purchase of shares and debentures of other financial, non-financial companies, hotels and government companies.

He has not explained about the risk, which has to be faced by these joint venture banks. His study cannot show the fund mobilizing policy of the selected banks for the succeeding years because of time limitation i.e. up to 2003/2004.

Shrestha (2007) in her thesis report entitled "Liquidity Management of Nabil Bank Ltd" The objectives of study is to analyzes financial ratios, trend analysis of ratios and profit and to provide suggestion for the future betterment of Nabil Bank Ltd.

She found that the liquidity ratios of Nabil Bank Ltd. are fluctuating over the study period. The profitability ratio are also fluctuating and in increasing trend. The interest income and expenses are in increasing. In order to maintain fluctuating trend of profitability, she recommends investing different risk profile by establishing Special Investment Promotion Unit. She has also recommended to minimize the minimum cash balance that should maintained by depositor and enhance the wide range of services provided to customer as per changing environment.

Liquidity management is an important branch of total management of commercial banks. So, it should be taken as a different discipline rather than cash management, working capital management and ratio analysis. After the re-engineering of NRB, with the help of ISO partners of USA, NRB has made a directive to adopt liquidity profile and GAP analysis tools to manage liquidity properly for the commercial banks in Nepal.

While reviewing the books, articles and previous studies, it is found that there are so many theories and rules relating to liquidity management in foreign practice. Liquidity management is considered as an important discipline in USA and other developed countries. But it is still lacking in Nepal. In Nepalese books, journals and studies, liquidity is taken only as a part of cash management, working capital

management and ratio analysis. Even in central library, TU, the research on these discipline are categorized in the heading of liquidity management. On this research heading, there were a few theses found relating to liquidity management of Nepalese commercial banks. Thus, this research work is done to fulfill this kind of lacks. Moreover, in this research, an attempt has been made to recognize the liquidity management as a major function of Nepalese commercial banks and the tools and techniques are also searched for the betterment for it.

2.4   Research Gap

Reviewing various books, journals, thesis and other independent studies by different authors related to the topic, it could be concluded that all those worked performed are related to the study of liquidity management. Above studies has provide us little but more knowledge for our research purpose. The review of above relevant literature has contributed to enhance the fundamental understanding and knowledge, which is require making study liquidity position of NIBL, HBL and NBL. By using different financial indicator, out of which profitability and efficiency is also important one. If any firm makes excess profit than the normal level, the firm is said to have successful management, efficient control mechanism. But sometimes, the profit earned by a firm can be affected by external factor like government policies relating to financial sector and inflation. So, this study is also focused on how the banks utilizes the resources properly, liquidity management, loan and advance, credit investment, capital structure, operating income and expenses, resource mobilization.

There are various researches conducted on liquidity management and policy of commercial banks. But still they have left to show linkage between financial position and liquidity of sampled commercial banks. The study seeks to fulfill it. So this study be fruitful to those interested person, party, scholars, professor, student, businessman and government for academically as well as policy perspective

CHAPTER III

RESEARCH METHODOLOGY

Research is an original contribution to the existing stock of knowledge of making for its advancement. It is the pursuit of truth with the help of study, observation, comparison and experiment. In short, the search for knowledge through objectives and systematic method of finding solution to a problem is research. "Research Methodology is the way to solve the problem systematically and scientifically.

Wolff and Pant (2002) in their book "Social science Research and Thesis Writing" states "Research is undertaken not only to solve a problem existing in the work setting, but also to add or contribute to the general body of knowledge in a particular area of interest to the researcher. Research is thus a knowledge, which can be used for different purposes. It is used to build a theory, develop policies, support decision making and solve problems with the opening of new frontiers of knowledge through research, new concepts and theories are developed to explain, verify and analyze the social phenomena."

The main objectives of research methodology are to achieve the basic objectives of the research study. The major contents of research methodology followed in course of this study are as follows:

3.1 Research Design

Research Design is a plan to obtain the answer of research question through analysis of data. The formidable problem that follows the task of defining the research problem is the preparation of the design of the research work, particularly known as the "research design". It refers that research design is a set of work for researching a particular problem. Decisions regarding what, where, when how much, by what means concerning an inquiry or a research study constitute a research design.

In fact, research design is the conceptual structure within which research is conducted; it constitutes the blueprint for the collection, measurement and analysis of data. This study is mainly related to quantitative aspects such as various accounting

statement, functional budgets and the actual results of the budgets. As per the requirements of the study, both descriptive and analytical approaches are used.

3.2 Population and Sample

The population refers to the organizing of the same nature on its services and product in general. This study intends to identify the factors that affect the liquidity and how to manage it properly. So the population of the study is all commercial banks in Nepal i.e. 31 commercial banks in Nepal. In the study 3 sample banks are taken into consideration among those 31 commercial banks.

3.3 Source and Nature of Data

There are two sources of data collection. The research is based on secondary source of data. All the adequate data are collected from secondary sources.

This refers to data that are already used and gathered by others. Secondary data are mostly used for this research purpose. So the major sources of secondary data are as follows

☐☐Annual Report of concern Bank.

☐Internet and E-mails.

☐☐NRB directives.

☐☐Economy survey of Government of Nepal and Ministry of finance.

☐☐Newspaper, journals, articles and various magazines.

☐☐Dissertation of Central Library of T. U. , Library of Patan Multiple Campus and Nepal Commerce Campus

The source of secondary data are Annual reports of concerned commercial banks, concerned commercial banks web-sites, NRB web-sites, bulletins publication of different authorities, researchers, journals, unpublished thesis reports, newspapers etc. The learners' practitioners and banking professionals of the banking sector are the major source of primary information of this study.

3.4 Data Collection Techniques

To collect the secondary data, published materials are viewed in various sports. Books by different authors, unpublished thesis reports, journals, magazines, internet websites, AGM reports of commercial banks, bulletins published by NRB, are major sources of secondary data. To collect these secondary data, the researchers visited campus library of Patan Multiple Campus including online library, TU Central Library and Nepal Rastra Bank's Library.

3.5 Data Analysis Procedures

This step is done in the field or area of the study. The information can be obtained from the respondent by using different methods of data collection. Furthermore balance sheet, cash flow analysis, profit and loss accounts of respected banks, NRB bulletins and other related articles, journals and research studies are analyzed as per the requirement of the study.

The data which is not originally collected but obtained from published and an unpublished source of data is called secondary data. Here secondary data are used to find out the liquidity position, annual reports of different years, web page publication of sample banks, different business magazines, previous research studies, are analyzed. The data are systematically arranged. These data are grouped in different tables and charts according to their nature. To analyze the data in this research the researcher has used some statistical and financial tools, which are explained here separately.

3.5.1 Statistical Tool

Statistical tools are the measures or the instruments to analyze the collected data from different sources. In statistics, there are numerous statistical tools to analyze data of various natures. In this study, the researcher has used the following statistical tools to analyze the data.

3.5.1.1 Average (Mean)

An average is a single value related from a group of values to represent them in some way, a value which is supposed to stand for whole group of which it is part, as typical of all the values in the group. There are various types of averages. Arithmetic mean (A.M. simple and weighted), median, mode, geometric mean, harmonic mean, are the major types of averages. The most popular and widely used measure representing the entire data by one value is the A.M. The value of the A.M. is obtained by adding together all the items and by dividing this total by the number of items.

Mathematically,

$$\text{Arithmetic Mean (A.M.) is given by, } \overline{X} = \frac{X}{n}$$

Where,

$\overline{X}$ = Arithmetic Mean

X = Sum of all the values of the variable X.

n = Number of observations

3.5.1.2 Standard Deviation

The standard Deviation ( ) measures the absolute dispersion. The greater the standard deviation, greater will be the magnitude of the deviation of the values from their mean. A small standard deviation means a high degree of uniformity of the observations as well as homogeneity of a series and vice versa.

Mathematically,

$$\text{Standard Deviation ( )} = \sqrt{\frac{\int X \, z \overline{X} \, \text{Å}}{n}}$$

3.5.1.3 Coefficient of Variation

The standard deviation is absolute measures of dispersion: where as the coefficient of variation (CV) is a relative measure. To compare the variability between two or more series, CV is more appropriate statistical tool.

Mathematically,

$$\text{Coefficient of Variation (CV)} = \frac{\dagger}{\overline{X}} \mid 100$$

3.5.1.4 Trend Analysis:

Trend analysis is a significant tool of horizontal financial analysis. It is a dynamic method to indicate the changes in terms of financial statement. Trend analysis helps to identify the controllable items of given period and future forecast can be made for ongoing concern. It is one of the useful tools in making a comparative study of the financial statement of the number of years. It makes easy to identify the changes in an item or in a group of items over a period of time and to draw the conclusion regarding the changes there on.

Under this topic, trend of different ratios are forecasted for next five years. The projections are based on the following assumptions.

) The main assumption is that other things will remain unchanged i.e.
) The banks will remain in the present position.
) The economy will remain in the present stage.
) NRB will not change its guidelines to commercial banks.
) The forecast will be true only when the limitation of least square method is carried out.

Least square method:

This is one of the most commonly used methods to describe the trend. This is the mathematical method.

The straight line trend between the dependent variable 'y' and independent variable 'x' (i.e. time) is representing by equation $Y_c = a + bx$

Where,

Y_c = estimated value of 'y' for any given value of independent variable X.

$a = y$ – intercept of value of 'y' when x = 0 [i.e. $a = \dfrac{Y}{n}$]

b= slope of the trend line or amount of change in 'y' per unit change in x

[i.e. b= $\dfrac{XY}{X^2}$]

3.5.1.5 Coefficient of Correlation Analysis

Karl Pearson's co-efficient of correlation is determined. Karl Pearson's co-efficient of correlation is the most commonly used measure of the relationship between two or more two variable. The value of co-efficient of correlation denoted by 'r' and it always lies between +1and -1. +1 indicate that there is perfectively positively correlated and -1 indicate perfectively negative correlated.

Mathematically,

$$r \; X \frac{xy}{\sqrt{x^2 \quad y^2}}$$

Where,

X and Y are two variables

r = Coefficient of Correlation

$x = X\text{-}\overline{X}$

$y = Y\text{-}\overline{Y}$

One very convenient and useful way of interpreting the value of coefficient of correlation(r) between the two variables is coefficient of determination, which is denoted by r2. It explains the total variation in dependent variable is explained by independent variable.

The significant of coefficient of correlation (r) is tested with the help of probable error of 'r' (i.e. P.E). If coefficient of correlation 'r' is less than probable error 'P.E.', it is insignificant. So, perhaps there is no evidence of correlation. If coefficient of

correlation 'r' is greater than six times of probable error 'P.E.(r), it is significant and the other cases, nothing can be concluded.

$$P.E. = 0.6745 \frac{1 - r^2}{\sqrt{n}}$$

Where,

P.E. = Probable error of correlation coefficient

r = Correlation Coefficient

n = Number of Observation

Under this topic, Karl's Pearson's Coefficient of Correlation is used to measure the degree of relationship between the following variables.

I) Coefficient of Correlation between Total Deposit and Investment
II) Coefficient of Correlation between Total Deposit and Loans & Advances.
III) Coefficient of Correlation between Total cash & Bank Balance and Total Deposit
IV) Coefficient of Correlation between total investment in govt. Securities and Total Deposit

3.5.2 Financial Tools

Financial tools also are the measures or the instruments to analyze the collected data from different sources. In this study, the researcher has used the following financial tools to analyze the data.

3.5.2.1 Financial Ratio Analysis

Financial Ratio Analysis is a tool, through which economic and financial position of organization can be fully to X-rayed. It is the indicated quotient of two mathematical expressions, and as the relationship between two or more things. Therefore, to find out the liquidity position of the sampled commercial banks, the following ratios are examined:

I) **Total Cash and Bank Balance to Total Deposit Ratio**

This ratio is calculated by dividing cash and bank balance by total deposits. Total deposits consist of current deposit, saving deposit, fixed deposit, money at call and short notice and other liabilities. This ratio shows the proportion of total deposits held as compared to the most liquid assets. High ratio shows the strong liquidity position of the bank but very high ratio is not favorable for the bank because it does not produce appropriate profit to bear the high interest.

$$\text{Total Cash and Bank Balance to Total Deposit Ratio} = \frac{\text{Total Cash and Bank Balance}}{\text{Total Deposit}} \mid 100$$

II) Core Capital Ratio (CCR)

This ratio is designed to see what portion of the Core Capital of commercial banks is kept as Core Capital. As Per NRB Directives the CRR should not be less than 6 percent. This ratio is calculated by dividing Core Capital Fund by Total Risk Weighted Assets and formula is:

$$\text{Core Capital Ratio (CCR)} = \frac{\text{Core Capital Fund}}{\text{Total Risk Weighted Assets}} \mid 100$$

III) Short Term Investment to Total Deposit Ratio.

This ratio is designed to analyze the liquidity position of commercial banks. It shows the portion of the total deposits in short term investment. Higher ratio indicates the better liquidity position where as lower ratio is the symptom of liquidity risks which may arise in the future. It is computed by using the formula as under:

$$\text{Short Term Investment to Total Deposit Ratio} = \frac{\text{Short Term Investment}}{\text{Total Deposit}} \mid 100$$

IV) Short Term Investment to Total Investment Ratio

This ratio shows the percentage of short term investment on total investment of sampled banks. This ratio is calculated by dividing short terms investment by total investment and the formula is:

Short Term Investment to Total Investment Ratio $= \dfrac{\text{Short Term Investment}}{\text{Total Investment}} \mid 100$

V) Total Investment to Total Deposit Ratio

This ratio is calculated dividing total investment by total deposits. Total investment includes government treasury bills, development bonds, company shares and other investments. This ratio presents how efficiently the resources of the banks have been mobilized. High ratio shows managerial efficiency regarding the utilization of deposits and vice-versa.

Total Investment to Total Deposit Ratio $= \dfrac{\text{Total Investment}}{\text{Total Deposits}} \mid 100$

VI) Total Loan & Advances to Total Deposit Ratio (C/D Ratio)

The ratio assesses to what extent the bankers are able to utilize the depositor's fund to earn profit by providing loans and advances. In other words, how quickly total collected deposit are converted into loan and advances given to the client to earn income. The Ratio also called C/D Ratio. It is computed by dividing the total amount of loan and advances to total deposit fund. Higher ratio indicates higher/proper utilization of funds and low ratio is the signal of inefficiency or remaining idle. This ratio is calculated by using the following formula:

Loan & Advances To Total Dep. Ratio (C/D Ratio) $= \dfrac{\text{Total Loan \& Advances}}{\text{Total Deposit}} \mid 100$

VII) Balance with NRB to Total Deposit Ratio

Nepal Rastra Bank (NRB), the central bank, is the regulatory body of all the commercial banks. In order to enable to smooth functioning of the commercial banks NRB has compelled them to hold a certain percentage of their total deposit as a reserve. This is particularly done in order to maintain the strength of commercial banks regarding the liquidity position. This ratio is calculated by using the following formula:

$$\text{Balance with NRB to Total Deposit Ratios} = \frac{\text{Balance with NRB}}{\text{Total Deposits}} \mid 100$$

VIII) Cash Reserve Ratio (CRR)

Commercial banks are directed by Nepal Rastra Bank, the central bank to maintain certain percentage of their deposits liabilities with NRB in own account in order to enable them to maintain the sound liquidity position. Cash reserve ratio (CRR) describes whether the commercial banks have met the liquidity requirement as prescribed by NRB or not. CRR is maintained on weekly basis as per the average balance. It is computed by dividing the cash reserve of commercial banks by total deposit and the formula is:

$$\text{Cash Reserve Ratio (CRR)} = \frac{\text{NRB balance (Lcy only)}}{\text{Lcy Deposits - Margin Deposit}} \mid 100$$

IX) Balance with NRB to Current Deposit Ratio

This ratio presents the portion of balance with NRB on current deposit. It is used to measure the liquidity position of commercial banks and capacity to pay depositors amount promptly. This ratio can be calculated by using the following formula:

$$\text{Balance with NRB to Current Deposit Ratio} = \frac{\text{Balance with NRB}}{\text{Current Deposits}} \mid 100$$

X) Investment on Government Securities to Total Deposit Ratio

This ratio shows the percentage of investment on government securities on total deposit. It presents that how much funds are invested on government securities of total deposit of commercial banks. This ratio is computed by using the following formula:

$$\text{Investment in Govt. Securities to Total Deposit Ratio} = \frac{\text{Investment in Govt. securities}}{\text{Total Deposits}} \mid 100$$

XI) Cash in Vault to Current Deposit Ratio

This ratio is designed to measure the portion of cash in vault on current deposit. This ratio presents the cash position in vault as compare to current deposit which shows the liquidity position of banks. This ratio is computed as follows:

$$\text{Cash in Vault to Current Deposit Ratio} = \frac{\text{Cash in Vault}}{\text{Current Deposits}} | 100$$

XII) Capital Adequacy Ratio (CAR)

Total Capital refers to the sum of core capital and supplementary capital of bank. As per NRB Directives 2067, A total capital fund of not less than 10 percent of its risk weighted exposure. This ratio is computed by using following formula:

$$\text{Capital Adequacy Ratio (CAR)} = \frac{\text{Total Capital Fund}}{\text{Total Risk Weighted Assets}} \times 100$$

3.5.2.2 Liquidity Profile Analysis

Liquidity profile analysis is a financial cum banking tool, which is very useful to measure liquidity position of commercial banks properly. It is a scientific concept in the banking sector and newly introduced in Nepal. Under directive no.5, issued on 2061/62 B.S., Nepal Rastra Bank has prescribed this tool to measure the liquidity position of commercial banks the researcher found that this tool is adopted from 2002 A.D. and most of the banks have followed this tool.

Under this section, it is attempted to analyze the liquidity position of commercial banks by matching assets and liability based on the maturity period.

3.6 Methods of Data Presentation

The collected data are presented in simple and easily understandable tables to make those data clear and more informative. Such data have been presented in figures like bar diagram, trend line, pie chart whichever is relevant to explain the data more effectively, based on the nature of data. After presenting such data in the table and

figures are analyzed using various statistical, mathematical and financial tools and techniques.

CHAPTER - IV

DATA PRESENTATION AND ANALYSIS

4.1 Introduction

This chapter deals with the presentation, analysis and interpretation of statistics, evidence and facts, to clearing the research works. Here the study presents the collected data for various purpose of analysis. The data are analyzed by using financial and statistical tools to get values of different variables. The analyzed data and results are presented clearly and simultaneously by using tables and graphs. Finally, each of the results in interpreted in each topics and sub-topics.

4.2 Financial Ratio Analysis

Financial Ratio Analysis is a tool, through which economic and financial position of organization can be fully to x-rayed. It is the indicated quotient of two mathematical expressions, and as the relationship between two or more things. Therefore, to find out the liquidity position of the sampled commercial banks, the following ratios are examined:

4.2.1 Total Cash & Bank Balance to Total Deposit Ratio

This ratio is designed to measure the bank's ability to meet the immediate obligations. This ratio is obtained by dividing cash and bank balance by current deposits i.e.

$$\text{Cash and Bank Balance to Total Deposit Ratio} = \frac{\text{Total Cash and Bank Balance}}{\text{Total Deposit}} \mid 100$$

Table: 4.1

Comparative Analysis of Cash and Bank Balance to Total Deposit Ratio

Ratio in percent

Year	Banks		
	NIBL	**HBL**	**NABIL**
2061/62	9.40	8.11	3.83
2062/63	12.34	6.48	3.26
2063/64	9.97	5.85	6.00
2064/65	10.90	4.55	8.37
2065/66	16.96	8.79	9.02
Mean(x)	**11.91**	**6.76**	**6.10**
SD( )	**2.71%**	**1.53%**	**2.325**
C.V.	**0.23**	**0.23**	**0.38**

Source: Annual Reports of Concern Banks (2009).

Table 4.1 shows that cash and bank balance to total deposit ratio of NIBL is in the highest and in fluctuating trend among other banks. In the fiscal year 2061/62 it has 9.40% and whereas in FY 2065/66 is the highest ratio of 16.96%. In FY 2062/63 the ratio increased by 12.34. There after it is decreased in following year and slightly increased in next following year. And in FY 2065/66 it is highest with 16.96 percent. Similarly, HBL and NABIL both have maintained low level of ratio which is less than 40% as comparing to NIBL with the average value of 6.76% and 6.10% respectively and NIBL of 11.91%. The Standard Deviation of NIBL is high which is also shown by line diagram fluctuating from year to year. HBL and NABIL have low variability in compare to NIBL. During the study period, NIBL has maintained high Cash and Bank Balance in relation to total Deposit and following by HBL and NIBL respectively. Even Coefficient of variance (C.V.) of HBL and NIBL are same and NABIL, 0.38 reveal the inconsistency to its average ratio. HBL is more consistent or less variable than others, which is also shown by Diagram 4.1.

Figure: 4.1

Comparative Cash and Bank Balance to Total Deposit Ratio
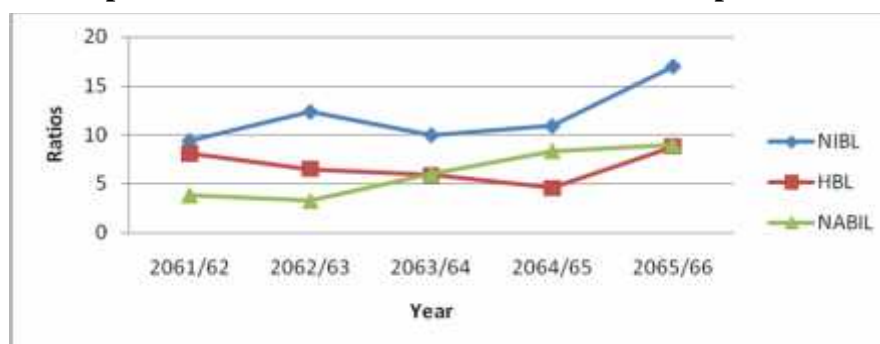
4.2.2 Core Capital Ratio (CCR)

This ratio is designed to see whether all banks and financial institutions are maintaining CCR ratio or not. CCR is mandatory to maintain as per NRB directives. This ratio is calculated by dividing total core capital fund by total risk weighted exposure and formula is:

$$\text{Core Capital Ratio (CCR)} = \frac{\text{Total Core Capital fund}}{\text{Total Risk weighted Assets}} \mid 100$$

Table: 4.2

Comparative Analysis of Core Capital Ratio

Ratio in percent

Year	Banks		
	NIBL	**HBL**	**NABIL**
2061/62	8.52	8.33	11.35
2062/63	7.97	8.65	10.78
2063/64	7.90	9.61	10.40
2064/65	7.71	9.64	8.75
2065/66	8.56	8.81	8.74
Mean(x)	**8.13**	**9**	**10**
SD( )	**0.34%**	**0.53%**	**1.07%**
C.V.	**0.04**	**0.06**	**0.11**

Source: Annual Reports of Concern Banks (2009).

Table 4.2 shows the CCR of all sampled banks maintained above mandatory ratio. As per NRB directives minimum CCR is 5.5 % upto FY 2065/66. All the sampled commercial banks maintained its ratio with low Variance. NABIL maintained highest CCR with 10% which shows the high core capital adequacy in sampled banks. In FY 2061/62 NABIL had maintained highest CCR with 11.35%. In all FY all three sampled commercial banks maintained CCR nearly by 1.5 times. It shows all sampled banks strongly followed the NRB Directives. Which also clearly shows by line Diagram 4.2.

Figure: 4.2

Comparative Analysis of Core Capital Ratio
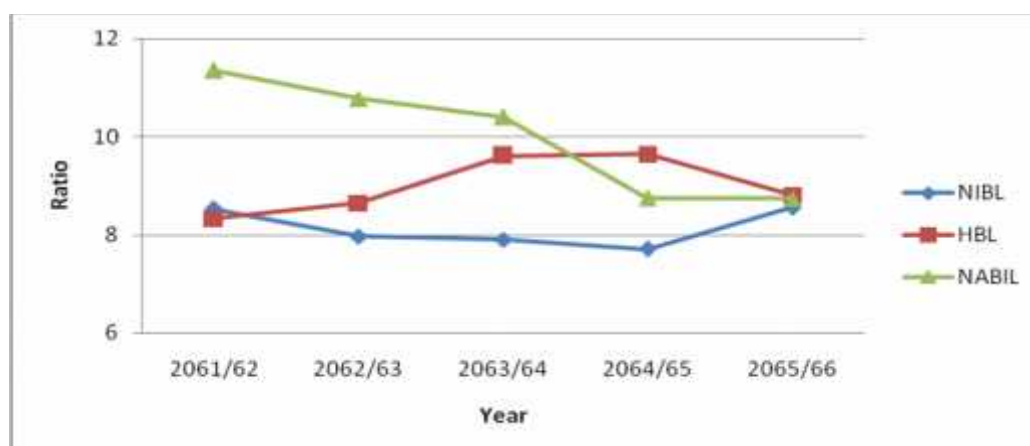
4.2.3 Short Term Investment to Total Deposit Ratio

This ratio is designed to analyze the liquidity position of commercial banks. It shows the portion of short term investment in total deposit. Higher ratio indicates the better liquidity position where as lower ratio is the symptom of liquidity risks which may arise in the future. It is computed by using the formula as shown below:

$$\text{Short Term Investment to Total Deposit Ratio} = \frac{\text{Short Term Investment}}{\text{Total Deposit}} \mid 100$$

Table: 4.3

Comparative Analysis of Short Term Investment to Total Deposit Ratio

Ratio in percent

Year	Banks		
	NIBL	**HBL**	**NABIL**
2061/62	13.67	19.42	4.56
2062/63	13.32	17.23	6.33
2063/64	13.30	20.23	17.50
2064/65	9.16	22.51	11.87
2065/66	5.42	11.27	4.92
Mean(x)	**10.97**	**18.13**	**9.04**
SD( )	**3.23%**	**3.82%**	**4.98%**
C.V.	**0.29**	**0.21**	**0.55**

Source: Annual Reports of Concern Banks (2009).

Table 4.3 shows that the short term investment to total deposit ratio of NIBL is in decreasing trend. In FY 2061/62 it has 13.67% but in FY 206/66 It has only 5.42% with the average of 10.97%. The ratio of HBL is in fluctuating trend giving 19.42% in FY 2061/62 to 22.51 % in FY 2064/65. NABIL has also the fluctuating trend, In FY 2061/62 it has 4.56% but it is increased to 6.33% in following year and increased to 17.50% in FY 2063/64 and again decreased in final year with average of 11.16%. In last of study it reached at 4.92%. The highest average ratio is of HBL and following by NIBL and NABIL respectively.

The value of CV 0.55 of NABIL implies that the ratio is inconsistent to average investment ratio and SD of 4.98% indicate fluctuating. The CV of NIBL and HBL is 0.29 and 0.21 respectively and indicates the consistent to average ratio.

In comparing among these three sampled banks, the fact is revealed that the liquidity position of HBL is strong and NIBL and NABIL are in satisfactory position.

Figure: 4.3

Comparative Analysis of Short Term Investment to Total Deposit Ratio
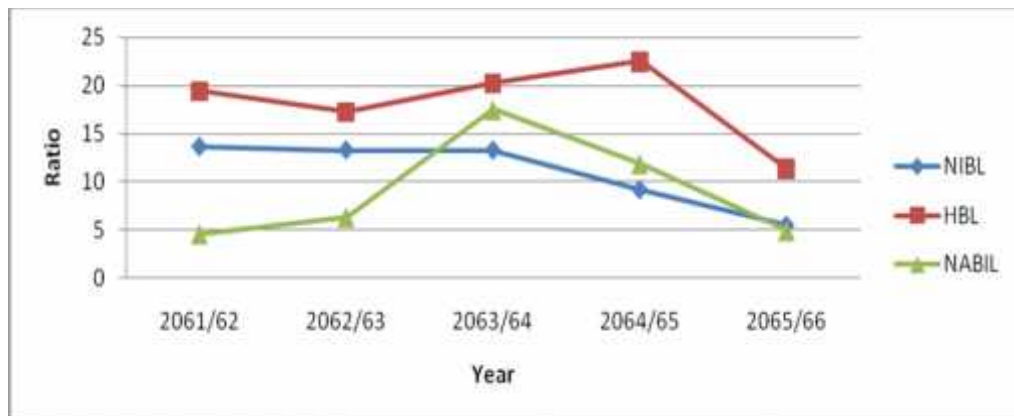
4.2.4 Short Term Investment to Total Investment Ratio

This ratio shows the percentage of short term investment on total investment of sampled banks. This ratio is calculated by dividing short terms investment by total investment amount and the formula is:

Short Term Investment to Total Investment Ratio =

$$\frac{\text{Short Term Investment}}{\text{Total Investment}} \mid 100$$

Table: 4.4

Comparative Analysis of Short Term Investment to Total Investment Ratio

Ratio in Percent

Year	Banks		
	NIBL	**HBL**	**NABIL**
2061/62	49.52	41.22	15.55
2062/63	45.01	41.92	19.81
2063/64	50.05	51.42	45.68
2064/65	45.90	53.73	38.11
2065/66	42.64	44.85	16.99
Mean(x)	**48.62**	**46.63**	**27.23**
SD( )	**2.80%**	**5.06%**	**12.19%**
C.V.	**0.06**	**0.11**	**0.45**

Source: Annual Reports of Concern Banks (2009).

Table 4.4 shows that the ratio of short term investment to total investment ratio of NIBL is in less fluctuating trend. It is headed slightly decreasing during the study period. The highest ratio is 50.05% in the year 2063/64 and the lowest ratio is 42.64% in the year 2065/66 with the average ratio of 48.62%. The ratio of NABIL is also in fluctuating trend. It is deviated by 12.19% with the average ratio 27.23%. The highest ratio is 45.68% in the year 2063/64 and the lowest ratio is 15.55% in the year 2061/62. The SD is also high 12.19% indicate the fluctuating trend. The data of HBL shows that the ratio is in increasing trend for first four year of the study period. The highest ratio is 53.73% and lowest ratio is 41.22% in FY 2064/65 and 2061/62 respectively and it is deviated by 5.06% from the average ratio 46.63%. The CV of NABIL, HBL and NIBL are 0.45 0.11 and 0.06 respectively and indicate more consistent in NIBL and Inconsistent in NABIL. By this table it is revealed that NIBL has invested in large portion of investment in show term increases the liquidity position than of NABIL. With the help of the Line Diagram it can be seen more clearly.

Figure: 4.4

Comparative Analysis of Short Term Investment to Total Investment Ratio
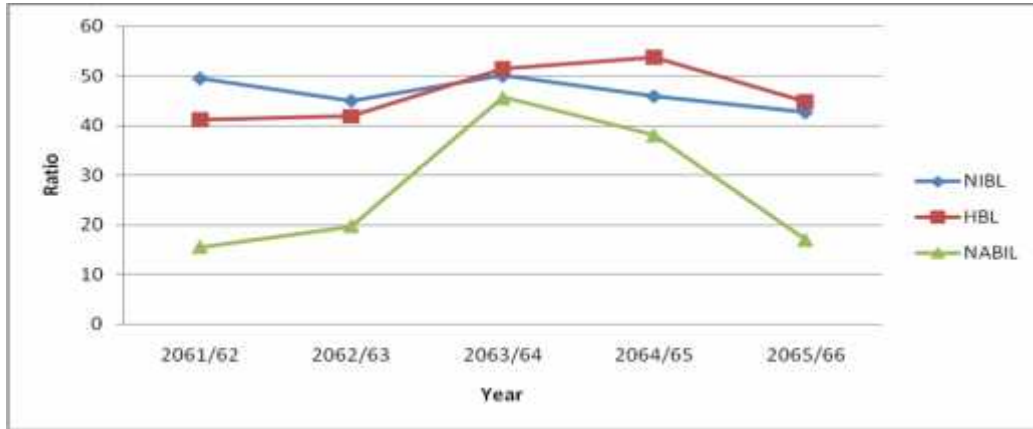
4.2.5 Total Investment to Total Deposit Ratio

This ratio is used to find out the ratio of total investment to total deposits. The ratio can be computed by using following formula:

Total Investment to Total Deposit Ratio $= \dfrac{\text{Total Investment}}{\text{Total Deposit}} \mid 100$

Table: 4.5

Comparative Analysis of Total Investment to Total Deposit Ratio

Ratio in Percent

Year	Banks		
	NIBL	**HBL**	**NABIL**
2061/62	27.60	47.12	29.31
2062/63	29.60	41.10	31.94
2063/64	26.57	39.35	38.32
2064/65	19.95	41.89	31.15
2065/66	15.45	25.12	28.99
Mean(x)	**23.83**	**38.92**	**31.94**
SD( )	**5.30%**	**7.37%**	**3.37%**
C.V.	**0.22**	**0.19**	**0.11**

Source: Annual Reports of Concern Banks (2009).

From the table 4.5, it is observed that NIBL has invested only 23.23% of total deposit in average during the study period. The highest ratio of total investment to total deposit is 29.60% in the year 2062/63 and the lowest ratio is 15.45% in the year 2065/66. The ratio of total investment to total deposit is heading downward slope deviating by 5.30% from the average ratio 23.83% . The data of HBL shows that the average investment to total deposit ratio is 38.92%. It is in fluctuating trend deviating by 7.37% form average ratio. The highest investment to total deposit ratio is 47.12% in the year 2061/62 and lowest ratio is 25.12% in FY 2065/66. The ratio of NABIL is also fluctuating trend deviating 3.37% from the average ratio of 31.94%. Since its CV is 0.11 it is inconsistent to average ratio.

Among these three banks HBL is in strong position in investment to total deposit ratio. It has invested more than 47.12% in 2061/62. Its average investment ratio is 38.92%. The investment position of NIBL is low than two bank. HBL and NABIL are in satisfactory level. The trends of ratio can be seen in Diagram clearly.

Figure: 4.5

Comparative Analysis of Total Investment to Total Deposit Ratio
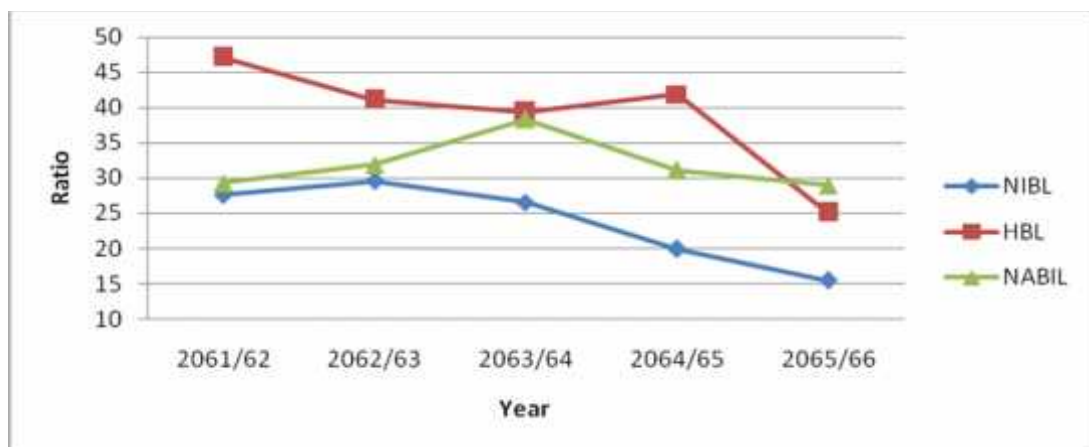
4.2.6 Loans and Advances and to Total Deposit

This ratio measures the portion of Loans and Advances on total deposit. It is also called C/D ratio in banking language. It clarifies how much percentage of the total deposits is invested to loans and advances. It is computed by dividing Loans, Advances and Bills Purchased by Total Deposit and formula is;

$$\text{Loans and Advance to Total Deposit} = \frac{\text{Loans and Advances}}{\text{Total Deposit}} \mid 100$$

Table: 4.6

Comparative Analysis of Loans and Advances to Total Deposit Ratio

Ratio in Percent

Year	Banks		
	NIBL	**HBL**	**NABIL**
2061/62	71.03	50.07	72.57
2062/63	67.50	55.28	66.80
2063/64	70.59	56.57	66.60
2064/65	78.36	61.23	66.94
2065/66	77.61	71.49	73.87
Mean(x)	**73.02**	**58.93**	**69.36**
SD( )	**4.24%**	**7.21%**	**3.18%**
C.V.	**0.06**	**0.12**	**0.05**

Source: Annual Reports of Concern Banks (2009).

Table 4.6, it is observed that NIBL has invested 73.02% of total deposit in average during the study period. The highest ratio of loans and advances to total deposit is 78.36% in the year 2064/65 and the lowest ratio is 67.50% in the year 2062/63. The ratio loans and advances to total deposit is heading upward slope deviating by 4.24% from the average ratio 73.02%. The data of HBL shows that the average loans and advances to total deposit ratio is 58.93%. It is in fluctuating trend deviating by 7.21% form average ratio. The highest Loans and advances to total deposit ratio is 71.49% in the year 2065/66 and lowest ratio is 50.07% in FY 2061/62. The ratio of NABIL is also fluctuating in first three year and almost constant after that year deviating 3.18% from the average ratio of 69.36%. The CV of NIBL, HBL and NABIL is 0.06, 0.12 and 0.05 respectively. It indicates that HBL has slightly inconsistent amongst the three banks.

Among these three banks NIBL has invested more in loans and advances to total deposit ratio. It has invested more than 73.02% in average which indicates low liquidity position of the bank and increase profitability. The loans and advance ratio of HBL is low than two bank. The trends of ratio can be seen in Diagram clearly.

Comparative Analysis of Loans and Advance to Total Deposit Ratio
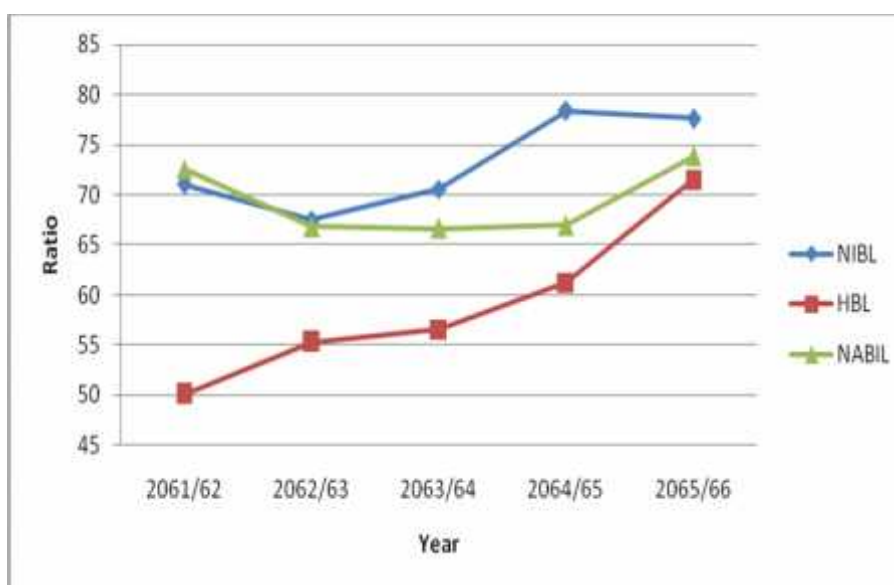
4.2.7 Balance with NRB to Total Deposit Ratio

Nepal Rastra Bank (NRB), the central bank, is the regulatory body of all the commercial banks. In order to enable the smooth functioning of the commercial banks, NRB has compelled them to hold a certain percentage of their total deposit as a reserve. This is particularly done in order to maintain the strength of commercial banks regarding the liquidity position. This ratio is calculated by using the following formula:

$$\text{Balance with NRB to Total Deposit Ratios} = \frac{\text{Balance with NRB}}{\text{Total Deposit}} | 100$$

Comparative Analysis of Balance with NRB to Total Deposit Ratio

Ratio in Percent

Year	Banks		
	NIBL	**HBL**	**NABIL**
2061/62	5.47	6.46	2.67
2062/63	8.06	4.14	1.64
2063/64	5.64	4.24	4.77
2064/65	5.28	2.94	5.73
2065/66	9.45	6.71	7.09
Mean(x)	**6.78**	**4.90**	**4.38**
SD( )	**1.68%**	**1.45%**	**1.99%**
C.V.	**0.25**	**0.30**	**0.45**

Source: Annual Reports of Concern Banks (2009).

Table 4.7 shows that the ratios of all the banks are fluctuated. The average ratio of the balance with NRB to total deposit of NIBL is 6.78 %. The highest ratio is 9.45% in the year 2065/66, The ratio is in fluctuating trend and the lowest ratio is 5.28% in the year 2064/65. The ratios of balance with NRB to total deposit of HBL are decreasing in first four year than others. The highest ratio is 6.71% in the year 2065/66 which is highest of that year and the lowest ratio is 2.94% in 2064/65 which is lowest for the year. The average ratio is 4.90%. NABIL has maintained lowest ratio amongst three banks and are fluctuating from year to year. The highest ratio during period is 7.09% in FY 2065/66 and lowest in FY 2062/63 is 1.64% deviating 1.99% from the average of 4.38%. The CV of NABIL is 0.45, it is seen as highly inconsistent of the ratios to average ratio. The CV of HBL is 0.30 and it is also inconsistent to average ratio during the study period. The average ratio of NIBL is high i.e. 6.78% during the study period. With the help of the above figure it can be seen more clearly.

Figure: 4.7

Comparative Analysis of Balance with NRB to Total Deposit Ratio
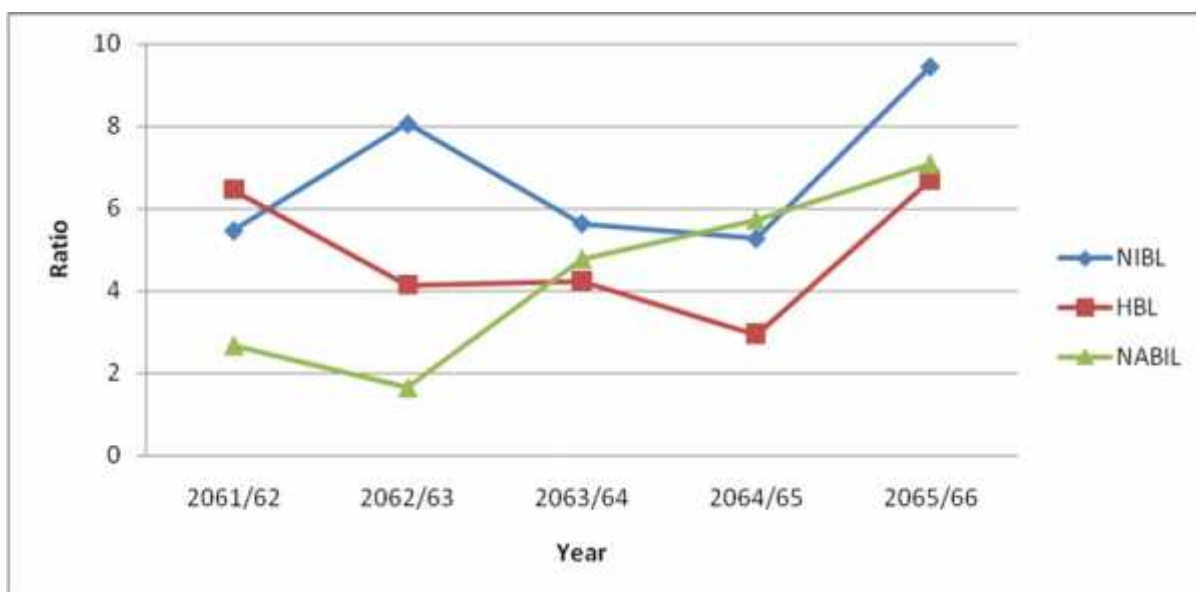
4.2.8 Cash Reserve Ratio (CRR)

Commercial banks are directed by Nepal Rastra Bank, the central bank to maintain certain percentage of their deposits liabilities with NRB in own account in order to enable them to maintain the sound liquidity position. Cash reserve ratio (CRR) describes whether the commercial banks have met the liquidity requirement as prescribed by NRB or not. In 2003 NRB issued notice in monetary policy and prescribed CRR rate as   6% of total deposit but it was revised in 2004 as 5% of total deposit. Since 2003 NRB has withdrawn the other reserve ratio for liquidity purpose like statutory liquidity ratio. Presently commercial banks have to maintain 5.5% of their total deposit in NRB and own in hand. It is computed by dividing the cash reserve of commercial banks by total deposit and the formula is:

$$\textbf{Cash Reserve Ratio (CRR)} = \frac{\text{NRB balance (Lcy only)}}{\text{Lcy Deposits - Margin Deposit}} \vert 100$$

Table: 4.8

Comparative Analysis of Cash Reserve Ratio (CRR)

Ratio in Percent

Year	Banks		
	NIBL	**HBL**	**NABIL**
2061/62	9.78	7.86	3.83
2062/63	13.61	5.92	3.26
2063/64	10.47	5.92	6.00
2064/65	10.91	5.13	8.37
20065/66	10.32	6.76	9.03
Mean(x)	**11.02**	**6.32**	**6.10**
SD( )	**1.35%**	**0.93%**	**2.32%**
C.V.	**0.12**	**0.15**	**0.38**

Source: Annual Reports of Concern Banks (2009).

Table 4.8, it is portrayed that the ratios of CRR are in fluctuating trend in all banks. The average CRR of each bank is more than the standard set by NRB i.e. 5.5%. This shows that each bank has tied up their fund in excess deposit in NRB, other banks and hold in cash, which ultimately affects the profitability negatively. The average ratios of NIBL, HBL and NABIL are 11.02%, 6.32% and 6.10% respectively. In average all banks are in strong liquidity position, further more the CVs NIBL, 0.12 reveals the better consistency to ratios during the study period than of HBL and NABIL of 0.15 and 0.38 respectively. With the help of the above figure it can be seen more clearly.

Figure: 4.8

Comparative Analysis of Cash Reserve Ratio (CRR)
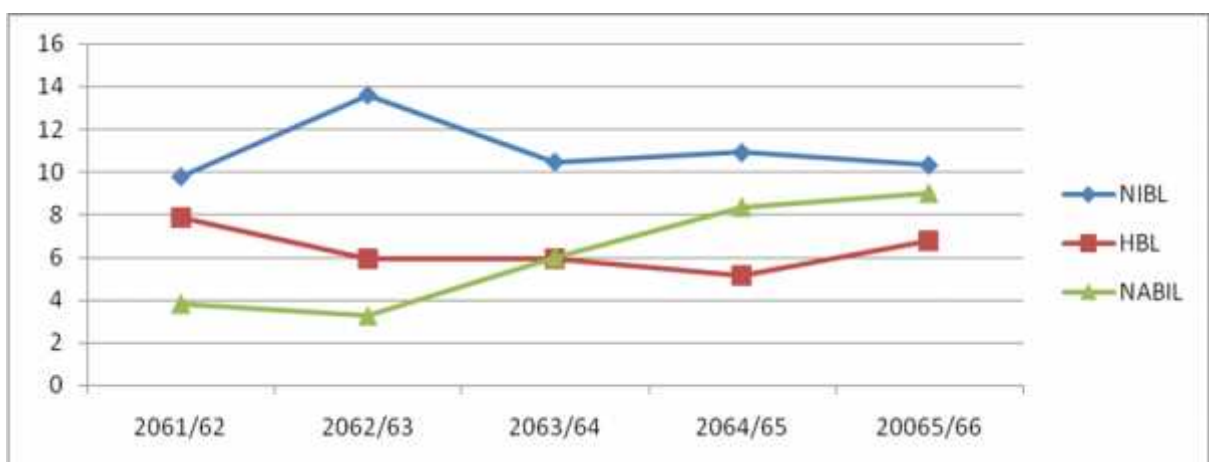
4.2.9 Balance with NRB to Current Deposit Ratio

This ratio presents the portion of balance with NRB on current deposit. It is used to measure the liquidity position of commercial banks and capacity to pay depositors amount promptly. This ratio can be calculated by using the following formula:

Balance with NRB to Current Deposit Ratio= $\dfrac{\text{Balance with NRB}}{\text{Current Deposit}} \mid 100$

Table: 4.9

Comparative Analysis of Balance with NRB to Current Deposit Ratio

Ratio in Percent

Year	Banks		
	NIBL	**HBL**	**NABIL**
2061/62	49.27	31.79	13.93
2062/63	89.45	21.80	10.92
2063/64	63.49	22.77	32.78
2064/65	57.98	19.57	34.61
2065/66	117.41	72.34	48.33
Mean(x)	**75.52**	**33.65**	**28.11**
SD( )	**24.86%**	**19.79%**	**13.92%**
C.V.	**0.33**	**0.59**	**0.50**

Source: Annual Reports of Concern Banks (2009).

Table and figure 4.9, it is clearly observed the comparative ratio of balance with NRB to current deposit ratio of NIBL, HBL and NABIL banks. By these figure, it has been seen that the ratio of all banks are in fluctuating trend. The average ratios are 75.52%, 33.65% and 28.11% respectively which implies that out of current deposit banks has deposited in NRB and it shows the strong liquidity position of NIBL and comparatively low liquidity position of HBL and NABIL. The ratios of NABIL are inconsistent to the average ratio. But CV of HBL is consistent in comparison to both banks, NABIL is poor in liquidity position, with the help of the above figure, it can be seen more clearly.

Comparative Analysis of Balance with NRB to Current Deposit Ratio
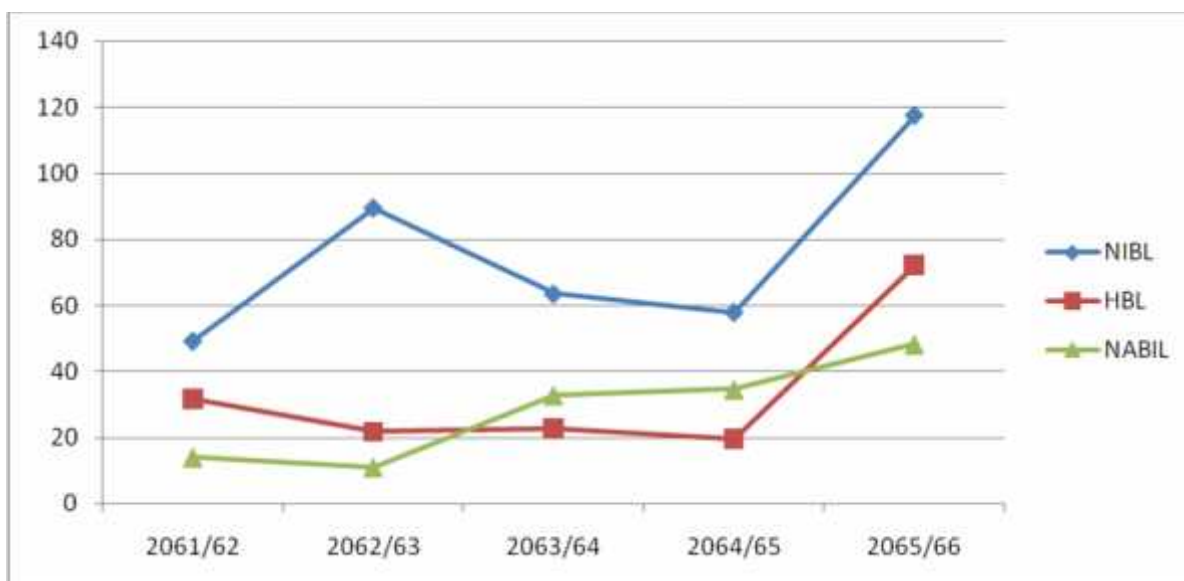
4.2.10 Investment on Government Securities to Total Deposit Ratio

This ratio shows the percentage of investment on government securities on total deposit. It presents that how much funds are invested on government securities of total deposit of commercial banks. This ratio is computed by using the following formula:

Investment on Government Securities to Total Deposit Ratio =

$$\frac{\text{Investment on Government Securities}}{\text{Total Deposit}} \mid 100$$

Table: 4.10

Comparative Analysis of Investment on Government Securities to Total Deposit Ratio

Ratio in Percent

Year	Banks		
	NIBL	**HBL**	**NABIL**
2061/62	13.67	22.04	16.55
2062/63	13.47	19.42	11.89
2063/64	13.30	21.48	20.60
2064/65	9.16	23.47	14.56
2065/66	5.42	12.14	9.92
Mean(x)	**11**	**19.71**	**14.70**
SD( )	**3.26%**	**4%**	**3.71%**
C.V.	**0.30**	**0.20**	**0.25**

Sources: Annual Reports of Concern Banks (2009).

Table 4.10 shows that the investment on government securities to total deposit ratio of all banks are fluctuating in trend. In context of NIBL it has decreasing trend in ratio since last five years. In context of HBL, it has fluctuating trend on their funds to investment on government securities and decreasing trend in NIBL and NABIL. The ratio of NIBL is the highest in 2061/62 i.e. 13.67% and decrease to 5.42% in 2065/66. HBL is investing in Government securities 22.04% and decreased to 12.14% in FY 2065/66 with an average of 19.71%. It is depicted that HBL has used its total deposit in investment on government securities, which is secure and non-risky. By this, HBL can gain more profitability as compared to others. As its CV is 0.20 it is relatively consistent but lesser than NIBL and NABIL of 0.30 and 0.25 respectively. In comparison to all banks the ratio of NABIL is inconsistent to average ratio. With the help of the above figure, it can be seen more clearly.

Figure: 4.10

Comparative Analysis of Investment on Govt. Securities to Total Deposit Ratio
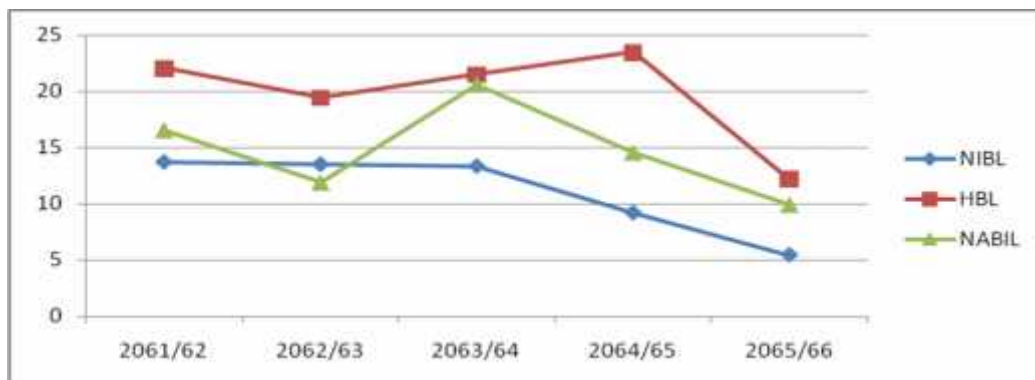
4.2.11 Cash in Vault to Current Deposit Ratio

This ratio is designed to measure the portion of cash in vault on current deposit. This ratio presents the cash position in vault as compare to current deposit which shows the liquidity position of banks. This ratio is computed as follows:

$$\text{Cash in Vault to Current Deposit Ratio} = \frac{\text{Cash in Vault}}{\text{Current Deposit}} \mid 100$$

<div align="center">

Table: 4.11

Comparative Analysis of Cash in Vault to Current Deposit Ratio

</div>

<div align="right">

Ratio in Percent

</div>

Year	Banks		
	NIBL	**HBL**	**NABIL**
2061/62	23.63	5.69	5.22
2062/63	33.00	6.07	8.18
2063/64	35.13	3.17	7.95
2064/65	46.64	5.81	9.67
2065/66	48.79	14.73	12.30
Mean(x)	**37.44**	**7.09**	**8.66**
SD( )	**9.21%**	**3.96%**	**2.32%**
C.V.	**0.25**	**0.56**	**0.27**

Source: Annual Reports of Concern Banks (2009).

Table 4.11 shows that cash in vault to current deposit ratio of NIBL is in increasing trend. The average ratio of NIBL is 37.44% and it is seen that the ratio is increased from FY 2061/62 with 23.63% to FY 2065/66 with 48.79% during the study period. The C.V. 0.25 depicts the inconsistency of ratios to average ratio. The ratio of HBL is 7.09% in average and this is the lowest ratio among the sampled banks. Comparatively the ratio 48.79% of NIBL is the highest ratio among all. The average ratio of NABIL is 8.66% and is relatively higher than HBL but lower than NIBL. As compared with among sampled banks the liquidity position of NIBL is strong which depicts the capacity of prompt payment to current depositors but at the same time idle cash balance decrease the profitability. The liquidity position of HBL and NABIL is too low i.e. 7.09% and 8.66% respectively in average, which may arise liquidity scarce to the banks. With the help of the above figure it can be seen more clearly.

<div align="center">

Figure: 4.11

Comparative Analysis of Cash in Vault to Current Deposit Ratio.

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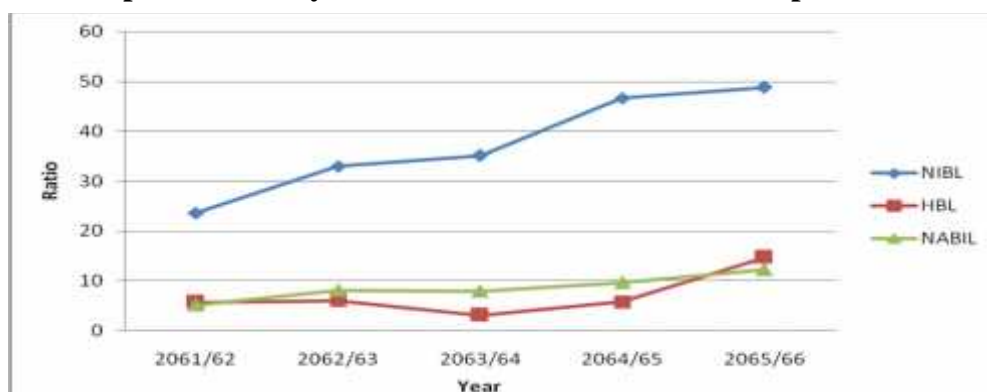
4.2.12 Capital Adequacy ratio (CAR)

It is a test of capital adequacy in banks. All banks should maintain CAR with minimum of 11 percent (FY 2065/66). But in FY 2066/67 it is reduced into 10 percent. All assets like loan and advances, Money at call, fixed assets and other assets are in its own risk. The category is specified by NRB. It measures the adequate capital in bank. It is the sum of core capital and supplementary capital. The capital is defined under TIER I and TIER II. Under TIER I, all capital is used in specified purpose. And under TIER II, this type of capital can be used for various purpose. The ratio can be calculated by using following formula:

$$\text{Capital Adequacy Ratio (CAR)} = \frac{\text{Total Capital fund}}{\text{Total Risk Weighted Assets}}$$

Table: 4.12
Comparative Analysis of Capital Adequacy Ratio

Ratio in Percent

Year	Banks		
	NIBL	**HBL**	**NABIL**
2061/62	11.58	11.01	12.44
2062/63	11.97	11.26	12.31
2063/64	12.17	12.11	12.04
2064/65	11.28	12.70	11.10
2065/66	11.24	11.02	10.70
Mean($\overline{X}$)	**11.65**	**11.62**	**11.72**
SD( )	**0.37%**	**0.67%**	**0.69%**
C.V.	**0.03**	**0.06**	**0.06**

Source: Annual Reports of Concern Banks (2009).

Table 4.12 shows that Capital Adequacy Ratio of all banks. All banks should maintain CAR ratio. NRB has strictly directed by its directive year by year. Year by year NRB changes its policy according to need to survive financial institution. In context of sampled commercial banks all banks have maintained CAR ratio except NABIL fail to maintain CAR in last year of study with 10.70%.which is less than NRB requirements with 0.30%. NIBL maintained in increasing trend for first two year of study then it started decreasing in FY 2064/65 and in 2065/66 with average of 11.65% and deviation with less than 1 i.e. 0.37%. .In context of HBL it increased its CAR for first four year in last year CAR is decreased to 11.02% with average 11.62%. In

context of NABIL it has decreasing trend since five year of study. In fy 2061/62 it had 12.44% of CAR which is highest in sampled banks in five year of study with average of 11.72%. Even NABIL has highest average of CAR with 11.72% it failed to maintain CAR in last year of study. The CV of CAR of NIBL, HBL and NABIL is 0.03, 0.06 and 0.06 respectively which indicate that NIBL is less variable than others. With the help of the above figure it can be seen more clearly.

Figure: 4.12
Comparative Analysis of Capital Adequacy Ratio
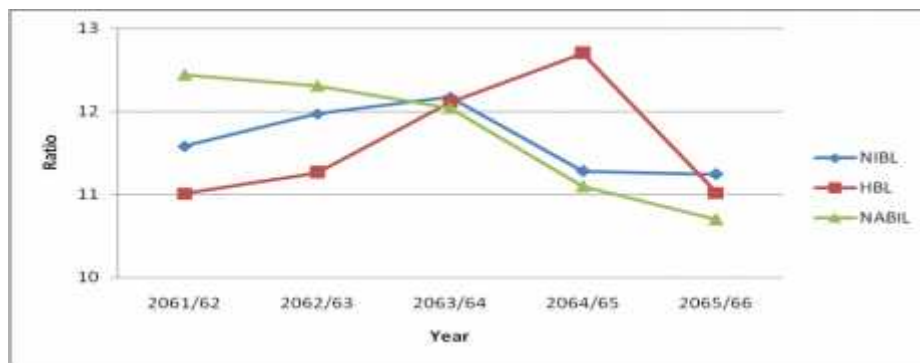
4.3 Least Square Linear Trend Analysis

Trend analysis has been a very useful and commonly applied statistical tool to forecast the future events in quantitative terms. On the basis of tendencies in the dependent variables in the past periods, the future trend is predicted. This analysis takes the historical data as the basis of forecasting. This method of forecasting the future trend is based on the assumptions that the past tendencies of the variable are repeated in the future or the past events affect the future events significantly.

The future trend is forecasted by using the following formula:

$$Y_c = a + bx$$

where,

Y_c = the dependent variable

a = the origin i. e. arithmetic mean

b = the slope coefficient i. e. rate of change

x = the independent variable

4.3.1 Trend Analysis of Total Deposit

Under this topic, an effort has been made to calculate the trend value of total deposit of NIBL, HBL, and NABIL with comparatively under five years study period and project the trend for next two years.

The following table describes the trend values of total deposit of sampled banks for seven years.

Table: 4.13

Comparative Trend Analysis of Total Deposit

In Million

Year	Banks		
	NIBL	**HBL**	**NABIL**
2061/62	11,682.00	24,558.20	13,689.80
2062/63	19,723.10	27,066.80	19,498.80
2063/64	27,764.20	29,575.40	25,307.80
2064/65	35,805.30	32,084.00	31,116.80
2065/66	43,846.40	34,592.60	36,925.80
2066/67	51,887.50	37,101.20	42,734.80
2067/68	59,928.60	39,609.80	48,543.80
Mean (a)	**27,764.20**	**29,575.40**	**25,307.80**
Rate of change (b)	**8,041.10**	**2,508.60**	**5,809**
Trend equation (y)	**27764.20+8041.10x**	**29575.40+2508.60x**	**25307.80+5809x**

Source: Annual Reports of Concern Banks (2009).

The above table shows that the trend line of total deposit is in increasing trend in all sampled banks. Comparatively the slope of equation of NIBL is high and its trend line is sloping upward rapidly and following by NABIL and HBL respectively. If other things remaining the same, the amount of Total Deposit of NIBL, HBL, and NABIL will be 59,928.60, 39,609.80 and 48,543.80 respectively in the year 2067/68.

Trend line of Total Deposit of sampled banks is presented below.

Figure: 4.13

Comparative Trend Analysis of Total Deposit
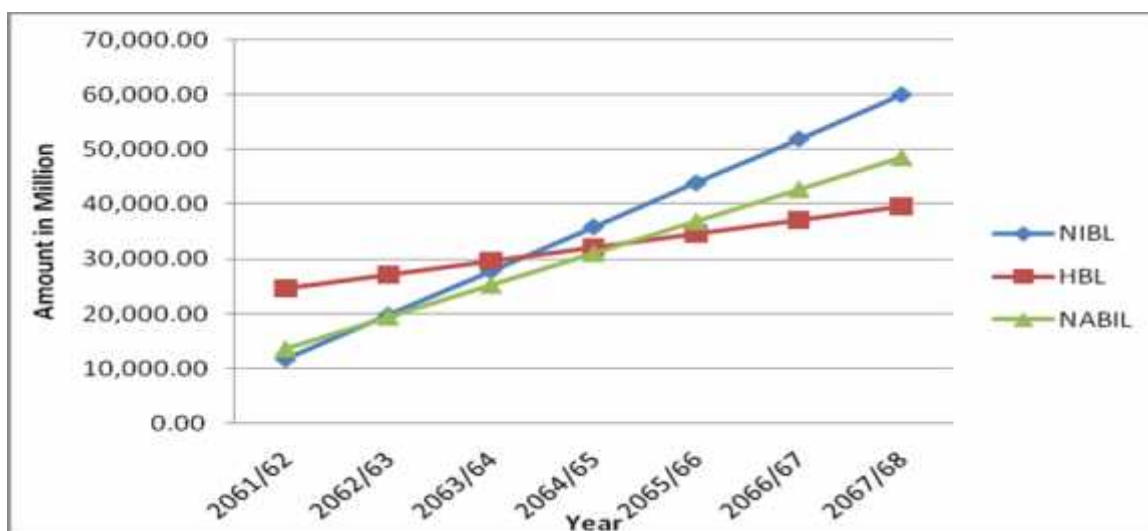
4.3.2 Trend Analysis of Total Investment

Under this topic, an effort has been made to calculate the trend value of total
Investment of NIBL, HBL, and NABIL with comparative under five years study
period and project the trend for next two years.

The following table describes the trend values of Total Investment of sampled banks
for seven years.

Table: 4.14

Comparative Trend Analysis of Total Investment

In Million

Year	Banks		
	NIBL	**HBL**	**NABIL**
2061/62	4,422.80	11,993.20	4,661.00
2062/63	5,243.10	11,642.10	6,347.10
2063/64	6,063.40	11,291.00	8,033.20
2064/65	6,883.70	10,939.90	9,719.30
2065/66	7,704.00	10,588.80	11,405.40
2066/67	8,524.30	10,237.70	13,091.50
2067/68	9,344.60	9,886.60	14,777.60
Mean (a)	**6,063.40**	**11291**	**8033.20**
Rate of change (b)	**820.30**	**-351.10**	**1686.10**
Trend equation (y)	**6063.40+820.30x**	**11291-351.10x**	**8033.20+1686.10x**

Source: Annual Reports of Concern Banks (2009).

Table 4.14, depicts that the total investments of sampled banks are in increasing trend. The slope of equation of NABIL is high and its trend line is upward sloping than NIBL but total investment of HBL is in decreasing trend. The slope of equation of HBL is downward sloping. .

If other things remaining the same the expected total investment of NIBL, HBL, and NABIL will be 9344.60, 9866.60 and 14777.60 respectively in the year 2067/68.

Trend lines of total investment of sampled banks are shown below.

Figure: 4.14

Comparative Trend Analysis of Total Investment
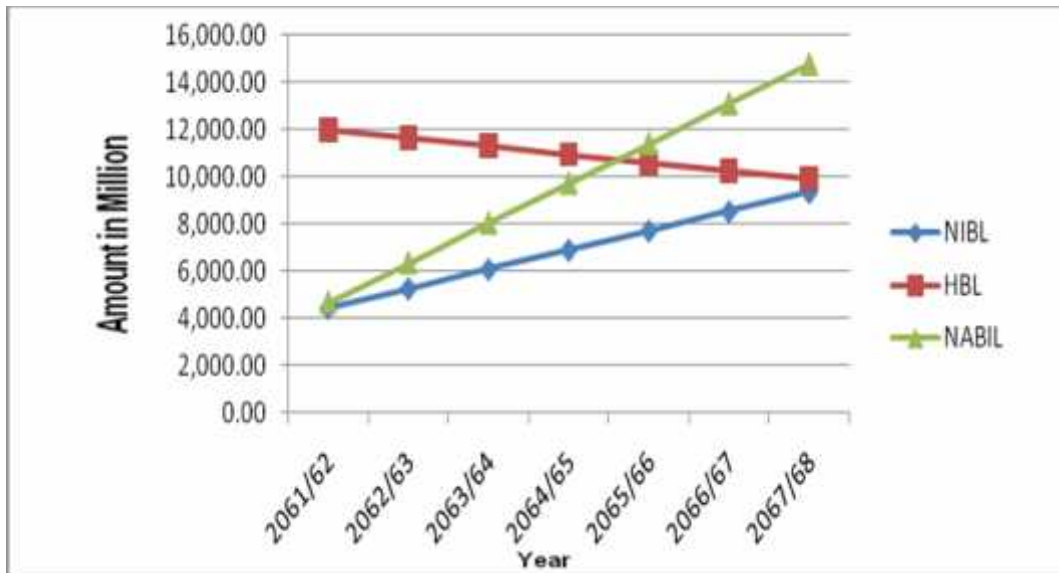
4.3.3 Trend Analysis of Loans and Advances

Under this topic an attempt has been made to analyze the trend of short loans, advances and bills purchased of sampled banks with comparative under five years study period and project the trend value for next two years. The following table describes the trend value of loans, advances and bills purchased of sampled banks for seven years.

Table: 4.15

Comparative Trend Analysis of Loans and Advances

In million

Year	Banks		
	NIBL	**HBL**	**NABIL**
2061/62	7,395.00	11,722.90	9,112.00
2062/63	14,040.10	14,682.00	13,357.00
2063/64	20,685.20	17,641.10	17,602.00
2064/65	27,330.30	20,600.20	21,847.00
2065/66	33,975.40	23,559.30	26,092.00
2066/67	40,620.50	26,518.40	30,337.00
2067/68	47,265.60	29,477.50	34,582.00
Mean (a)	**20,685.20**	**176,41.40**	**17,602**
Rate of change (b)	**6645.10**	**2959.10**	**4245**
Trend equation (y)	**20685.20+6645.10x**	**17641.40+2959.10x**	**17602+4245x**

Source: Annual Reports of Concern Banks (2009).

Table 4.15 shows that the loans, advances and bills purchased of sampled banks are in increasing trend. The rate of change of NIBL is higher, i.e. 6645.10, than NABIL and HBL of 4245 and 2959.10 respectively.

If other things remaining the same the expected total investment of NIBL, HBL, and NABIL will be 47265.60, 29477.50 and 34582 respectively in the year 2067/68.Trend line of loans, advances and bills purchased of sampled banks are shown as follows.

Figure: 4.15

Trend Analysis of loans and advances
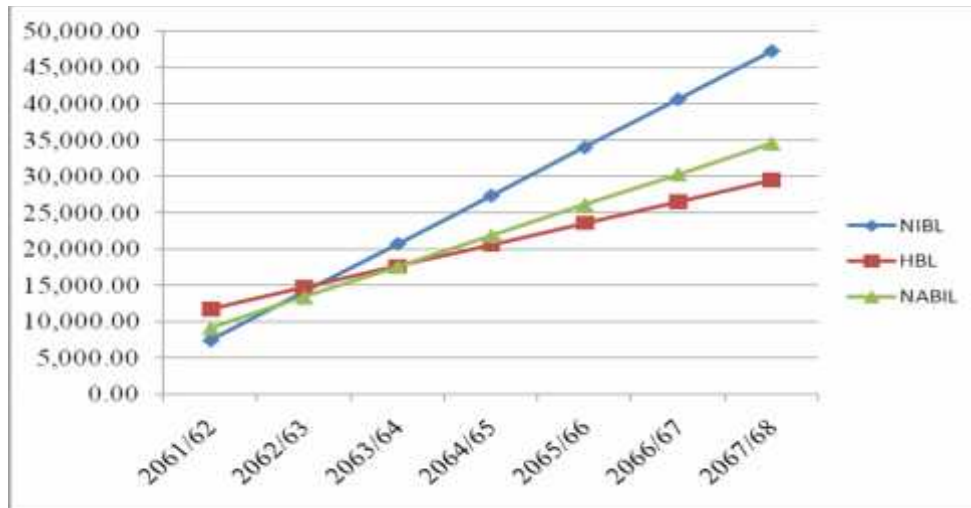
4.3.4 Trend Analysis of Cash & Bank Balance Ratio

Under this topic an attempt has been made to analyze the trend of Cash & Bank Balance Ratio of sampled banks with comparative under five years study period and project the trend value for next two years. The following table describes the trend value of cash & Bank Balance Ratio of sampled banks for seven years.

Table: 4.16

Comparative Trend Analysis of Cash & Bank Balance Ratio

Ratio in percent

Year	Banks		
	NIBL	**HBL**	**NABIL**
2061/62	9.17	6.88	3.00
2062/63	10.54	6.82	4.55
2063/64	11.91	6.76	6.10
2064/65	13.28	6.70	7.65
2065/66	14.65	6.64	9.20
2066/67	16.02	6.58	10.75
2067/68	17.39	6.52	12.30
Mean (a)	**11.91**	**6.76**	**6.10**
Rate of change (b)	**1.37**	**(0.06)**	**1.55**
Trend equation (y)	**11.91+1.37x**	**6.76-0.06x**	**6.10+1.55x**

Source: Annual Reports of Concern Banks (2009).

Table 4.16, shows that Cash & Bank Balance Ratios of sampled commercial banks are in increasing trend except HBL. The rate of change of NABIL is higher, i.e. 1.55 than NIBL and HBL of 1.37 and (0.06) respectively.

If other things remaining the same the expected Cash & Bank Balance Ratio of NIBL, HBL, and NABIL will be 17.39, 6.52 and 6.10 respectively in the year 2067/68.

Trend line of Cash & Bank Balance Ratio of sampled commercial banks are shown as follows.

Figure: 4.16

Trend Analysis of Cash & Bank Balance Ratio
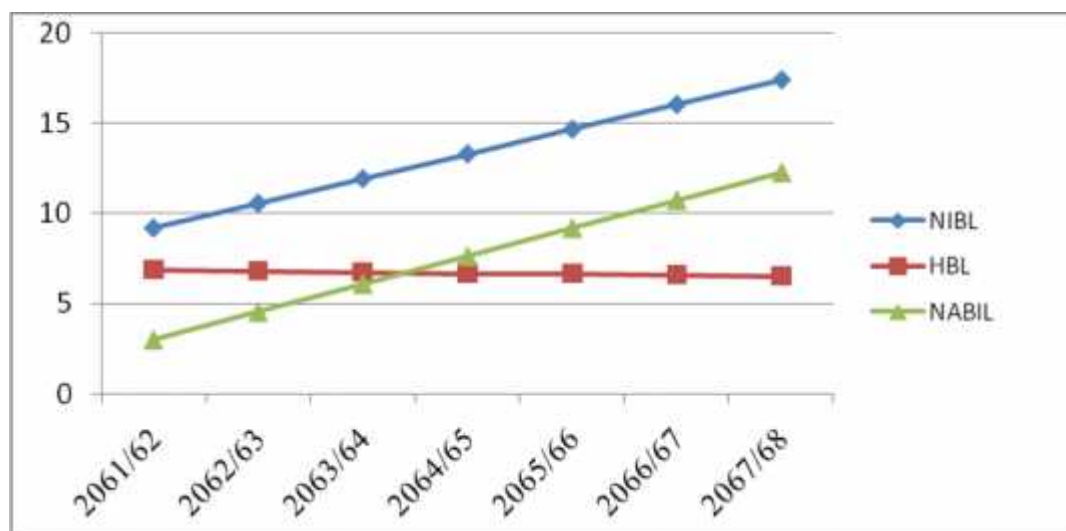
4.3.5 Trend Analysis of CRR Ratio

Under this topic an attempt has been made to analyze the trend of CRR Ratio of sampled banks with comparative under five years study period and project the trend value for next two years. The following table describes the trend value of CRR Ratio of sampled banks for seven years.

Table: 4.17

Comparative Trend Analysis of CRR Ratio

Ratio in percent

Year	Banks		
	NIBL	**HBL**	**NABIL**
2061/62	11.34	6.92	3.00
2062/63	11.18	6.62	4.55
2063/64	11.02	6.32	6.10
2064/65	10.86	6.02	7.65
2065/66	10.70	5.72	9.20
2066/67	10.54	5.42	10.75
2067/68	10.38	5.12	12.30
Mean (a)	**11.02**	**6.32**	**6.10**
Rate of change (b)	**(0.16)**	**(0.30)**	**1.55**
Trend equation (y)	**11.02-0.16x**	**6.32-0.30x**	**6.10+1.55x**

Source: Annual Reports of Concern Banks (2009).

Table 4.17, it has been found that CRR Ratios of NIBL and HBL is in decreasing trend and NABIL is in increasing trend. The rate of change of NIBL and HBL is (0.16) and (0.30) respectively downward sloping and the ratio is lower than NRB's requirement. NABIL is in upward sloping which has significantly higher and NABIL has slightly high than the NRB requirement.

If other things remaining the same the expected CRR Ratio of NIBL, HBL, and NABIL will be 10.38, 6.32 and 12.30 respectively in the year 2067/68. Trend line of CRR Ratio of sampled banks are shown as follows.

Figure: 4.17

Trend Analysis of CRR Ratio
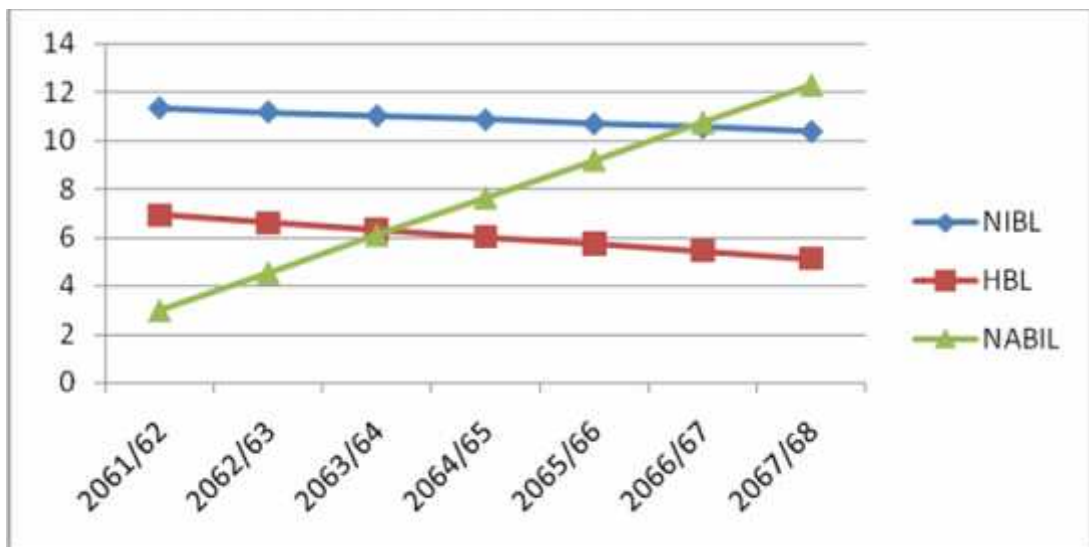
4.4 Coefficient of Correlation Analysis

Correlation coefficient measures the degree of relationship from –1 to +1. If correlation is +1, there is perfect positive correlation. If correlation coefficient is –1, there is perfect negative correlation. Perfect negative correlation coefficient can eliminate risk.

Interpretation of Correlation Coefficient

Degree	Direction	
	Positive	Negative
Perfect	+1	-1
Significant (very high)	+0.75 to +1	-0.75 to -1
High	+0.25 to +0.75	-0.25 to -0.75
Low	+0.25 to +0.50	-0.25 to -0.50
Insignificant (very low)	0 to +0.25	0 to -0.25
Absent	0	0

Source: Sthapit, Gautam, Joshi and Dangol (2004) Statistical Methods,Shangrila Printing Service, KTM

To find out the correlation between Total Deposit and Total Investment, Karl Pearson's co-efficient of correlation is determined. Karl Pearson's co-efficient of correlation is the most commonly used measure of the relationship between two or more two variable. The value of co-efficient of correlation denoted by 'r' and it always lies between +1and -1. +1 indicate that there is perfectively positively correlated and -1 indicate perfectively negative correlated.

One very convenient and useful way of interpreting the value of coefficient of correlation(r) between the two variables is coefficient of determination, which is denoted by r^2. It explains the total variation in dependent variable is explained by independent variable.

The significant of coefficient of correlation (r) is tested with the help of probable error of 'r' (i.e. P.E). If coefficient of correlation 'r' is less than probable error 'P.E.', it is insignificant. So, perhaps there is no evidence of correlation. If coefficient of correlation 'r' is greater than six times of probable error 'P.E.(r), it is significant and the other cases, nothing can be concluded.

4.4.1 Relationship between Deposit and Investment

Coefficient of correlation measures the degree of relationship between other two variables, deposit and total investment. Deposit is independent variable (X) and total investment is dependent variable (y). The purpose of computing it is to find out whether deposit is significantly used is investment or not.

Table 4.18

Correlation between Deposit and Total Investment

Banks	NIBL	HBL	NABIL
r	0.88	-0.33	0.95
r2	0.77	0.11	0.90
P.E.(r)	0.06	0.25	0.04
6 P.E.(r)	0.42	1.61	0.18

Source: Annual Reports of Concern Banks (2009).

Table-4.18 shows the value of coefficient of correlation(r) of NIBL, HBL and NABIL are 0.88, -0.33 and 0.95 respectively which shows that there is very high positive correlation between Deposit and Total Investment except HBL, it has low negative correlation between deposit and investment and the value of coefficient of determination (r2) is 0.77, 0.11 and 0.90 which shows that 77%, 11% and 90% of the total variation in dependent variable (Investment) is explained by independent variable (Deposit).

The coefficient of correlation 'r' of NIBL and NABIL is greater than six times of probable error 'P.E.(r) (i.e. 0.88>0.42) and P.E.(r) i.e. 0.95> 0.18 respectively, therefore it reveals that the relationship between Deposit and Total Investment is significant. From table 4.18 correlation coefficient of HBL is negative i. e. -0.33 < 1.61, therefore it reveals that the relationship between Deposit and Total Investment is low HBL.

4.4.2 Relationship Between Deposit and Loan and Advances

It measures the intensity or magnitudes or degree of relationship between the two variables, Deposit and Loans and Advances. In the analysis deposit is independent variable(x) and loan and advances is dependent variable (y). The purpose of computing coefficient of correlation(r) between the two variables is to justify whether deposit is significantly used as loan and advances or not.

Table 4.19

Correlation between deposit and Loan and Advances

Banks	NIBL	HBL	NABIL
r	1.00	0.98	0.99
r2	0.99	0.96	0.98
P.E.(r)	0.00	0.01	0.01
6 P.E.(r)	0.01	0.07	0.04

Source: Annual Reports of Concern Banks (2009).

Table-4.19, shows the value of coefficient of correlation(r) of NIBL, HBL and NABIL are 1.00, 0.98 and 0.99 respectively which shows that there are prefect positive correlation between Deposit and Loan and Advances in NIBL and highly positive correlation in HBL and NABIL, and the value of coefficient of determination (r2) is 0.99, 0.96 and 0.98 which shows that 99%, 96% and 98% of the total variation in dependent variable (Loans and Advances) is explained by independent variable (Deposit).

The coefficient of correlation 'r' of NIBL, HBL and NABIL is greater than six times of probable error 'P.E.(r) i.e. 1.00 > 0.01, 0.98 > .07 and 0.99 > .04, therefore it reveals that the relationship between Deposit and Total Investment is significant.

4.4.3 Relationship Between Deposit and Cash & Bank Balance

It measures the intensity or magnitudes or degree of relationship between the two variables, Deposit and Cash & Bank Balance. In the analysis deposit is independent variable(x) and cash & bank balance is dependent variable (y). The purpose of

computing coefficient of correlation(r) between the two variables is to justify whether deposit is significantly used as cash & bank balance or not.

Table 4.20

Correlation between deposit and cash & bank balance

Banks	NIBL	HBL	NABIL
r	0.96	0.48	0.99
r2	0.92	0.23	0.98
P.E.(r)	0.02	0.23	0.01
6 P.E.(r)	0.14	1.39	0.04

Source: Annual Reports of Concern Banks (2009).

From the Table-4.20, the values of coefficient of correlation(r) of NIBL, HBL and NABIL are 0.96, 0.48 and 0.99 respectively which shows that there are prefect positive correlation between Deposit and Total Investment. In the case of NIBL and NABIL very high positive correlation and HBL with high positive correlation, and the value of coefficient of determination (r2) is 0.92, 0.23 and 0.98 which shows that 92%, 23% and 98% of the total variation in dependent variable (cash & bank balance) is explained by independent variable (Deposit).

The coefficient of correlation 'r' of NIBL and NABIL is greater than six times of probable error 'P.E.(r) i.e. 0.96 > 0.14, and 0.99 > .04, e therefore it reveals that the relationship between Deposit and cash & bank balance is significant but in the case of HBL coefficient of correlation 'r' of HBL is less than six times of probable error i.e. 0.48<1.39 it shows that the relation between deposit and cash & bank balance is not significant.

4.4.4 Relationship between Deposit and Investment in Govt. Securities

It measures the intensity or magnitudes or degree of relationship between the two variables, Deposit and Investment in Govt. Securities. In the analysis deposit is independent variable(x) and Investment in Govt. Securities is dependent variable (y). The purpose of computing coefficient of correlation(r) between the two variables is to justify whether deposit is significantly used as Investment in Govt. Securities or not.

Table 4.21

Correlation between deposit and Investment in Govt. Securities

Banks	NIBL	HBL	NABIL
r	0.34	-0.02	0.60
r2	0.12	0	0.36
P.E.(r)	0.26	0.29	0.19
6 P.E.(r)	1.59	1.74	1.16

Source: Annual Reports of Concern Banks (2009).

Table-4.21 shows the values of coefficient of correlation(r) of NIBL, HBL and NABIL are 0.34, -0.02 and 0.60 respectively which shows that there are positive correlation between Deposit and Investment in Govt. Securities except HBL, in NIBL and NABIL has positive correlation and the value of coefficient of determination (r2) is 0.12, 0 and 0.36 which shows that 12%, 0% and 36% of the total variation in dependent variable (Investment in Govt. Securities) is explained by independent variable (Deposit).

The coefficient of correlation 'r' of NIBL, HBL and NABIL is less than six times of probable error 'P.E.(r) i.e. 0.34<1.59, -0.02< 1.74 and 0.60<1.16, therefore it reveals that the relationship between Deposit and Investment in Govt. Securities is not significant.

4.5 Liquidity Profile Analysis

Liquidity profile analysis is a financial cum banking tool, which is very useful to measure liquidity position of commercial banks properly. It is a scientific concept in the banking sector and newly introduced in Nepal. Under Directive No.5, Nepal Rastra Bank has prescribed this tool to measure the liquidity position of commercial banks it is found that this tool has been adopted from 2002 and most of the banks have followed this tool.

In the following section, an attempt has been made to analyze the liquidity position of sampled commercial banks by matching assets and liability based on the maturity period.

The individual analyses of liquidity profile of sampled banks are presented below.

4.5.1 Liquidity Profile Analysis of NIBL

Table: 4.22

Liquidity Profile Analysis of NIBL

(Rs. in million)

Year		0-90 days	91-180 days	181-270 days	271-365 days	Above one	Total
2061/62	Net Asset	4,887	1,392	314	1,845	(6,907)	1,531
	Cum NA	4,887	6,279	6,593	8,438	1,531	-
2062/63	Net Asset	4,530	3,016	462	2,523	(8,561)	1,970
	Cum NA	4,530	7,546	8,008	10,531	1,970	-
2063/64	Net Asset	4,190	3,659	1,679	2,856	(10,277)	2,107
	Cum NA	4,190	7,849	9,528	12,384	2,107	-
2064/65	Net Asset	(10,174)	4,239	3,306	3,068	2,770	3,209
	Cum NA	(10,174)	(5,935)	(2,629)	439	3,209	-
2065/66	Net Asset	(8,502)	4,598	5,279	271	3,379	5,025
	Cum NA	(8,502)	(3,904)	1,375	1,646	5,025	-

Source: Annual Reports of NIBL (2009).

Table 4.22 shows that the NIBL is positive in liquidity profile based on different maturity period in the year 2061/62 to 2065/66. This indicates that the asset is excess over liability in cumulative figure in the year end. The cumulative figure in FY 2065/66 for the period 0-90 days to 181 days in negative but at the period end it is in positive figure. The cumulative net asset of FY 2061/62 to 2066/67 is 1531, 1970, 2107, 3209 and 5,025 respectively. This figure shows the strong liquidity position but may impact in profitability of the overall company.

4.5.2 Liquidity Profile Analysis of HBL

Table 4.23

Liquidity Profile Analysis of Himalayan Bank Ltd. (HBL)

(Rs. in million)

Year		0-90 days	91-180 days	181-270 days	271-365 days	Above one years	Total
2061/62	Net Asset	(98)	3,056	1,283	6,826	(8,386)	2,681
	Cum NA	(98)	2,958	4,241	11,067	2,681	-
2062/63	Net Asset	2,266	5,068	2,776	2,642	(12,752)	-
	Cum NA	2,266	7,334	10,110	12,752	-	-
2063/64	Net Asset	6,632	1,847	(603)	(4,047)	(3,829)	-
	Cum NA	6,632	8,479	7,876	3,829	-	-
2064/65	Net Asset	6,555	1,165	29	(2,996)	(4,753)	-
	Cum NA	6,555	7,720	7,749	4,753	-	-
2065/66	Net Assets	4,846	(875)	864	(2,989)	(1846)	-
	Cum NA	4,846	3,971	4,835	1,846	-	-

Source: Annual Reports of HBL (2009).

Table 4.23 shows HBL has maintained positive cumulative net asset by 2681 in FY 2061/62. After that year it has been matching current asset with liability. By analyzing period wise, it has maintained excess asset over liability in period less than one year but over one year, it has excess liability and matched over the period.

4.5.3 Liquidity Profile Analysis of NABIL

Table 4.24

Liquidity Profile Analysis of Nabil Bank Ltd. (NABIL)

(Rs. in million)

Year		0-90 days	91-180 days	181-270 days	271-365 days	Above one years	Total
2061/62	Net Asset	1,896	662	336	1,679	(4,573)	-
	Cum NA	1,896	2,558	2,894	4,573	-	-
2062/63	Net Asset	3,929	227	(148)	3,188	(7,196)	-
	Cum NA	3,929	4,156	4,008	7,196	-	-
2063/64	Net Asset	413	592	1,977	4,714	(7,696)	-
	Cum NA	413	1,005	2,982	7,696	-	-
2064/65	Net Asset	3,853	(1,253)	421	2,177	(5,198)	-
	Cum NA	3,853	2,600	3,021	5,198	-	-
2065/66	Net Asset	116	1,707	(88)	1,133	(2,868)	-
	Cum NA	116	1,823	1,735	2,868	-	-

Source: Annual Reports of NABIL (2009).

Table 4.23, shows the fact that the cumulative liquidity position of NABIL Bank is strong for the period up to 365 days but above one year it has negative net assets. In the FY 2061/62 to 2065/66, cumulative net assets up to the period 365 days, there is 4573, 7196, 7696, 5198 and 2,868 respectively but above one year there is negative net asset by the same amount matching the asset and liability same at the year end. NABIL has not maintained asset and liability on period basis.

Table 4.24 also shows that individual analysis the comparative result is drawn out that the NIBL is in proper liquidity position of maturity matching between assets and liabilities with positive cumulative net assets but remaining two HBL and NABIL has maintained positive net assets in short period up to one year but negative in above one year matching the overall asset and liability.. Comparatively the liquidity position of NIBL is strong than HBL and NABIL.

4.6 Empirical Findings of the Study

From the above research study, following findings are drawn on the liquidity position of the selected commercial banks.

During the study, all the secondary data has been analyzed by using financial as well as statistical tools. This topic focused on the major findings from the secondary data analysis, which are derived from the analysis of liquidity management of three commercial banks named NIBL, HBL and NABIL with comparatively applying five years data from FY 2061/62 to 2065/66.

The major findings of the study drawn from the analysis of secondary data of sampled banks are given below.

4.6.1 Findings from Ratio Analysis

a. Cash and bank balance to total deposit ratio of NIBL is high and HBL and NABIL are significantly low. This implies that the liquidity position of NIBL is strong and HBL and NABIL are in moderate.

b. All sampled commercial banks had maintained CCR with above 5.5 percent of its risk weighted exposure. Core capital ratio of NIBL and HBL are consistent than NABIL. All three banks have strong capacity to meet the long term obligations. But NABIL gets decreasing its CCR it doesn't mean its bad, because it is in under NRB directives.

c. Short term investment to total deposit ratio of HBL is strong, NIBL and NABIL is in moderate.

d. Short term investment to total investment ratio of NIBL and HBL are high and NABIL has the low ratio among them. This implies that NIBL and HBL are capable to meet the necessary short term obligations by short term investment and it is efficient to manage liquidity position than other. But NABIL has low ratio of short term investment to total investment ratio which may arise liquidity crisis in the bank.

e. HBL is efficient to utilize total deposit in investment following by NABIL in moderate and NIBL in low amongst them.

f. Loans, Advances and Bills Purchased to total deposit ratio of NIBL is the highest and HBL is the lowest which means that NIBL is investing its deposits to long term loans and advances but HBL is not doing so. It is depicted that the liquidity risk is high in NIBL comparing to other two banks.

g. As per NRB directive all listed commercial banks in Nepal maintain its cash balance with NRB with 5.5 percent of its deposit. NIBL has maintained adequate balance with NRB which is high than required CRR limit but HBL and NABIL have not maintained sufficient reserve in bank for liquidity provisions.

h. All listed commercial bank in Nepal should maintain its CRR in NRB. CRR is maintained on a weekly basis as per the average balance of 5.5 percent. NIBL has maintained in average 11.02% of total LCY deposit in NRB Balance(LCY) , HBL and NABIL have 6.32% and 6.10% respectively which may be insufficient to maintain liquidity position. NABIL was not able to maintain its CRR ratio in FY 2061/62 and 2062/63, similarly HBL was not able to maintain its CRR in FY 2064/65.

i. Balance with NRB to current deposit of NIBL is higher than other two banks which about 75.52% is, this implies the strong liquidity position of bank. The liquidity position of NABIL and HBL are in moderate about 33.65% and 28.11% respectively. In FY 2065/66 all three commercial banks increased its ratio highly due to liquidity crisis.

j. HBL is increasing its fund to invest on government securities. But NIBL and NABIL are in decreasing trend. Government securities are risk free investment and returns comparatively low. When banks find investment opportunity in other sector, they prefer to investment in other areas.

k. Since the cash in vault to current deposit ratio of NIBL is high which are about 37.44%, but NABIL and HBL is too low about 8.66% and 7.09%. This implies that the liquidity position of NIBL is high and sufficient to meet the obligation immediately. NABIL and HBL are in poor liquidity position.

l. Since the current ratio of banks can not be derived but NRB had set CAR as current ratio. NRB has set CAR with not less than of 11 percent upto FY 2065/66. It is mandatory to met. All sampled commercial banks NIBL, HBL and NABIL met its mandatory ratio in average of 11.65%, 11.62% and

11.72% respectively, but in case of year wise NABIL failed to maintain the CAR ratio in FY 2065/66.

4.6.2 Findings from Trend Analysis

a) The total deposit of all banks is in increasing trend. The rate of change of NIBL is high and its trend is heading upward rapidly and NABIL is also in good position. The trend line of HBL is sloping relatively steady during the study period. Thus, it is depicted that the NIBL and NABIL are collecting more deposit than HBL.

b) The investments of two banks NIBL and NABIL are in increasing trend and HBL in decreasing trend. The trend diverted in last year of study it shows it wants to maintain more liquidity and collect from investments. However the slope of Investment is low in comparison of Total Deposit. NABIL has high slope in total deposit but low slope in Investment which implies deposit money is utilizing and increasing liquidity position. HBL is increasing their liquid fund where most of the deposit of NIBL, HBL and NABIL are remained as liquid fund.

c) The loans and advances of all banks are in increasing trend. The rate of change of NIBL is high and NABIL is also in good position. The trend line of HBL is sloping relatively steady during the study period. The trend of loans and advances are moving in relation to total deposit trend.

d) The cash & bank balance ratio of two banks NIBL and NABIL are in increasing trend especially in FY 2065/66.HBL is sloping downward.

e) The mandatory CRR ratio of all three sampled commercial banks are in decreasing trend. Even it is in decreasing trend, it stops at the point specified by central bank of Nepal.

4.6.3 Findings from Coefficient of Correlation

a) The coefficient of correlation between deposit and total investment of two banks NIBL and NABIL are highly correlated and coefficient of correlation between deposit and total investment of HBL is negatively correlated with -33%. NIBL, HBL and NABIL's coefficient of determination defines that 77%,

11% and 90% of the total variation in dependent variable (Investment) is explained by independent variable (Deposit) respectively and is significant.

b) The coefficient of correlation between deposit and loans and advance of NIBL is perfect positive correlated and NIBL and NABIL are highly correlated. The coefficient of determination of NIBL, HBL and NABIL defines that 100%, 96% and 98% of the total variation in dependent variable (loans and advances) is explained by independent variable (Deposit) respectively and is significant.

c) The coefficient of correlation between total deposit and cash & bank balance of two banks NIBL and NABIL are highly correlated and NIBL, HBL and NABIL's coefficient of determination defines that 92%, 23% and 98% of the total variation in dependent variable (cash & bank balance) is explained by independent variable (total deposit) respectively and is significant.

d) The coefficient of correlation between total deposit and investment in govt. securities of two banks NIBL and NABIL are correlated but HBL is negatively correlated and NIBL, HBL and NABIL's coefficient of determination defines that 12%, 0% and 36% of the total variation in dependent variable (investment in govt. securities) is explained by independent variable (total deposit) respectively and is not significant.

4.6.4 Findings from Liquidity Profile Analysis

a) NIBL has strong liquidity position and is improving its liquidity position and asset is excess over the liability over its maturity period.
b) HBL has excess assets over liability in short period and manage maturity matching of assets and liabilities in long period.
c) NABIL is facing maturity mismatching management problem but normal in liquidity position. It has also excess assets over liability in short period and manages maturity matching of assets and liabilities in over the one year period.

CHAPTER-V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

In this chapter, summary and conclusions of the research as well as recommendations are presented separately. After summarizing and concluding the research, recommendations are suggested for the effective liquidity Management of Nepalese Commercial Banks. The researcher has tried to give suggestions and recommendations to the commercial banks based on this research.

5.2 Summary

Basically, the entire research work has focused on the comparative study on liquidity management in Nepalese commercial banks. For the study, three commercial banks (i.e. NIBL, HBL and NABIL) were taken as sampled and analyzed their liquidity management practice by taking five years secondary data from FY 2060/61 to 2064/65 as well as primary data. The objective of the study is to find out and analyze the liquidity management practice in Nepalese Commercial banks. To fulfill the main objectives following specific objectives are formulated.

a) To analyze financial ratios, liquidity trend and Correlation of NIBL, HBL and NABIL,
b) To analyze Liquidity profile of NIBL, HBL and NABIL,
c) To identify factors affecting the liquidity position and its management in Nepalese commercial banks,
d) To examine the effectiveness of liquidity management in Nepalese commercial banks,
e) To provide suggestions and recommendations about liquidity management in commercial banks.

To fulfill the research objectives the study is divided into five chapters.

In the first chapter, brief introduction of liquidity management, focus of the study, significance of the study, research objectives, brief introduction of the sampled banks, limitation of the study and research scheme are included.

In the second chapter, theoretical review has been made. Different theories, policies, rules and regulations about liquidity management are reviewed. During the study different books, journals, previous studies, websites, reports are viewed and visited to different professionals to know the liquidity management. During the literature review, it is found that there is a few research have been made on this topic.

Research design, population and sample and analysis tools are included in the third chapter. The data are collected from secondary source for the study. The secondary data are collected from annual papers of sampled banks, SEBO/N, and Nepal Rastra Bank. After collecting the data from different source, it is analyzed by using financial and statistical tools and techniques.

An attempt has been made to fulfill the objectives of the research work in chapter four. In this chapter all the secondary as well as primary data are compiled, processed and tabulated as per the necessity and figures; diagrams are also used to present it clearly.

In the chapter five, the summary, conclusion and recommendations are included. The summary of the study, conclusion drawn from the study are presented and necessary suggestions are given to the concern authorities, sampled banks as well as Nepalese commercial banks for the betterment of liquidity management.

This study suffers from different limitations; it considers three banks for the sampled of total commercial banks in Nepal. Time and resources are the constraints of the study. Therefore, the study may not be generalized in all cases and accuracy depends upon the data collected and provided by the organizations and respondents.

5.3 Conclusion

From the analysis of data following conclusions have been drawn out:

⟩ From the analysis of cash and bank balance to Total deposit ratio, it is seen that the liquidity position of NIBL is very strong and almost double than HBL and NABIL.

⟩ From the analysis of core capital ratio (CCR), all listed commercial banks should maintain CCR according to NRB directives. All sampled commercial banks have maintained its CCR above mandatory ratio of 5.5 percent. It is found that NABIL have less risk weighted assets to meet the long term obligations. NIBL has comparatively less than two banks over study period.

⟩ HBL has utilized 18.13% of its deposit in short term investment. NIBL and NABIL have utilized their fund lower than HBL

⟩ Almost half of the investment by NIBL has made in short term investment. So, NIBL can convert its short term investment into cash i.e. liquid fund to meet the requirement of payment. Thus, it is the most efficient to manage liquidity among other banks. HBL are moderate and NABIL is poor to do it.

⟩ HBL has invested significant portion of deposit to total investment and followed up by NABIL and NIBL respectively.

⟩ All the sampled banks have invested the total deposit to loans and advances efficiently.

⟩ NIBL and HBL have adequate balance with NRB but NABIL has not sufficient. From this study, it is seen that NIBL and HBL have ready cash for maintain liquidity.

⟩ As per the standard prescribed by NRB, the CRR should be at or above 5.5%. During the study, it is found that all banks have maintained the CRR above 5.5%. So, based on the CRR, all banks are in strong liquidity position.

⟩ From the analysis of balance with NRB and to current deposit ratio, it is found that NIBL has adequate reserve in NRB and maintained cash balances to meet the obligation of current deposit but NABIL and HBL are in moderate.

⟩ From the analysis of Investment in Govt. securities to total deposit Ratio, it is found that all the sampled banks has maintained considerably sufficient to

meet the obligation of liquidity. But in FY 2065/66, it is rapidly decreased due to liquidity crisis in Nepalese financial market.

⟩ From the analysis of cash in vault to current deposit Ratio, it is found that NIBL hs maintained considerably high ratio than HBL and NABIL. NIBL has maintained nearly about five times than other two banks. NIBL has sufficient fund to meet the obligation of liquidity. Trend of ratio is in increasing in the case of NIBL. But HBL and NABIL are in fluctuating trend. In last year of study in FY 2065/66, ratio of all sampled commercial banks increased.

⟩ From the analysis of capital adequacy ratio, it is found that all sampled commercial had maintained CAR ratio above 11 percent in average. But NABIL failed to maintain it in last year of study i.e. in FY 2065/66. Both banks NIBL and HBL are in increasing trend in CAR but NABIL is in decreasing trend.

⟩ From the trend analysis, it is found that total deposit of all sampled commercial banks in increasing trend, in the case of total investment NIBL and NABIL are in increasing trend but investment of HBL is in decreasing trend. Loans and advances of all banks are also in increasing trend. Cash & bank balance ratio of NIBL and NABIL is in increasing trend whereas HBL in decreasing trend.

⟩ In average the mandatory CRR ratio of all three sampled commercial banks are in control. But individually NIBL has maintained it strongly, in the case of HBL it failed to maintain in last year of study in FY 2065/66 with 5.12%, which is less than mandatory with 0.38%. In the case of NABIL it failed to maintain in beginning two year of study then after it maintained strongly. At the last year of study it has maintained highest CRR in sampled banks with 12.30%. It implies that NIBL and NABIL are increasing their effectiveness CRR maintaining the liquidity position.

⟩ The coefficient of Correlation shows the relationship between Deposit and investment is significant in case of NIBL and NABIL but HBL has low negative correlation with investment.

⟩ The coefficient of correlation of between deposit and loan and advances is significant i.e. very high.

⎰ The coefficient of Correlation shows the relationship between Deposit and cash & bank balance is significant in case of NIBL and NABIL but HBL has high positive correlation with cash & bank balance

⎰ Commercial banks have been adopted a banking tool called liquidity profile from 2002. From the analysis of liquidity profile, it is found that NIBL is in strong liquidity position having surplus asset over liability over the period matching properly. HBL is improving the liquidity mismatch problems over the period above one year. NABIL is also matching its net assets over the long period.

During the study, primary data are also used. For this purpose, research questions are made and asked to the respondents. From the analysis of all the primary data following conclusions are drawn out;

⎰ Nepalese commercial banks are in liquidity crisis position with slightly variation and are not changing significantly over the study period. The factors, Investment opportunity, Interest Rate, NRB's Regulation are to be found most affecting factor of liquidity position.

⎰ The CRR Ratio prescribed by NRB of liquidity management is found adequate and some has suggested increasing its level.

⎰ NRB is effectively monitoring its banks during the last years and intervention is required to maintained effective liquidity position.

⎰ From the study it is found that the main problems of liquidity management are:
   o National insecurity and political instability.
   o Investment opportunities.
   o Lack of proper inspection and supervision by NRB.
   o Lack of capability of management.
   o Undeveloped market for liquidity creating financial instruments.

⎰ Following techniques are found to manage liquidity in existing practice:
   o Matching principle of assets and liabilities.
   o Preparing liquidity profile and GAP analysis in the maturity basis.
   o Maintaining proper portfolio risk analysis for investment
   o Demand and supply theory.

o By effective implementation of risk management

⟩ The main causes of current liquidity crisis in Nepalese banking sector are:

o Asset liability mismatch

o Lack of trust of depositors on banks

o CD Ratio greater than NRB provision

o Negative Balance of Payment (BOP)

o Political Instability

o Anti money laundering Policy

o Lack of supervision of Co-operatives

o Unspent capital expenditure

o Decreasing Rate of Remittance

o Institutional Depositors going for alternate investments

o Growth in Imports higher than that of Exports

⟩ From the study, it is found that liquidity management practice is still in developing phase. Most of the banks have maintained liquid fund to fulfill the statutory provision only. Since, NRB has to threat to commercial banks to maintain liquidity, it is seen that the commercial banks are found less sincere to liquidity management. Commercial banks have maintained liquidity measuring tools like liquidity profile and GAP analysis by force, not voluntarily. From this condition, it is revealed that the commercial banks are not taking it easily and positively but they are feeling it as a burden. It should be taken positively and implemented compulsorily by commercial banks for the betterment of liquidity management, banks credibility and safety for depositors' amount.

5.4 Recommendations

Suggestion is the output of the whole study. It helps to take corrective action in their activities in future. Different analyses are done to arrive at this step. On the basis of above analysis and findings of the study following suggestions and recommendations may be referred to overcome weakness, inefficiency to liquidity management and for corrective action for the concern authorities and other researchers.

To NIBL

The following points are recommended to NIBL:

- Cash and bank balance to total deposit ratio should be reduced.
- CCR should be maintained not more excessive than NRB criteria.
- Short term investment to total deposit ratio is very low so short term investment should be increased to increase liquid assets.
- Short term investment to total investment is high in past years then it is decreasing continuously, still it should be decreased.
- Total investment to total deposit ratio should be increased.
- C/D ratio should be decreased to have more liquidity.
- Balance with NRB to total deposit ratio should be decreased in comparison to other banks
- CRR should be reduced upto 5.5%.
- Since positive liquidity profile, it is recommended to reduce short term assets and improve matching between assets and liabilities.
- The deposits, investments and loans & advances are in increasing trend, but cure must be given to safe investment and profitability, not only to liquidity position. There should be tradeoff between profitability and liquidity.
- CAR is in balance so keep it constant, and should update according NRB directives.

To HBL

The following points are recommended to HBL:

- Short term investment to total investment should be slightly decreased.

- CCR should be maintained not more excessive than NRB criteria.
- The portion of investment to total deposit should be decreased in order to increase in loans and advances.
- Cash in vault to total deposit ratio should be increased upto 3%.
- CRR should be up to 5.5%, in FY 2064/65 it is fail to maintain, now it is above than NRB's requirement.
- Cash in vault to current deposit should be increased; otherwise, it may suffer from liquidity crisis.
- CAR is in balance so keep it constant, and should update according NRB directives.
- Negative difference in liquidity profile should be improved by reducing short term liabilities or by increasing short term assets by analyzing liquidity profile

To NABIL

The following points are recommended to NABIL:

- Short term investment to total investment ratio should be increased.
- CCR is excessive so it should be decreased by increasing in investment.
- Reserve with NRB to total deposit ratio should keep constant.
- Cash in vault to total deposit ratio should be increased upto 3%.
- Balance with NRB to current deposit should be increased.
- CRR should maintain upto 5.5 percent but in first two year it had not maintained then after it had increased continuously.
- CAR is maintained for last four year in last year it failed to maintain it. All commercial banks should maintain CAR with or above 11 percent. So CAR should be increased in recommended portion.
- Maturity mismatch problem should be improved by using liquidity profile analysis properly.
- The ratios are found to be highest variation during the study period which may be risky and recommend making effort for managing effectively.

To All Commercial Banks:

Based on the findings of the research, following points are suggested to all commercial banks.

- Liquidity profile analysis and GAP analysis with IRC should be prepared quarterly basis and send to NRB within stipulated time period.
- An effort should be made on human resource development on the risk analysis management and liquidity management.
- An effort should be made on the development of market for the liquidity generating assets like; T-bills, Options and Bank CDs etc.
- Satisfied employees are the backbone of the bank. So, necessary steps should be step forwarded to develop satisfied and obedient employees, which may reduce the problems of bank defaulters and corruptions.
- Rules and regulations are the guidelines of things to do or not to do. So, its effects can be seen after the implementations. In order to manage the liquidity effectively the existing regulation should be effectively put in practice.

To Other Researchers

This research may be helpful to fulfill the gap of proper research in liquidity management in Nepalese commercial banks. It may provide the knowledge about liquidity management in Nepalese commercial banks. This research covers the existing liquidity management practice, existing liquidity position and its trend, factors affecting the liquidity management and banking tools for liquidity management only. For the further study and analysis, this study may be the guideline to other researchers. Other researchers are suggested to study about the effect of every factor to liquidity management.

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Appendix I

RATIO ANALYSIS

Formulae:

a) Total Cash &Bank Balance to Total Deposit Ratio

$$= \frac{\text{Total Cash \& Bank Balance}}{\text{Total Deposit}} \mid 100$$

b) Core Capital Ratio (CCR) $= \dfrac{\text{Core Capital Fund}}{\text{Total Risk Weighted Assets}} \mid 100$

c) Short Term Investment to Total Deposit Ratio $= \dfrac{\text{Short Term Investment}}{\text{Total Deposit}} \mid 100$

d) Short Term Investment to Total Investment Ratio $= \dfrac{\text{Short Term Investment}}{\text{Total Investment}} \mid 100$

e) Total Investment to Total Deposit Ratio $= \dfrac{\text{Total Investment}}{\text{Total Deposit}} \mid 100$

f) Total Loan & Advances to Total Deposit (C/D Ratio) $= \dfrac{\text{Total Loan \& Advances}}{\text{Total Deposit}} \mid 100$

g) Balance with NRB to Total Deposit Ratios $= \dfrac{\text{Balance with NRB}}{\text{Total Deposit}} \mid 100$

h) Cash Reserve Ratio (CRR) $= \dfrac{\text{NRB balance (Lcy only)}}{\text{Lcy Deposits - Margin Deposit}} \mid 100$

i) Balance with NRB to Current Deposit Ratio $= \dfrac{\text{Balance with NRB}}{\text{Current Deposit}} \mid 100$

j) Investment in Govt. Securities to Total Deposit Ratio =

$$\frac{\text{Investment in Govt. Securities}}{\text{Total Deposit}} \mid 100$$

k) Cash Balance to Current Deposit Ratio $= \dfrac{\text{Cash Balance}}{\text{Current Deposit}} \mid 100$

l) Capital Adequacy Ratio (CAR) $= \dfrac{\text{Total Capital Fund}}{\text{Total Risk Weighted Assets}} \times 100$

RATIO ANALYSIS of NIBL

Summary of Financial Transaction of NIBL

(In million)

Particular	Ref	2061/62	2062/63	2063/64	2064/65	2065/66
Cash at NRB	a	780.00	1,526.00	1,381.00	1,820.00	4,411.00
Cash Balance	b	374.00	563.00	764.00	1,464.00	1,833.00
Total Capital Fund	c	1,579.00	2,094.00	2,852.00	3,891.00	5,095.00
Core Capital Fund	d	1,161.00	1,393.00	1,852.00	2,659.00	3,880.00
Total Cash &Bank Balance	e	1,340.00	2,336.00	2,442.00	3,755.00	7,918.00
Current Deposit	f	1,583.00	1,706.00	2,175.00	3,139.00	3,757.00
Total Deposit	g	14,255.00	18,927.00	24,489.00	34,452.00	46,698.00
Short Term Investment	h	1,948.00	2,522.00	3,256.00	3,155.00	2,531.00
Inv. in Govt. Securities	i	1,948.00	2,550.00	3,256.00	3,155.00	2,531.00
Total Investment	j	3,934.00	5,603.00	6,506.00	6,874.00	7,400.00
Total Loan and Advances	k	10,126.00	12,776.00	17,286.00	26,997.00	36,241.00
Total Risk Weighted Assets	l	13,633.00	17,492.00	23,436.00	34,485.00	45,312.00

Calculation of Ratio Analysis of NIBL

Particular	Ref	2061/62	2062/63	2063/64	2064/65	2065/66
Cash & Bank Balance to Total Deposit	e/g	9.40	12.34	9.97	10.90	16.96
Core Capital Ratio (CCR)	d/l	23.07	25.67	23.27	20.06	8.56
Short term Invest to Total Deposit	h/g	13.67	13.32	13.3	9.16	5.42
Short term Investment to Total investment	h/j	49.52	45.01	50.05	45.9	42.64
Total Investment to Total Deposit	j/g	27.60	29.60	26.57	19.95	15.85
Total Loan & Advances to Total Deposit (C/D Ratio)	k/g	71.03	67.50	70.59	78.36	77.61

Balance with NRB to Total Deposit	a/g	5.47	8.06	5.64	5.28	9.45
Cash Reserve Ratio (CRR)	From Report	9.78	13.61	10.47	10.91	10.32
Balance with NRB to Current Deposit	a/f	49.27	89.45	63.49	57.98	117.41
Investment on Govt. Sec to Total Deposit	i/g	13.67	13.47	13.3	9.16	5.42
Cash Balance to Current Deposit	b/f	23.63	33.00	35.13	46.64	48.79
Capital Adequacy Ratio (CAR)	c/l	11.58	11.97	12.17	11.28	11.24

RATIO ANALYSIS of HBL

Summary of Financial Transaction of HBL   (in Million)

Particular	Ref	2061/62	2062/63	2063/64	2064/65	2065/66
Cash at NRB	a	1,604.00	1,096.00	1,273.00	936.00	2,328.00
Cash Balance	b	287.00	305.00	177.00	278.00	474.00
Total Capital Fund	c	2,017.00	2,242.00	2,651.00	3,254.00	3,845.00
Core Capital Fund	d	1,526.00	1,722.00	2,105.00	2,470.00	3,074.00
Total Cash and Bank Balance	e	2,014.00	1,717.00	1,757.00	1,448.00	3,048.00
Current Deposit	f	5,045.00	5,028.00	5,590.00	4,782.00	3,218.00
Total Deposit	g	24,814.00	26,491.00	30,048.00	31,843.00	34,681.00
Short Term Investment	h	4,820.00	4,565.00	6,079.00	7,167.00	3,907.00
Inv. in Govt. Securities	i	5,470.00	5,144.00	6,455.00	7,472.00	4,212.00
Total Investment	j	11,692.00	10,889.00	11,823.00	13,340.00	8,711.00
Total Loan and Advances	k	12,425.00	14,643.00	16,998.00	19,498.00	24,793.00
Total Risk weighted Assets	l	18,322.00	19,918.00	21,890.00	25,624.00	34,906.00

Calculation of Ratio Analysis of HBL

Particular	Ref	2061/62	2062/63	2063/64	2064/65	2065/66
Total Cash & Bank Balance to Total Deposit	e/g	8.11	6.48	5.85	4.55	8.79
Core Capital Ratio (CCR)	d/l	8.33	8.65	9.61	9.64	8.81
Short term Invest to Total Deposit	h/g	19.42	17.23	20.23	22.51	11.27
Short term Investment to Total investment	h/j	41.22	41.92	51.42	53.73	44.85
Total Investment to Total Deposit	j/g	47.12	41.10	39.35	41.89	25.12
Total Loan Advance to Total Deposit(C/D Ratio)	k/g	50.07	55.28	56.57	61.23	71.49
Balance with NRB to Total Deposit	a/g	6.46	4.14	4.24	2.94	6.71
Cash Reserve Ratio (CRR)	From report	7.86	5.92	5.92	5.13	6.76

Balance with NRB to Current Deposit	a/f	31.79	21.8	22.77	19.57	72.34
Investment on Govt. Sec to Total Deposit	i/g	22.04	19.42	21.48	23.47	12.14
Cash Balance to Current Deposit	b/f	5.69	6.07	3.17	5.81	14.73
Capital Adequacy Ratio (CAR)	c/l	11.01	11.26	12.11	12.70	11.02

RATIO ANALYSIS of NABIL

Summary of Financial Transaction of NABIL (in Million)

Particular	Ref	2061/62	2062/63	2063/64	2064/65	2065/66
Cash at NRB	a	390.00	318.00	1113.00	1829.00	2649.00
Cash Balance	b	146.00	238.00	270.00	511.00	674.00
Total Capital Fund	c	1766.00	2089.00	2308.00	2999.00	3727.00
Core Capital Fund	d	1611.00	1831.00	1993.00	2364.00	3044.00
Total Cash and Bank Balance	e	559.00	630.00	1400.00	2671.00	3372.00
Current Deposit	f	2799.00	2911.00	3395.00	5284.00	5481.00
Total Deposit	g	14587.00	19347.00	23342.00	31915.00	37348.00
Short Term Investment	h	665.00	1224.00	4086.00	3788.00	1839.00
Inv. in Govt. Securities	i	2414.00	2301.00	4808.00	4647.00	3706.00
Total Investment	j	4276.00	6179.00	8945.00	9940.00	10826.00
Total Loan and Advances	k	10586.00	12923.00	15546.00	21365.00	27590.00
Total Risk Weighted Assets	l	14193.00	16976.00	19167.00	27011.00	34817.00

Calculation of Ratio Analysis of NABIL

Particular	Ref	2061/62	2062/63	2063/64	2064/65	2065/66
Total Cash & Bank Balance to Total Deposit	e/g	3.83	3.26	6.00	8.37	9.02
Core Capital Ratio (CCR)	d/l	11.35	10.78	10.40	8.75	8.74
Short term Invest to Total Deposit	h/g	4.56	6.33	17.50	11.87	4.92
Short term Investment to Total investment	h/j	15.55	19.81	45.68	38.11	16.99
Total Investment to Total Deposit	j/g	29.31	31.94	38.32	31.15	28.99
Total Loan Advance to Total Deposit (C/D Ratio)	k/g	72.57	66.80	66.60	66.94	73.87
Balance with NRB to Total Deposit	a/g	2.67	1.64	4.77	5.73	7.09
Cash Reserve Ratio (CRR)	From Report	3.83	3.26	6.00	8.37	9.03

Balance with NRB to Current Deposit	a/f	13.93	10.92	32.78	34.61	48.33
Investment on Govt. Sec to Total Deposit	i/g	16.55	11.89	20.60	14.56	9.92
Cash Balance to Current Deposit	b/f	5.22	8.18	7.95	9.67	12.30
Capital Adequacy Ratio (CAR)	c/l	12.44	12.31	12.04	11.10	10.70

Appendix – I-a

Calculation of Mean ($\overline{X}$), Standard Deviation ($\dagger$) and Coefficient of Variation (C.V.) of Cash and Bank Balance to Total Deposit Ratio

Bank	NIBL			HBL			NABIL		
Fiscal Year	X_1	$X_1 Z \overline{X}_1$	$\left(X_1 Z \overline{X}_1\right)^2$	X_2	$X_2 Z \overline{X}_2$	$\left(X_2 Z \overline{X}_2\right)^2$	X_3	$X_3 Z \overline{X}_3$	$\left(X_3 Z \overline{X}_3\right)^2$
2061/62	9.40	(2.51)	6.3001	8.11	1.35	1.8225	3.83	(2.27)	5.1529
2062/63	12.34	0.43	0.1849	6.48	(0.28)	0.0784	3.26	(2.84)	8.0656
2063/64	9.97	(1.94)	3.7636	5.85	(0.91)	0.8281	6.00	(0.10)	0.0100
2064/65	10.90	(1.01)	1.0201	4.55	(2.21)	4.8841	8.37	2.27	5.1529
2065/66	16.96	5.05	25.5025	8.79	2.03	4.1209	9.02	2.92	8.5264
Total	**59.57**	**-**	**36.77**	**33.78**	**-**	**11.734**	**30.48**	**-**	**26.9078**

1) Calculation of arithmetic mean

$$\overline{X}_1 X \frac{X_1}{n_1} \qquad \overline{X}_2 X \frac{X_2}{n_2} \qquad \overline{X}_3 X \frac{X_3}{n_3}$$

$$X \frac{59.57}{5} \qquad X \frac{33.78}{5} \qquad X \frac{30.48}{5}$$

$$= 11.91 \qquad\qquad = 6.76 \qquad\qquad = 6.10$$

2) Calculation of Standard deviation

$$\dagger_{X1} X \sqrt{\frac{\left(X_1 Z \overline{X}_1\right)^2}{n_{X1}}} \qquad \dagger_{X2} X \sqrt{\frac{\left(X_2 Z \overline{X}_2\right)^2}{n_{X2}}}$$

$$\dagger_{X3} X \sqrt{\frac{\left(X_3 Z \overline{X}_3\right)^2}{n_{X3}}}$$

$$\dagger_{X1} X \sqrt{\frac{36.77}{5}} \qquad \dagger_{X2} X \sqrt{\frac{11.73}{5}} \qquad \dagger_{X3} X \sqrt{\frac{26.91}{5}}$$

$$= 2.71\% \qquad\qquad = 1.53\% \qquad\qquad = 2.32\%$$

3) <u>Calculation of co-efficient of variation (CV)</u>

$$C.V._{fX1A} \, \mathrm{X} \, \frac{\dagger_{X1}}{X_1} \qquad\qquad C.V._{fX2A} \, \mathrm{X} \, \frac{\dagger_{X2}}{X_2} \qquad\qquad C.V._{fX3A} \, \mathrm{X} \, \frac{\dagger_{X3}}{X_3}$$

$$\mathrm{X} \, \frac{2.71}{11.91} \qquad\qquad \mathrm{X} \, \frac{1.53}{6.76} \qquad\qquad \mathrm{X} \, \frac{2.32}{6.10}$$

$$= 0.23 \qquad\qquad = 0.23 \qquad\qquad = 0.38$$

Appendix – I-b

Calculation of Mean ($\overline{X}$), Standard Deviation ($\dagger$) and Coefficient of Variation (C.V.) of Core Capital Ratio (CCR)

Bank	NIBL			HBL			NABIL		
Fiscal Year	X_1	$X_1 Z \overline{X}_1$	$fX_1 z\overline{X}_1 Å$	X_2	$X_2 Z \overline{X}_2$	$fX_2 z\overline{X}_2 Å$	X_3	$X_3 Z \overline{X}_3$	$fX_3 z\overline{X}_3 Å$
2061/62	8.52	0.39	0.1521	8.33	(0.67)	0.4489	11.35	1.35	1.8225
2062/63	7.97	(0.16)	0.0256	8.65	(0.35)	0.1225	10.78	0.78	0.6084
2063/64	7.90	(0.23)	0.0529	9.61	0.61	0.3721	10.40	0.4	0.16
2064/65	7.71	(0.42)	0.1764	9.64	0.64	0.4096	8.75	(1.25)	1.5625
2065/66	8.56	0.43	0.1849	8.81	(0.19)	0.0361	8.74	(1.26)	1.5876
Total	**40.66**	**-**	**0.5919**	**45.04**	**-**	**1.3892**	**50.02**	**-**	**5.741**

1) Calculation of arithmetic mean

$$\overline{X}_1 \text{ X} \frac{X_1}{n_1} \qquad \overline{X}_2 \text{ X} \frac{X_2}{n_2} \qquad \overline{X}_3 \text{ X} \frac{X_3}{n_3}$$

$$\text{X} \frac{40.66}{5} \qquad \text{X} \frac{45.04}{5} \qquad \text{X} \frac{50.02}{5}$$

$$= 8.13 \qquad = 9 \qquad = 10$$

2) Calculation of Standard deviation

$$\dagger_{X1} \text{ X} \sqrt{\frac{fX_1 Z\overline{X}_1 Å}{n_{X1}}} \qquad \dagger_{X2} \text{ X} \sqrt{\frac{fX_2 Z\overline{X}_2 Å}{n_{X2}}}$$

$$\dagger_{X3} \text{ X} \sqrt{\frac{fX_3 Z\overline{X}_3 Å}{n_{X3}}}$$

$$\dagger_{X1} \text{ X} \sqrt{\frac{0.59}{5}} \qquad \dagger_{X2} \text{ X} \sqrt{\frac{1.39}{5}} \qquad \dagger_{X3} \text{ X} \sqrt{\frac{5.74}{5}}$$

= 0.34%   = 0.53%   = 1.07%

3) Calculation of co-efficient of variation (CV)

$$C.V._{fX1A} X \frac{\dagger_{X1}}{X_1} \qquad C.V._{fX2A} X \frac{\dagger_{X2}}{X_2} \qquad C.V._{fX3A} X \frac{\dagger_{X3}}{X_3}$$

$$X \frac{0.34}{8.13} \qquad X \frac{0.53}{9} \qquad X \frac{1.07}{10}$$

= 0.04   = 0.06   = 0.11

Appendix – I-c

Calculation of Mean ($\overline{X}$), Standard Deviation (†) and Coefficient of Variation (C.V.) of Short term Investment to Total Deposit Ratio

Bank	NIBL			HBL			NABIL		
Fiscal Year	X_1	$X_1 Z\overline{X}_1$	$(X_1 Z\overline{X}_1)^2$	X_2	$X_2 Z\overline{X}_2$	$(X_2 Z\overline{X}_2)^2$	X_3	$X_3 Z\overline{X}_3$	$(X_3 Z\overline{X}_3)^2$
2061/62	13.67	2.7	7.2900	19.42	1.29	1.6641	4.56	(4.48)	20.0704
2062/63	13.32	2.35	5.5225	17.23	(0.9)	0.8100	6.33	(2.71)	7.3441
2063/64	13.30	2.33	5.4289	20.23	2.1	4.4100	17.5	8.46	71.5716
2064/65	9.16	(1.81)	3.2761	22.51	4.38	19.1844	11.87	2.83	8.0089
2065/66	5.42	(5.55)	30.8025	11.27	(6.86)	47.0596	4.92	(4.12)	16.9744
Total	**54.87**	**-**	**52.3200**	**90.66**	**-**	**73.1281**	**45.18**	**-**	**123.9694**

1) Calculation of arithmetic mean

$$\overline{X}_1 X \frac{X_1}{n_1} \qquad \overline{X}_2 X \frac{X_2}{n_2} \qquad \overline{X}_3 X \frac{X_3}{n_3}$$

$$X \frac{54.87}{5} \qquad X \frac{90.66}{5} \qquad X \frac{45.18}{5}$$

$$= 10.97 \qquad\qquad = 18.13 \qquad\qquad = 9.04$$

2) Calculation of Standard deviation

$$\dagger_{X1} X \sqrt{\frac{(X_1 Z\overline{X}_1)^2}{n_{X1}}} \qquad \dagger_{X2} X \sqrt{\frac{(X_2 Z\overline{X}_2)^2}{n_{X2}}}$$

$$\dagger_{X3} X \sqrt{\frac{(X_3 Z\overline{X}_3)^2}{n_{X3}}}$$

$$\dagger_{X1} X \sqrt{\frac{52.32}{5}} \qquad \dagger_{X2} X \sqrt{\frac{73.13}{5}} \qquad \dagger_{X3} X \sqrt{\frac{123.97}{5}}$$

= 3.23%   = 3.82%   = 4.98%

3) Calculation of co-efficient of variation (CV)

$$C.V._{fX1A} X \dfrac{\dagger_{X1}}{X_1} \qquad C.V._{fX2A} X \dfrac{\dagger_{X2}}{X_2} \qquad C.V._{fX3A} X \dfrac{\dagger_{X3}}{X_3}$$

$$X \dfrac{3.23}{10.97} \qquad\qquad X \dfrac{3.82}{18.13} \qquad\qquad X \dfrac{4.98}{9.04}$$

$$= 0.29 \qquad\qquad\qquad = 0.21 \qquad\qquad\qquad = 0.55$$

Appendix – I-d

Calculation of Mean ($\overline{X}$), Standard Deviation (σ) and Coefficient of Variation (C.V.) of Short term Investment to Total Investment Ratio

Bank	NIBL			HBL			NABIL		
Fiscal Year	X_1	$X_1 - \overline{X}_1$	$(X_1 - \overline{X}_1)^2$	X_2	$X_2 - \overline{X}_2$	$(X_2 - \overline{X}_2)^2$	X_3	$X_3 - \overline{X}_3$	$(X_3 - \overline{X}_3)^2$
2061/62	49.52	2.9	8.4100	41.22	(5.41)	29.2681	15.55	(11.68)	136.4224
2062/63	45.01	(1.61)	2.5921	41.92	(4.71)	22.1841	19.81	(7.42)	55.0564
2063/64	50.05	3.43	11.7649	51.42	4.79	22.9441	45.68	18.45	340.4025
2064/65	45.90	(0.72)	0.5184	53.73	7.10	50.4100	38.11	10.88	118.3744
2065/66	42.64	(3.98)	15.8404	44.85	(1.78)	3.1684	16.99	(10.24)	104.8576
Total	**233.12**	-	**39.1258**	**233.14**	-	**127.9747**	**136.14**	-	**755.1133**

1) Calculation of arithmetic mean

$$\overline{X}_1 = \frac{X_1}{n_1} \qquad \overline{X}_2 = \frac{X_2}{n_2} \qquad \overline{X}_3 = \frac{X_3}{n_3}$$

$$= \frac{233.12}{5} \qquad = \frac{233.14}{5} \qquad = \frac{755.13}{5}$$

$$= 46.62 \qquad\qquad = 46.63 \qquad\qquad = 27.23$$

2) Calculation of Standard deviation

$$\sigma_{X1} = \sqrt{\frac{(X_1 - \overline{X}_1)^2}{n_{X1}}} \qquad \sigma_{X2} = \sqrt{\frac{(X_2 - \overline{X}_2)^2}{n_{X2}}}$$

$$\sigma_{X3} = \sqrt{\frac{(X_3 - \overline{X}_3)^2}{n_{X3}}}$$

$$\sigma_{X1} = \sqrt{\frac{39.13}{5}} \qquad \sigma_{X2} = \sqrt{\frac{127.97}{5}} \qquad \sigma_{X3} = \sqrt{\frac{755.11}{5}}$$

= 2.80%	= 5.06%	=12.29%

3) Calculation of co-efficient of variation (CV)

$$C.V._{fX1A} X \frac{\dagger_{X1}}{\overline{X}_1} \qquad C.V._{fX2A} X \frac{\dagger_{X2}}{\overline{X}_2} \qquad C.V._{fX3A} X \frac{\dagger_{X3}}{\overline{X}_3}$$

$$X \frac{2.80}{46.62} \qquad X \frac{5.06}{46.63} \qquad X \frac{12.29}{27.23}$$

$$= 0.06 \qquad = 0.11 \qquad = 0.45$$

Appendix – I-e

Calculation of Mean ($\overline{X}$), Standard Deviation (†) and Coefficient of Variation (C.V.) of Total Investment to Total Deposit Ratio

Bank	NIBL			HBL			NABIL		
Fiscal Year	X_1	$X_1 Z\overline{X}_1$	$\int X_1 Z\overline{X}_1 Å$	X_2	$X_2 Z\overline{X}_2$	$\int X_2 Z\overline{X}_2 Å$	X_3	$X_3 Z\overline{X}_3$	$\int X_3 Z\overline{X}_3 Å$
2061/62	27.6	3.77	14.2129	47.12	8.20	67.24	29.31	(2.63)	6.9169
2062/63	29.6	5.77	33.2929	41.10	2.18	4.7524	31.94	0	0
2063/64	26.57	2.74	7.5076	39.35	0.43	0.1849	38.32	6.38	40.7044
2064/65	19.95	(3.88)	15.0544	41.89	2.97	8.8209	31.15	(0.79)	0.6241
2065/66	15.45	(8.38)	70.2244	25.12	(13.80)	190.44	28.99	(2.95)	8.7025
Total	**119.17**	-	**140.2922**	**194.58**	-	**271.4382**	**159.71**	-	**56.9479**

1) Calculation of arithmetic mean

$$\overline{X}_1 \; X \; \frac{X_1}{n_1} \qquad \overline{X}_2 \; X \; \frac{X_2}{n_2} \qquad \overline{X}_3 \; X \; \frac{X_3}{n_3}$$

$$X\frac{119.17}{5} \qquad\qquad X\frac{194.58}{5} \qquad\qquad X\frac{159.71}{5}$$

$$= 23.83 \qquad\qquad = 38.92 \qquad\qquad = 31.94$$

2) Calculation of Standard deviation

$$\sigma_{X1} = \sqrt{\dfrac{fx_1\left(x\bar{X}_1\right)^2}{n_{X1}}} \qquad \sigma_{X2} = \sqrt{\dfrac{fx_2\left(x\bar{X}_2\right)^2}{n_{X2}}}$$

$$\sigma_{X3} = \sqrt{\dfrac{fx_3\left(x\bar{X}_3\right)^2}{n_{X3}}}$$

$$\sigma_{X1} = \sqrt{\dfrac{140.29}{5}} \qquad \sigma_{X2} = \sqrt{\dfrac{271.44}{5}} \qquad \sigma_{X3} = \sqrt{\dfrac{56.95}{5}}$$

$$= 5.30\% \qquad\qquad = 7.37\% \qquad\qquad = 3.37\%$$

3) Calculation of co-efficient of variation (CV)

$$C.V._{fx1A} = \dfrac{\sigma_{X1}}{\bar{X}_1} \qquad C.V._{fx2A} = \dfrac{\sigma_{X2}}{\bar{X}_2} \qquad C.V._{fx3A} = \dfrac{\sigma_{X3}}{\bar{X}_3}$$

$$= \dfrac{5.30}{23.83} \qquad\qquad = \dfrac{7.37}{38.92} \qquad\qquad = \dfrac{3.37}{31.94}$$

$$= 0.22 \qquad\quad = 0.19 \qquad\qquad = 0.11$$

Appendix – I-f

Calculation of Mean ($\overline{X}$), Standard Deviation (σ) and Coefficient of Variation (C.V.) of Total Loans and Advances to Total Deposit Ratio

Bank	NIBL			HBL			NABIL		
Fiscal Year	X_1	$X_1-\overline{X}_1$	$(X_1-\overline{X}_1)^2$	X_2	$X_2-\overline{X}_2$	$(X_2-\overline{X}_2)^2$	X_3	$X_3-\overline{X}_3$	$(X_3-\overline{X}_3)^2$
2061/62	71.03	(1.99)	3.9601	50.07	(8.86)	78.4996	72.57	3.21	10.3041
2062/63	67.50	(5.52)	30.4704	55.28	(3.65)	13.3225	66.80	(2.56)	6.5536
2063/64	70.59	(2.43)	5.9049	56.57	(2.36)	5.5696	66.60	(2.76)	7.6176
2064/65	78.36	5.34	28.5156	61.23	2.30	5.2900	66.94	(2.42)	5.8564
2065/66	77.61	4.59	21.0681	71.49	12.56	157.7536	73.87	4.51	20.3401
Total	**365.09**	-	**89.9191**	**294.64**	-	**260.4353**	**346.78**	-	**50.6718**

1) Calculation of arithmetic mean

$$\overline{X}_1 = \frac{X_1}{n_1} \qquad \overline{X}_2 = \frac{X_2}{n_2} \qquad \overline{X}_3 = \frac{X_3}{n_3}$$

$$= \frac{365.09}{5} \qquad = \frac{294.64}{5} \qquad = \frac{346.78}{5}$$

$$= 73.02 \qquad\qquad = 58.93 \qquad\qquad = 69.36$$

2) Calculation of Standard deviation

$$\sigma_{X1} = \sqrt{\frac{(X_1-\overline{X}_1)^2}{n_{X1}}} \qquad \sigma_{X2} = \sqrt{\frac{(X_2-\overline{X}_2)^2}{n_{X2}}}$$

$$\sigma_{X3} = \sqrt{\frac{(X_3-\overline{X}_3)^2}{n_{X3}}}$$

$$\sigma_{X1} = \sqrt{\frac{89.92}{5}} \qquad \sigma_{X2} = \sqrt{\frac{260.44}{5}} \qquad \sigma_{X3} = \sqrt{\frac{50.67}{5}}$$

= 4.24%	= 7.21%	= 3.18%

3) Calculation of co-efficient of variation (CV)

$$C.V._{fX1A} \, X \frac{\dagger_{X1}}{X_1} \qquad\qquad C.V._{fX2A} \, X \frac{\dagger_{X2}}{X_2} \qquad\qquad C.V._{fX3A} \, X \frac{\dagger_{X3}}{X_3}$$

$$X \frac{4.24}{73.02} \qquad\qquad X \frac{7.21}{58.93} \qquad\qquad X \frac{3.18}{69.36}$$

$$= 0.06 \qquad\qquad\qquad = 0.12 \qquad\qquad\qquad = 0.05$$

Appendix – I-g

Calculation of Mean ($\bar{X}$), Standard Deviation (σ) and Coefficient of Variation (C.V.) of Balance with NRB to Total Deposit Ratio

Bank	NIBL			HBL			NABIL		
Fiscal Year	X_1	$X_1 - \bar{X}_1$	$(X_1 - \bar{X}_1)^2$	X_2	$X_2 - \bar{X}_2$	$(X_2 - \bar{X}_2)^2$	X_3	$X_3 - \bar{X}_3$	$(X_3 - \bar{X}_3)^2$
2061/62	5.47	(1.31)	1.7161	6.46	1.56	2.4336	2.67	(1.71)	2.9241
2062/63	8.06	1.28	1.6384	4.14	(0.76)	0.5776	1.64	(2.74)	7.5076
2063/64	5.64	(1.14)	1.2996	4.24	(0.66)	0.4356	4.77	0.39	0.1521
2064/65	5.28	(1.50)	2.25	2.94	(1.96)	3.8416	5.73	1.35	1.8225
2065/66	9.45	2.67	7.1289	6.71	1.81	3.2761	7.09	2.71	7.3441
Total	**33.9**	-	**14.033**	**24.49**	-	**10.5645**	**21.9**	-	**19.7504**

1) Calculation of arithmetic mean

$$\bar{X}_1 = \frac{X_1}{n_1} \qquad \bar{X}_2 = \frac{X_2}{n_2} \qquad \bar{X}_3 = \frac{X_3}{n_3}$$

$$= \frac{33.90}{5} \qquad = \frac{24.49}{5} \qquad = \frac{21.90}{5}$$

$$= 6.78 \qquad\qquad = 4.90 \qquad\qquad = 4.38$$

2) Calculation of Standard deviation

$$\sigma_{X1} = \sqrt{\frac{(X_1 - \bar{X}_1)^2}{n_{X1}}} \qquad \sigma_{X2} = \sqrt{\frac{(X_2 - \bar{X}_2)^2}{n_{X2}}}$$

$$\sigma_{X3} = \sqrt{\frac{(X_3 - \bar{X}_3)^2}{n_{X3}}}$$

$$\sigma_{X1} = \sqrt{\frac{14.33}{5}} \qquad \sigma_{X2} = \sqrt{\frac{10.56}{5}} \qquad \sigma_{X3} = \sqrt{\frac{19.75}{5}}$$

= 1.68%   = 1.45%   = 1.99%

3) Calculation of co-efficient of variation (CV)

$$C.V._{fX1A} \, \text{X} \, \frac{\dagger_{X1}}{\overline{X_1}} \qquad C.V._{fX2A} \, \text{X} \, \frac{\dagger_{X2}}{\overline{X_2}} \qquad C.V._{fX3A} \, \text{X} \, \frac{\dagger_{X3}}{\overline{X_3}}$$

$$\text{X} \, \frac{1.68}{6.78} \qquad\qquad \text{X} \, \frac{1.45}{4.90} \qquad\qquad \text{X} \, \frac{1.99}{4.38}$$

$$= 0.25 \qquad\qquad = 0.30 \qquad\qquad = 0.45$$

Appendix – I-h

Calculation of Mean ($\overline{X}$), Standard Deviation (σ) and Coefficient of Variation (C.V.) of CRR Ratio

Bank	NIBL			HBL			NABIL		
Fiscal Year	X_1	$X_1 - \overline{X}_1$	$(X_1 - \overline{X}_1)^2$	X_2	$X_2 - \overline{X}_2$	$(X_2 - \overline{X}_2)^2$	X_3	$X_3 - \overline{X}_3$	$(X_3 - \overline{X}_3)^2$
2061/62	9.78	(1.24)	1.5376	7.86	1.54	2.3716	3.83	(2.27)	5.1529
2062/63	13.61	2.59	6.7081	5.92	(0.40)	0.1600	3.26	(2.84)	8.0656
2063/64	10.47	(0.55)	0.3025	5.92	(0.40)	0.1600	6.00	(0.10)	0.01
2064/65	10.91	(0.11)	0.0121	5.13	(1.19)	1.4161	8.37	2.27	5.1529
2065/66	10.32	(0.70)	0.4900	6.76	0.44	0.1936	9.03	2.93	8.5849
Total	**55.09**	-	**9.0503**	**31.59**	-	**4.3013**	**30.49**	-	**26.9663**

1) Calculation of arithmetic mean

$$\overline{X}_1 = \frac{X_1}{n_1} \qquad \overline{X}_2 = \frac{X_2}{n_2} \qquad \overline{X}_3 = \frac{X_3}{n_3}$$

$$= \frac{55.09}{5} \qquad = \frac{31.59}{5} \qquad = \frac{30.49}{5}$$

$$= 11.02 \qquad\qquad = 6.32 \qquad\qquad = 6.10$$

2) Calculation of Standard deviation

$$\sigma_{X1} = \sqrt{\frac{(X_1 - \overline{X}_1)^2}{n_{X1}}} \qquad \sigma_{X2} = \sqrt{\frac{(X_2 - \overline{X}_2)^2}{n_{X2}}}$$

$$\sigma_{X3} = \sqrt{\frac{(X_3 - \overline{X}_3)^2}{n_{X3}}}$$

$$\sigma_{X1} = \sqrt{\frac{9.05}{5}} \qquad \sigma_{X2} = \sqrt{\frac{4.30}{5}} \qquad \sigma_{X3} = \sqrt{\frac{26.97}{5}}$$

| = 1.35% | | = 0.93% | | = 2.32% |

3) Calculation of co-efficient of variation (CV)

$$C.V._{fX1A} \, X \frac{\dagger_{X1}}{X_1} \qquad C.V._{fX2A} \, X \frac{\dagger_{X2}}{X_2} \qquad C.V._{fX3A} \, X \frac{\dagger_{X3}}{X_3}$$

$$X \frac{1.35}{11.02} \qquad\qquad X \frac{0.93}{6.32} \qquad\qquad X \frac{2.32}{6.10}$$

$$= 0.12 \qquad\qquad = 0.15 \qquad\qquad = 0.38$$

Appendix – I-i

Calculation of Mean ($\overline{X}$), Standard Deviation (†) and Coefficient of Variation (C.V.) of Balance with NRB to Current Deposit Ratio

Bank	NIBL			HBL			NABIL		
Fiscal Year	X_1	$X_1 Z \overline{X}_1$	$(X_1 Z \overline{X}_1)^2$	X_2	$X_2 Z \overline{X}_2$	$(X_2 Z \overline{X}_2)^2$	X_3	$X_3 Z \overline{X}_3$	$(X_3 Z \overline{X}_3)^2$
2061/62	49.27	(26.25)	689.0625	31.79	(1.86)	3.4596	13.93	(14.18)	201.0724
2062/63	89.45	13.93	194.0449	21.80	(11.85)	140.4225	10.92	(17.19)	295.4961
2063/64	63.49	(12.03)	144.7209	22.77	(10.88)	118.3744	32.78	4.67	21.8089
2064/65	57.98	(17.54)	307.6516	19.57	(14.08)	198.2464	34.61	6.50	42.2500
2065/66	117.41	41.89	1754.7721	72.34	38.69	1496.9161	48.33	20.22	408.8484
Total	**377.6**	-	**3,090.25**	**168.27**		**1957.419**	**140.57**	-	**969.4758**

1) Calculation of arithmetic mean

$$\overline{X}_1 = \frac{X_1}{n_1} \qquad \overline{X}_2 = \frac{X_2}{n_2} \qquad \overline{X}_3 = \frac{X_3}{n_3}$$

$$= \frac{377.60}{5} \qquad = \frac{168.27}{5} \qquad = \frac{140.57}{5}$$

$$= 75.52 \qquad\qquad = 33.65 \qquad\qquad = 28.11$$

2) Calculation of Standard deviation

$$\dagger_{X1} = \sqrt{\frac{(X_1 Z \overline{X}_1)^2}{n_{X1}}} \qquad \dagger_{X2} = \sqrt{\frac{(X_2 Z \overline{X}_2)^2}{n_{X2}}}$$

$$\dagger_{X3} = \sqrt{\frac{(X_3 Z \overline{X}_3)^2}{n_{X3}}}$$

$$\dagger_{X1} = \sqrt{\frac{3090.25}{5}} \qquad \dagger_{X2} = \sqrt{\frac{1957.20}{5}} \qquad \dagger_{X3} = \sqrt{\frac{969.48}{5}}$$

= 24.86%	= 19.79%	= 13.92%

3) Calculation of co-efficient of variation (CV)

$$C.V._{fX1A} \, \text{X} \, \frac{\dagger_{X1}}{X_1} \qquad C.V._{fX2A} \, \text{X} \, \frac{\dagger_{X2}}{X_2} \qquad C.V._{fX3A} \, \text{X} \, \frac{\dagger_{X3}}{X_3}$$

$$\text{X} \, \frac{24.86}{75.52} \qquad\qquad \text{X} \, \frac{19.79}{33.65} \qquad \text{X} \, \frac{13.92}{28.11}$$

= 0.33	= 0.59	= 0.50

Appendix – I-j

Calculation of Mean ($\overline{X}$), Standard Deviation ($\dagger$) and Coefficient of Variation (C.V.) of Investment in Government Securities to Total Deposit Ratio

Bank	NIBL			HBL			NABIL		
Fiscal Year	X_1	$X_1 Z\overline{X}_1$	$(X_1 z\overline{X}_1)^2$	X_2	$X_2 Z\overline{X}_2$	$(X_2 z\overline{X}_2)^2$	X_3	$X_3 Z\overline{X}_3$	$(X_3 z\overline{X}_3)^2$
2061/62	13.67	2.67	7.1289	22.04	2.33	5.4289	16.55	1.85	3.4225
2062/63	13.47	2.47	6.1009	19.42	(0.29)	0.0841	11.89	(2.81)	7.8961
2063/64	13.30	2.30	5.2900	21.48	1.77	3.1329	20.60	5.90	34.8100
2064/65	9.16	(1.84)	3.3856	23.47	3.76	14.1376	14.56	(0.14)	0.0196
2065/66	5.42	(5.58)	31.1364	12.14	(7.57)	57.3049	9.92	(4.78)	22.8484
Total	55.02	-	53.0418	98.55	-	80.0884	73.52	-	68.9966

1) Calculation of arithmetic mean

$$\overline{X}_1 X \frac{X_1}{n_1} \qquad \overline{X}_2 X \frac{X_2}{n_2} \qquad \overline{X}_3 X \frac{X_3}{n_3}$$

$$X \frac{55.02}{5} \qquad X \frac{98.55}{5} \qquad X \frac{73.52}{5}$$

$$= 11 \qquad\qquad = 19.71 \qquad\qquad = 14.70$$

2) Calculation of Standard deviation

$$\dagger_{X1} X \sqrt{\frac{(X_1 Z\overline{X}_1)^2}{n_{X1}}} \qquad \dagger_{X2} X \sqrt{\frac{(X_2 Z\overline{X}_2)^2}{n_{X2}}}$$

$$\dagger_{X3} X \sqrt{\frac{(X_3 Z\overline{X}_3)^2}{n_{X3}}}$$

$$\dagger_{X1} X \sqrt{\frac{53.04}{5}} \qquad \dagger_{X2} X \sqrt{\frac{80.09}{5}} \qquad \dagger_{X3} X \sqrt{\frac{69}{5}}$$

= 3.26%	= 4%	= 3.71%

3) <u>Calculation of co-efficient of variation (CV)</u>

$$C.V._{fX1A} X \frac{\dagger_{X1}}{\overline{X}_1} \qquad C.V._{fX2A} X \frac{\dagger_{X2}}{\overline{X}_2} \qquad C.V._{fX3A} X \frac{\dagger_{X3}}{\overline{X}_3}$$

$$X \frac{3.26}{11} \qquad\qquad X \frac{4}{19.71} \qquad\qquad X \frac{3.71}{14.70}$$

= 0.30	= 0.20	= 0.25

Appendix – I-k

Calculation of Mean ($\overline{X}$), Standard Deviation ($\dagger$) and Coefficient of Variation (C.V.) of Cash in Vault to Current Deposit Ratio

Bank	NIBL			HBL			NABIL		
Fiscal Year	X_1	$X_1 Z \overline{X}_1$	$fX_1 Z \overline{X}_1 \mathring{A}$	X_2	$X_2 Z \overline{X}_2$	$fX_2 Z \overline{X}_2 \mathring{A}$	X_3	$X_3 Z \overline{X}_3$	$fX_3 Z \overline{X}_3 \mathring{A}$
2061/62	23.63	(13.81)	190.7161	5.69	-1.40	1.9600	5.22	-3.44	11.8336
2062/63	33.00	(4.44)	19.7136	6.07	-1.02	1.0404	8.18	-0.48	0.2304
2063/64	35.13	(2.31)	5.3361	3.17	-3.92	15.3664	7.95	-0.71	0.5041
2064/65	46.64	9.20	84.6400	5.81	-1.28	1.6384	9.67	1.01	1.0201
2065/66	48.79	11.35	128.8225	14.73	7.64	58.3696	12.30	3.64	13.2496
Total	**187.19**	-	**429.2283**	**35.47**	-	**78.3748**	**43.32**	-	**26.8378**

1) Calculation of arithmetic mean

$$\overline{X}_1 \ X \ \frac{X_1}{n_1} \qquad \overline{X}_2 \ X \ \frac{X_2}{n_2} \qquad \overline{X}_3 \ X \ \frac{X_3}{n_3}$$

$$X \frac{187.19}{5} \qquad X \frac{35.47}{5} \qquad X \frac{43.32}{5}$$

$$= 37.44 \qquad = 7.09 \qquad = 8.66$$

2) Calculation of Standard deviation

$$\dagger_{X1} \ X \sqrt{\frac{fX_1 Z \overline{X}_1 \mathring{A}}{n_{X1}}} \qquad \dagger_{X2} \ X \sqrt{\frac{fX_2 Z \overline{X}_2 \mathring{A}}{n_{X2}}}$$

$$\dagger_{X3} \ X \sqrt{\frac{fX_3 Z \overline{X}_3 \mathring{A}}{n_{X3}}}$$

$$\dagger_{X1} \ X \sqrt{\frac{429.23}{5}} \qquad \dagger_{X2} \ X \sqrt{\frac{78.37}{5}} \qquad \dagger_{X3} \ X \sqrt{\frac{26.84}{5}}$$

= 9.21%   = 3.96%   = 2.32%

3) Calculation of co-efficient of variation (CV)

$$C.V._{fX1A} \times \frac{\dagger_{X1}}{\overline{X}_1} \qquad C.V._{fX2A} \times \frac{\dagger_{X2}}{\overline{X}_2} \qquad C.V._{fX3A} \times \frac{\dagger_{X3}}{\overline{X}_3}$$

$$X \frac{9.21}{37.44} \qquad X \frac{3.96}{7.09} \qquad X \frac{2.32}{8.66}$$

= 0.25   = 0.56   = 0.27

Appendix – I-l

Calculation of Mean ($\overline{X}$), Standard Deviation (σ) and Coefficient of Variation (C.V.) of Capital Adequacy Ratio (CAR)

Bank	NIBL			HBL			NABIL		
Fiscal Year	X_1	$X_1-\overline{X}_1$	$(X_1-\overline{X}_1)^2$	X_2	$X_2-\overline{X}_2$	$(X_2-\overline{X}_2)^2$	X_3	$X_3-\overline{X}_3$	$(X_3-\overline{X}_3)^2$
2061/62	11.58	(0.07)	0.0049	11.01	(0.61)	0.3721	12.44	0.72	0.5184
2062/63	11.97	0.32	0.1024	11.26	(0.36)	0.1296	12.31	0.59	0.3481
2063/64	12.17	0.52	0.2704	12.11	0.49	0.2401	12.04	0.32	0.1024
2064/65	11.28	(0.37)	0.1369	12.70	1.08	1.1664	11.10	(0.62)	0.3844
2065/66	11.24	(0.41)	0.1681	11.02	(0.60)	0.3600	10.70	(1.02)	1.0404
Total	**58.24**		**0.6827**	**58.10**		**2.2682**	**58.59**		**2.3937**

1) Calculation of arithmetic mean

$$\overline{X}_1 = \frac{X_1}{n_1} \qquad \overline{X}_2 = \frac{X_2}{n_2} \qquad \overline{X}_3 = \frac{X_3}{n_3}$$

$$= \frac{58.24}{5} \qquad = \frac{58.10}{5} \qquad = \frac{58.59}{5}$$

$$= 11.65 \qquad\qquad = 11.62 \qquad\qquad = 11.72$$

2) Calculation of Standard deviation

$$\sigma_{X1} = \sqrt{\frac{(X_1-\overline{X}_1)^2}{n_{X1}}} \qquad \sigma_{X2} = \sqrt{\frac{(X_2-\overline{X}_2)^2}{n_{X2}}}$$

$$\sigma_{X3} = \sqrt{\frac{(X_3-\overline{X}_3)^2}{n_{X3}}}$$

$$\sigma_{X1} = \sqrt{\frac{0.68}{5}} \qquad \sigma_{X2} = \sqrt{\frac{2.27}{5}} \qquad \sigma_{X3} = \sqrt{\frac{2.39}{5}}$$

| | = 0.37% | | = 0.67% | | = 0.69% |

3) Calculation of co-efficient of variation (CV)

$$C.V._{fX1A} X \frac{\dagger_{X1}}{\overline{X}_1} \qquad C.V._{fX2A} X \frac{\dagger_{X2}}{\overline{X}_2} \qquad C.V._{fX3A} X \frac{\dagger_{X3}}{\overline{X}_3}$$

$$X \frac{0.37}{11.65} \qquad X \frac{0.67}{11.62} \qquad X \frac{0.69}{11.72}$$

$$= 0.03 \qquad = 0.06 \qquad = 0.06$$

Appendix – II-a

Calculation of Trend Analysis of Total Deposit

Banks		NIBL		HBL		NABIL	
F Y	X	Y_1	XY_1	Y_2	XY_2	Y_3	XY_3
2061/62	-2	14,255.00	(28,510.00)	24,814.00	(49,628.00)	14,587.00	(29,174.00)
2062/63	-1	18,927.00	(18,927.00)	26,491.00	(26,491.00)	19,347.00	(19,347.00)
2063/64	0	24,489.00	-	30,048.00	-	23,342.00	-
2064/65	1	34,452.00	34,452.00	31,843.00	31,843.00	31,915.00	31,915.00
2065/66	2	46,698.00	93,396.00	34,681.00	69,362.00	37,348.00	74,696.00
Total		138,821.00	80,411.00	147,877.00	25,086.00	126,539.00	58,090.00

Calculation of intercept of 'y' when x = 0

$$a_1 \; X \frac{Y_1}{n_1} \qquad\qquad a_2 \; X \frac{Y_2}{n_2} \qquad\qquad a_3 \; X \frac{Y_3}{n_3}$$

$$X \frac{138,821.00}{5} \qquad\qquad X \frac{147,877.00}{5} \qquad\qquad X \frac{126,539.00}{5}$$

$$= 27,764.20 \qquad\qquad = 29,575.40 \qquad\qquad = 25,307.80$$

Calculation of Slope of Trend Line

$$b_1 \; X \frac{XY_1}{X^2} \qquad\qquad b_2 \; X \frac{XY_2}{X^2} \qquad\qquad b_3 \; X \frac{XY_3}{X^2}$$

$$X \frac{80,411.00}{10} \qquad\qquad X \frac{25,086.00}{10} \qquad\qquad X \frac{58,090.00}{10}$$

$$= 8,041.10 \qquad\qquad = 2,508.60 \qquad\qquad = 5,809.00$$

Therefore, The Trend Equations are:

$$Y_1 = a_1 + b_1 X \qquad\qquad Y_2 = a_2 + b_2 X$$
$$Y_3 = a_3 + b_3 X$$

Year	When X=	$Y_1 = 27,764.20 + 8,041.1X$	$Y_2 = 29,575.40 + 2,508.60X$	$Y_3 = 25,307.80 + 5,809X$
2061/62	-2	11,682.00	24,558.20	13,689.80
2062/63	-1	19,723.10	27,066.80	19,498.80
2063/64	0	27,764.20	29,575.40	25,307.80
2064/65	1	35,805.30	32,084.00	31,116.80
2065/66	2	43,846.40	34,592.60	36,925.80
2066/67	3	51,887.50	37,101.20	42,734.80
2067/68	4	59,928.60	39,609.80	48,543.80

Appendix – II-b

Calculation of Trend Analysis of Total Investment

Banks		NIBL		HBL		NABIL	
F Y	X	Y_1	XY_1	Y_2	XY_2	Y_3	XY_3
2061/62	-2	3,934.00	(7,868.00)	11,692.00	(23,384.00)	4,276.00	(8,552.00)
2062/63	-1	5,603.00	(5,603.00)	10,889.00	(10,889.00)	6,179.00	(6,179.00)
2063/64	0	6,506.00	0	11,823.00	0	8,945.00	0
2064/65	1	6,874.00	6,874.00	13,340.00	13,340.00	9,940.00	9,940.00
2065/66	2	7,400.00	14,800.00	8,711.00	17,422.00	10,826.00	21,652.00
Total		30,317.00	8,203.00	56,455.00	(3,511.00)	40,166.00	16,861.00

Calculation of intercept of 'y' when x = 0

$$a_1 \; X \frac{Y_1}{n_1} \qquad a_2 \; X \frac{Y_2}{n_2} \qquad a_3 \; X \frac{Y_3}{n_3}$$

$$X \frac{30,317.0.00}{5} \qquad X \frac{56,455.00}{5} \qquad X \frac{40,166.00}{5}$$

$$= 6,063.40 \qquad\qquad = 11,291.00 \qquad\qquad = 8,033.20$$

Calculation of Slope of Trend Line

$$b_1 \; X \frac{XY_1}{X^2} \qquad b_2 \; X \frac{XY_2}{X^2} \qquad b_3 \; X \frac{XY_3}{X^2}$$

$$X \frac{8,203.00}{10} \qquad X \frac{-3,511.00}{10} \qquad X \frac{16,861.00}{10}$$

$$= 820.30 \qquad\qquad = -351.10 \qquad\qquad = 1,686.10$$

Therefore, The Trend Line Equations are:

$$Y_1 = a_1 + b_1 X \qquad\qquad Y_2 = a_2 + b_2 X \qquad\qquad Y_3 = a_3 + b_3 X$$

Year	When X=	$Y_1 = 6,063.40 + 820.30X$	$Y_2 = 11,291 + (-351.10)X$	$Y_3 = 8,033.20 + 1,686.10X$
2061/62	-2	4,422.80	11,993.20	4,661.00
2062/63	-1	5,243.10	11,642.10	6,347.10
2063/64	0	6,063.40	11,291.00	8,033.20
2064/65	1	6,883.70	10,939.90	9,719.30
2065/66	2	7,704.00	10,588.80	11,405.40
2066/67	3	8,524.30	10,237.70	13,091.50
2067/68	4	9,344.60	9,886.60	14,777.60

Appendix – II-c

Calculation of Trend Analysis of Total Loans and Advances

Banks		NIBL		HBL		NABIL	
F Y	X	Y_1	XY_1	Y_2	XY_2	Y_3	XY_3
2061/62	-2	10,126.00	(20,252.00)	12,425.00	(24,850.00)	10,586.00	(21,172.00)
2062/63	-1	12,776.00	(12,776.00)	14,643.00	(14,643.00)	12,923.00	(12,923.00)
2063/64	0	17,286.00	-	16,998.00	-	15,546.00	-
2064/65	1	26,997.00	26,997.00	19,498.00	19,498.00	21,365.00	21,365.00
2065/66	2	36,241.00	72,482.00	24,793.00	49,586.00	27,590.00	55,180.00
Total		103,426.00	66,451.00	88,357.00	29,591.00	88,010.00	42,450.00

Calculation of intercept of 'y' when x = 0

$$a_1 \; X\frac{Y_1}{n_1} \qquad\qquad a_2 \; X\frac{Y_2}{n_2} \qquad\qquad a_3 \; X\frac{Y_3}{n_3}$$

$$X\frac{103,426.00}{5} \qquad\qquad X\frac{88,357.00}{5} \qquad\qquad X\frac{88,010.00}{5}$$

$$= 20,685.20 \qquad\qquad = 17,641.40 \qquad\qquad = 17,602.00$$

Calculation of Slope of Trend Line

$$b_1 \; X\frac{XY_1}{X^2} \qquad\qquad b_2 \; X\frac{XY_2}{X^2} \qquad\qquad b_3 \; X\frac{XY_3}{X^2}$$

$$X\frac{66,451.00}{10} \qquad\qquad X\frac{29,591.00}{10} \qquad\qquad X\frac{42,450.00}{10}$$

$$= 6,645.10 \qquad\qquad = 2,959.10 \qquad\qquad = 4,245.00$$

Therefore, The Trend Equations are:

$$Y_1 = a_1 + b_1 X \qquad\qquad Y_2 = a_2 + b_2 X \qquad\qquad Y_3 = a_3 + b_3 X$$

Year	When X=	$Y_1 = 20{,}685.20 + 6{,}645.10X$	$Y_2 = 17{,}641.10 + 2{,}959.10X$	$Y_3 = 17{,}602 + 4{,}245X$
2061/62	-2	7,395.00	11,722.90	9,112.00
2062/63	-1	14,040.10	14,682.00	13,357.00
2063/64	0	20,685.20	17,641.10	17,602.00
2064/65	1	27,330.30	20,600.20	21,847.00
2065/66	2	33,975.40	23,559.30	26,092.00
2066/67	3	40,620.50	26,518.40	30,337.00
2067/68	4	47,265.60	29,477.50	34,582.00

Appendix – II-d

Calculation of Trend Analysis of Cash & Bank Balance Ratio

Banks		NIBL		HBL		NABIL	
F Y	X	Y_1	XY_1	Y_2	XY_2	Y_3	XY_3
2061/62	-2	9.40	(18.80)	8.11	(16.22)	3.83	(7.66)
2062/63	-1	12.34	(12.34)	6.48	(6.48)	3.26	(3.26)
2063/64	0	9.97	-	5.85	-	6.00	-
2064/65	1	10.90	10.90	4.55	4.55	8.37	8.37
2065/66	2	16.96	33.92	8.79	17.58	9.02	18.04
Total		**59.57**	**13.68**	**33.78**	**(0.57)**	**30.48**	**15.49**

Calculation of intercept of 'y' when x = 0

$$a_1 \, X \frac{Y_1}{n_1} \qquad\qquad a_2 \, X \frac{Y_2}{n_2} \qquad\qquad a_3 \, X \frac{Y_3}{n_3}$$

$$X \frac{59.57}{5} \qquad\qquad X \frac{33.78}{5} \qquad\qquad X \frac{30.48}{5}$$

$$= 11.91 \qquad\qquad = 6.76 \qquad\qquad = 6.10$$

Calculation of Slope of Trend Line

$$b_1 \, X \frac{XY_1}{X^2} \qquad\qquad b_2 \, X \frac{XY_2}{X^2} \qquad\qquad b_3 \, X \frac{XY_3}{X^2}$$

$$X \frac{13.68}{10} \qquad\qquad X \frac{-0.57}{10} \qquad\qquad X \frac{15.49}{10}$$

$$= 1.37 \qquad\qquad = -0.06 \qquad\qquad = 1.55$$

Therefore, The Trend Equations are:

$$Y_1 \mathrm{X} a_1 \, \Gamma \, b_1 X \qquad\qquad Y_2 \mathrm{X} a_2 \, \Gamma \, b_2 X \qquad\qquad Y_3 \mathrm{X} a_3 \, \Gamma \, b_3 X$$

Year	When X=	$Y_1 \mathrm{X} 11.91 \, \Gamma \, 1.37X$	$Y_2 \mathrm{X} 6.76 \, \mathrm{Z} \, 0.06X$	$Y_3 \mathrm{X} 6.10 \, \Gamma \, 1.55X$
2061/62	-2	9.17	6.88	3.00
2062/63	-1	10.54	6.82	4.55
2063/64	0	11.91	6.76	6.10
2064/65	1	13.28	6.70	7.65
2065/66	2	14.65	6.64	9.20
2066/67	3	16.02	6.58	10.75
2067/68	4	17.39	6.52	12.30

Appendix – II-e

Calculation of Trend Analysis of CRR Ratio

Banks		NIBL		HBL		NABIL	
F Y	X	Y_1	XY_1	Y_2	XY_2	Y_3	XY_3
2061/62	-2	9.78	(19.56)	7.86	(15.72)	3.83	(7.66)
2062/63	-1	13.61	(13.61)	5.92	(5.92)	3.26	(3.26)
2063/64	0	10.47	-	5.92	-	6.00	-
2064/65	1	10.91	10.91	5.13	5.13	8.37	8.37
2065/66	2	10.32	20.64	6.76	13.52	9.03	18.06
Total		55.09	(1.62)	31.59	(2.99)	30.49	15.51

Calculation of intercept of 'y' when x = 0

$$a_1 \; X \frac{Y_1}{n_1} \qquad\qquad a_2 \; X \frac{Y_2}{n_2} \qquad\qquad a_3 \; X \frac{Y_3}{n_3}$$

$$X \frac{55.09}{5} \qquad\qquad X \frac{31.59}{5} \qquad\qquad X \frac{30.49}{5}$$

$$= 11.02 \qquad\qquad = 6.32 \qquad\qquad = 6.10$$

Calculation of Slope of Trend Line

$$b_1 \; X \frac{XY_1}{X^2} \qquad\qquad b_2 \; X \frac{XY_2}{X^2} \qquad\qquad b_3 \; X \frac{XY_3}{X^2}$$

$$X \frac{-1.62}{10} \qquad\qquad X \frac{-2.99}{10} \qquad\qquad X \frac{15.51}{10}$$

$$= -0.16 \qquad\qquad = -0.30 \qquad\qquad = 1.55$$

Therefore, The Trend Equations are:

$$Y_1 \,\mathrm{X}\, a_1 \,\Gamma\, b_1 X \qquad\qquad Y_2 \,\mathrm{X}\, a_2 \,\Gamma\, b_2 X \qquad\qquad Y_3 \,\mathrm{X}\, a_3 \,\Gamma\, b_3 X$$

Year	When X=	$Y_1 \,\mathrm{X}\, 11.02\, Z\, 0.06X$	$Y_2 \,\mathrm{X}\, 6.32\, Z\, 0.30X$	$Y_3 \,\mathrm{X}\, 6.10\, \Gamma\, 1.55X$
2061/62	-2	11.34	6.92	3.00
2062/63	-1	11.18	6.62	4.55
2063/64	0	11.02	6.32	6.10
2064/65	1	10.86	6.02	7.65
2065/66	2	10.70	5.72	9.20
2066/67	3	10.54	5.42	10.75
2067/68	4	10.38	5.12	12.30

Appendix – III-a

Calculation of correlation of Coefficient between total deposit and total Investment of NIBL (in million)

FY	Deposit(X)	Investment (Y)	x= $X Z \overline{X}$	y= $Y Z \overline{Y}$	x^2	y^2	xy
2061/62	14,255.00	3,934.00	(13,509.20)	(2,129.40)	182,498,484.64	4,534,344.36	28,766,4
2062/63	18,927.00	5,603.00	(8,837.20)	(460.40)	78,096,103.84	211,968.16	4,068,6
2063/64	24,489.00	6,506.00	(3,275.20)	442.60	10,726,935.04	195,894.76	(1,449,60
2064/65	34,452.00	6,874.00	6,687.80	810.60	44,726,668.84	657,072.36	5,421,1
2065/66	46,698.00	7,400.00	18,933.80	1,336.60	358,488,782.44	1,786,499.56	25,306,9
Total	**138,821.00**	**30,317.00**	-	-	**674,536,974.80**	**7,385,779.20**	**62,113,5**

Calculation of arithmetic mean

$$\overline{X} \, X \frac{X}{n} \qquad\qquad \overline{Y} \, X \frac{Y}{n}$$

$$X \frac{138821}{5} \qquad\qquad X \frac{30317}{5}$$

= 27764.20   = 6063.40

Calculation of correlation co-efficient (r)

$$r \, X \frac{xy}{\sqrt{x^2}\sqrt{y^2}} \qquad\qquad r \, X \frac{62,113,581.60}{\sqrt{674,536,974.8}\sqrt{7,385,779.20}}$$

$$r \, X \frac{62,113,581.60}{70,583,177.31}$$

=0.88

Therefore, the co-efficient of determination (r^2) is 0.77

Calculation of probable error (PE)

$$= 0.6745 \frac{1 - r^2}{\sqrt{n}} \qquad\qquad = 0.6745 \frac{1 - 0.77}{\sqrt{5}}$$

$$= 0.6745 \times \frac{0.23}{2.24} \qquad\qquad = 0.06 \ \text{ or } 6\%$$

Calculation of correlation of Coefficient between total deposit and total Investment of HBL

FY	Deposit(X)	Investment (Y)	x= $X Z\overline{X}$	y=$Y Z\overline{Y}$	X²	y²	xy
2061/62	24,814.00	11,692.00	(4,761.40)	401.00	22,670,929.96	160,801.00	(1,909,321.40)
2062/63	26,491.00	10,889.00	(3,084.40)	(402.00)	9,513,523.36	161,604.00	1,239,928.80
2063/64	30,048.00	11,823.00	472.60	532.00	223,350.76	283,024.00	251,423.20
2064/65	31,843.00	13,340.00	2,267.60	2,049.00	5,142,009.76	4,198,401.00	4,646,312.40
2065/66	34,681.00	8,711.00	5,105.60	(2,580.00)	26,067,151.36	6,656,400.00	(13,172,448)
Total	**147,877.00**	**56,455.00**	**-**	**-**	**63,616,965.20**	**11,460,230.00**	**(8,944,105.00)**

<u>**Calculation of arithmetic mean**</u>

$$\overline{X} \text{ X} \frac{X}{n} \qquad \overline{Y} \text{ X} \frac{Y}{n}$$

$$\text{X} \frac{147877}{5} \qquad \text{X} \frac{56455}{5}$$

$$= 29575.40 \qquad = 11291$$

<u>**Calculation of correlation co-efficient (r)**</u>

$$r \text{ X} \frac{xy}{\sqrt{x^2}\sqrt{y^2}} \qquad r \text{ X} \frac{-8,944,105}{\sqrt{63,616,965.20}\sqrt{11,460,230}}$$

$$r \ \text{X} \frac{-8,944,105}{27,001,204.66} \qquad = -0.33$$

Therefore, the co-efficient of determination (r^2) is 0.11

Calculation of probable error (PE)

$$=0.6745 \ \frac{\left[1 - r^2 \right]}{\sqrt{n}} \qquad\qquad =0.6745 \ \frac{\left[1 - 0.11 \right]}{\sqrt{5}}$$

$$=0.6745 \ \text{x} \ \frac{0.89}{2.24} \qquad\qquad = 0.25 \ \text{or} \ 25\%$$

Calculation of correlation of Coefficient between total deposit and total Investment of NABIL

FY	Deposit (X)	Investment (Y)	x= $X - \overline{X}$	y= $Y - \overline{Y}$	x^2	y^2	xy
2061/62	14,587.00	4,276.00	(10,720.80)	(3,757.20)	114,935,552.64	14,116,551.84	40.280.189.76
2062/63	19,347.00	6,179.00	(5,960.80)	(1,854.20)	35,531,136.64	3,438,057.64	11.052.515.36
2063/64	23,342.00	8,945.00	(1,965.80)	911.80	3,864,369.64	831,379.24	(1.792.416.44)
2064/65	31,915.00	9,940.00	6,607.20	1,906.80	43,655,091.84	3,635,886.24	12,598,608.96
2065/66	37,348.00	10,826.00	12,040.20	2,792.80	144,966,416.04	7,799,731.84	33,625,870.56
Total	126,539.00	40,166.00	-	-	342,952,566.80	29,821,606.80	95,764,768.20

Calculation of arithmetic mean

$$\overline{X} = \frac{X}{n} \qquad\qquad \overline{Y} = \frac{Y}{n}$$

$$= \frac{126539}{5} \qquad\qquad = \frac{40166}{5}$$

$$=25307.80 \qquad\qquad =8033.20$$

Calculation of correlation co-efficient(r)

$$r = \frac{xy}{\sqrt{x^2}\sqrt{y^2}}$$

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$$r\ \text{X} \frac{95,764,768.20}{\sqrt{342,952,566.80}\sqrt{29,821,606.80}}$$

$$r\ \text{X} \frac{95,764,768.20}{101,130,591.80}$$

=0.95

Therefore, the co-efficient of determination (r^2) is 0.90

Calculation of probable error(PE)

$$=0.6745 \frac{\left(1 - r^2\right)}{\sqrt{n}}$$

$$=0.6745 \frac{\left(1 - 0.90\right)}{\sqrt{5}}$$

$$=0.6745 \text{x} \frac{0.10}{2.24}$$

=0.03 or 3%

Appendix – III-b

Calculation of correlation of Coefficient between total deposit and Loans & Advances of NIBL

FY	Deposit(X)	Loans & Advances(Y)	x= $X Z\overline{X}$	y= $Y Z\overline{Y}$	x^2	y^2	xy
2061/62	14,255.00	10,126.00	(13,509.20)	(10,559.20)	182,498,484.64	111,496,704.64	142,646,34
2062/63	18,927.00	12,776.00	(8,837.20)	(7,909.20)	78,096,103.84	62,555,444.64	69,895,18
2063/64	24,489.00	17,286.00	(3,275.20)	(3,399.20)	10,726,935.04	11,554,560.64	11,133,05
2064/65	34,452.00	26,997.00	6,687.80	6,311.80	44,726,668.84	39,838,819.24	42,212,05
2065/66	46,698.00	36,241.00	18,933.80	15,555.80	358,488,782.44	241,982,913.64	294,530,40
Total	138,821.00	103,426.00	-	-	674,536,974.80	467,428,442.80	560,417,04

Calculation of arithmetic mean

$$\overline{X} \: X \frac{X}{n} \qquad\qquad \overline{Y} \: X \frac{Y}{n}$$

$$X\frac{138821}{5} \qquad\qquad X\frac{103426}{5}$$

= 27764.20   = 20685.20

Calculation of correlation co-efficient (r)

$$r \: X \frac{xy}{\sqrt{x^2}\sqrt{y^2}} \qquad\qquad r \: X \frac{560,417,048.80}{\sqrt{674,536,974.80}\sqrt{467,428,442.80}}$$

$$r \: X \frac{560,417,048.80}{561,513,817.94}$$

=1

Therefore, the co-efficient of determination (r^2) is 1

Calculation of probable error (PE)

$$=0.6745 \frac{\sqrt{\sum Zr^2 A}}{\sqrt{n}} \qquad\qquad =0.6745 \frac{\sqrt{\sum Z1A}}{\sqrt{5}}$$

$$=0.6745 \times \frac{0}{2.24} \qquad\qquad = 0.00 \text{ or } 0\%$$

Calculation of correlation of Coefficient between total deposit and Loans & Advances of HBL

FY	Deposit (X)	Loans & Advances (Y)	x= $X Z \overline{X}$	y= $Y Z \overline{Y}$	x^2	y^2	xy
2061/62	24,814.00	12,425.00	(4,761.40)	(5,246.40)	22,670,929.96	27,524,712.96	24,980,208.96
2062/63	26,491.00	14,643.00	(3,084.40)	(3,028.40)	9,513,523.36	9,171,206.56	9,340,796.96
2063/64	30,048.00	16,998.00	472.60	(673.40)	223,350.76	453,467.56	(318,248.84)
2064/65	31,843.00	19,498.00	2,267.60	1,826.60	5,142,009.76	3,336,467.56	4,141,998.16
2065/66	34,681.00	24,793.00	5,105.60	7,121.60	26,067,151.36	50,717,186.56	36,360,040.96
Total	147,877.00	88,357.00	-	-	63,616,965.20	91,203,041.20	74,504,796.20

Calculation of arithmetic mean

$$\overline{X} X \frac{X}{n} \qquad \overline{Y} X \frac{Y}{n}$$

$$X\frac{147877}{5} \qquad X\frac{88357}{5}$$

= 29575.40   = 17671.40

Calculation of correlation co-efficient (r)

$$r X \frac{xy}{\sqrt{x^2}\sqrt{y^2}}$$

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$$r \text{ X} \frac{74{,}504{,}796.20}{\sqrt{63{,}616{,}965.20}\ \sqrt{91{,}203{,}041.20}}$$

$$r \text{ X} \frac{74{,}504{,}796.20}{76{,}171{,}259}$$

=0.98

Therefore, the co-efficient of determination (r^2) is 0.96

Calculation of probable error (PE)

$$=0.6745\,\frac{\hat{1}\,Z\,r^{2}\,\hat{A}}{\sqrt{n}}$$

$$=0.6745\,\frac{\hat{1}\,Z\,0.96\,\hat{A}}{\sqrt{5}}$$

$$=0.6745 \text{ x } \frac{0.04}{2.24}$$

= 0.01 or 1%

Calculation of correlation of Coefficient between total deposit and Loans & Advances of NABIL

FY	Deposit(X)	Loans & Advances (Y)	x= $X Z \overline{X}$	y= $Y Z \overline{Y}$	x^2	y^2	xy
2061/62	14,587.00	10,586.00	(10,720.80)	(7,016.00)	114,935,552.64	49,224,256.00	75,217,132.
2062/63	19,347.00	12,923.00	(5,960.80)	(4,679.00)	35,531,136.64	21,893,041.00	27,890,583.
2063/64	23,342.00	15,546.00	(1,965.80)	(2,056.00)	3,864,369.64	4,227,136.00	4,041,684.
2064/65	31,915.00	21,365.00	6,607.20	3,763.00	43,655,091.84	14,160,169.00	24,862,893.
2065/66	37,348.00	27,590.00	12,040.20	9,988.00	144,966,416.04	99,760,144.00	120,257,517.
Total	126,539.00	88,010.00	-	-	342,952,566.80	189,264,746.00	252,269,812

Calculation of arithmetic mean

$$\overline{X} X \frac{X}{n} \qquad \overline{Y} X \frac{Y}{n}$$

$$X \frac{126539}{5} \qquad X \frac{88010}{5}$$

=25307.80   =17602

Calculation of correlation co-efficient(r)

$$r X \frac{xy}{\sqrt{x^2} \sqrt{y^2}} \qquad r X \frac{252,269,812}{\sqrt{342,952,566.80} \sqrt{189,264,746}}$$

$$r X \frac{252,269,812}{254,772,114.73}$$

=0.99

Therefore, the co-efficient of determination (r^2) is 0.98

Calculation of probable error(PE)

$$=0.6745\frac{1-Zr^2A}{\sqrt{n}} \qquad\qquad =0.6745\frac{1-Z0.98A}{\sqrt{5}}$$

$$=0.6745\text{x}\frac{0.02}{2.24} \qquad =0.01\text{ or }1\%$$

Appendix – III-c

Calculation of correlation of Coefficient between Total Deposit and Cash & Bank Balance of NIBL

FY	Deposit(X)	Cash & Bank Balance (Y)	x= $X Z \overline{X}$	y= $Y Z \overline{Y}$	x^2	y^2	xy
2061/62	14,255.00	1,340.00	(13,509.20)	(2,218.20)	182,498,484.64	4,920,411.24	29,966,10
2062/63	18,927.00	2,336.00	(8,837.20)	(1,222.20)	78,096,103.84	1,493,772.84	10,800,82
2063/64	24,489.00	2,442.00	(3,275.20)	(1,116.20)	10,726,935.04	1,245,902.44	3,655,77
2064/65	34,452.00	3,755.00	6,687.80	196.80	44,726,668.84	38,730.24	1,316,15
2065/66	46,698.00	7,918.00	18,933.80	4,359.80	358,488,782.44	19,007,856.04	82,547,58
Total	138,821.00	17,791.00	-	-	674,536,974.80	26,706,672.80	128,286,45

<u>Calculation of arithmetic mean</u>

$$\overline{X} X \frac{X}{n} \qquad \overline{Y} X \frac{Y}{n}$$

$$X \frac{138821}{5} \qquad X \frac{17791}{5}$$

$$= 27764.20 \qquad = 3558.20$$

<u>Calculation of correlation co-efficient (r)</u>

$$r X \frac{xy}{\sqrt{x^2} \sqrt{y^2}} \qquad r X \frac{128,286,45 1.80}{\sqrt{674,536,974.80} \sqrt{26,706,672.80}}$$

$$r X \frac{128,286,45 1.80}{134,218,62 1.20}$$

$$= 0.96$$

Therefore, the co-efficient of determination (r^2) is 0.92

Calculation of probable error (PE)

$$=0.6745 \frac{1 - Zr^2A}{\sqrt{n}} \qquad\qquad =0.6745 \frac{1 - Z0.92A}{\sqrt{5}}$$

$$=0.6745 \times \frac{0.08}{2.24} \qquad\qquad = 0.02 \text{ or } 2\%$$

Calculation of correlation of Coefficient between Total Deposit and Cash & Bank Balance of HBL

FY	Deposit (X)	Cash & Bank Balance (Y)	x= $X Z \overline{X}$	y= $Y Z \overline{Y}$	x^2	y^2	xy
2061/62	24,814.00	2,014.00	(4,761.40)	17.20	22,670,929.96	295.84	(81,896.08)
2062/63	26,491.00	1,717.00	(3,084.40)	(279.80)	9,513,523.36	78,288.04	863,015.12
2063/64	30,048.00	1,757.00	472.60	(239.80)	223,350.76	57,504.04	(113,329.48)
2064/65	31,843.00	1,448.00	2,267.60	(548.80)	5,142,009.76	301,181.44	(1,244,458.88)
2065/66	34,681.00	3,048.00	5,105.60	1,051.20	26,067,151.36	1,105,021.44	5,367,006.72
Total	**147,877.00**	**9,984.00**	-	-	**63,616,965.20**	**1,542,290.80**	**4,790,337.40**

Calculation of arithmetic mean

$$\overline{X} X \frac{X}{n} \qquad \overline{Y} X \frac{Y}{n}$$

$$X \frac{147877}{5} \qquad X \frac{9984}{5}$$

$$= 29575.40 \qquad = 1996.80$$

Calculation of correlation co-efficient (r)

$$r X \frac{xy}{\sqrt{x^2}\sqrt{y^2}}$$

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$$r \text{ X} \dfrac{4{,}790{,}337.40}{\sqrt{63{,}616{,}965.20}\ \sqrt{1{,}542{,}290.80}}$$

$$r \text{ X} \dfrac{4{,}790{,}337.40}{9{,}905{,}345.03}$$

=0.48

Therefore, the co-efficient of determination (r^2) is 0.23

Calculation of probable error (PE)

$$=0.6745 \dfrac{\{1 Z r^2 A\}}{\sqrt{n}}$$

$$=0.6745 \dfrac{\{1 Z 0.23 A\}}{\sqrt{5}}$$

$$=0.6745 \text{ x } \dfrac{0.77}{2.24}$$

$$= 0.23 \text{ or } 23\%$$

Calculation of correlation of Coefficient between Total Deposit and Cash & Bank Balance of NABIL

FY	Deposit(X)	Cash & Bank Balance (Y)	$x = X - \overline{X}$	$y = Y - \overline{Y}$	x^2	y^2	xy
2061/62	14,587.00	559.00	(10,720.80)	(1,167.40)	114,935,552.64	1,362,822.76	12,515,461.9
2062/63	19,347.00	630.00	(5,960.80)	(1,096.40)	35,531,136.64	1,202,092.96	6,535,421.1
2063/64	23,342.00	1,400.00	(1,965.80)	(326.40)	3,864,369.64	106,536.96	641,637.1
2064/65	31,915.00	2,671.00	6,607.20	944.60	43,655,091.84	892,269.16	6,241,161.1
2065/66	37,348.00	3,372.00	12,040.20	1,645.60	144,966,416.04	2,707,999.36	19,813,353.1
Total	126,539.00	8,632.00	-	-	342,952,566.80	6,271,721.20	45,747,034.4

Calculation of arithmetic mean

$$\overline{X} = \frac{X}{n} \qquad \overline{Y} = \frac{Y}{n}$$

$$= \frac{126539}{5} \qquad = \frac{8632}{5}$$

$$=25307.80 \qquad =1726.40$$

Calculation of correlation co-efficient(r)

$$r = \frac{xy}{\sqrt{x^2}\sqrt{y^2}} \qquad r = \frac{45,747,034.40}{\sqrt{342,952,566.80}\sqrt{6,271,721.20}}$$

$$r = \frac{45,747,034.40}{46,377,827.50}$$

$$=0.99$$

Therefore, the co-efficient of determination (r^2) is 0.98

Calculation of probable error(PE)

$$=0.6745 \frac{1-Zr^2A}{\sqrt{n}} \qquad\qquad =0.6745 \frac{1-Z0.98A}{\sqrt{5}}$$

$$=0.6745 \times \frac{0.02}{2.24} \qquad =0.01 \text{ or } 1\%$$

Appendix – III-d

Calculation of correlation of Coefficient between Total Deposit and Investment in Govt. Securities of NIBL

FY	Deposit(X)	Inv. In Govt. Securities (Y)	x= $X Z\overline{X}$	y= $Y Z\overline{Y}$	x^2	y^2	xy
2061/62	14,255.00	1,948.00	(13,509.20)	(740.00)	182,498,484.64	547,600.00	9,996,80
2062/63	18,927.00	2,550.00	(8,837.20)	(138.00)	78,096,103.84	19,044.00	1,219,53
2063/64	24,489.00	3,256.00	(3,275.20)	568.00	10,726,935.04	322,624.00	(1,860,31
2064/65	34,452.00	3,155.00	6,687.80	467.00	44,726,668.84	218,089.00	3,123,20
2065/66	46,698.00	2,531.00	18,933.80	(157.00)	358,488,782.44	24,649.00	(2,972,60
Total	138,821.00	13,440.00	-	-	674,536,974.80	1,132,006.00	9,506,62

Calculation of arithmetic mean

$$\overline{X} X \frac{X}{n} \qquad \overline{Y} X \frac{Y}{n}$$

$$X\frac{138821}{5} \qquad X\frac{13440}{5}$$

$$= 27764.20 \qquad = 2688$$

Calculation of correlation co-efficient (r)

$$r X \frac{xy}{\sqrt{x^2}\sqrt{y^2}} \qquad r X \frac{9,506,624}{\sqrt{674,536,974.80}\sqrt{1,132,006}}$$

$$r X \frac{9,506,624}{27,632,949.58}$$

$$= 0.34$$

Therefore, the co-efficient of determination (r^2) is 0.12

Calculation of probable error (PE)

$$=0.6745 \frac{1-Zr^2 A}{\sqrt{n}} \qquad\qquad =0.6745 \frac{1-Z0.12A}{\sqrt{5}}$$

$$=0.6745 \times \frac{0.88}{2.24} \qquad\qquad = 0.26 \text{ or } 26\%$$

Calculation of correlation of Coefficient between Total Deposit and Investment in Govt. Securities of HBL

FY	Deposit (X)	Inv. In Govt. Securities (Y)	x= $X - \overline{X}$	y= $Y - \overline{Y}$	x^2	y^2	xy
2061/62	24,814.00	5,470.00	(4,761.40)	(280.60)	22,670,929.96	78,736.36	1,336,048.84
2062/63	26,491.00	5,144.00	(3,084.40)	(606.60)	9,513,523.36	367,963.56	1,870,997.04
2063/64	30,048.00	6,455.00	472.60	704.40	223,350.76	496,179.36	332,899.44
2064/65	31,843.00	7,472.00	2,267.60	1,721.40	5,142,009.76	2,963,217.96	3,903,446.64
2065/66	34,681.00	4,212.00	5,105.60	(1,538.60)	26,067,151.36	2,367,289.96	(7,855,476.16)
Total	**147,877.00**	**28,753.00**	-	-	**63,616,965.20**	**6,273,387.20**	**(412,084.20)**

Calculation of arithmetic mean

$$\overline{X} = \frac{X}{n} \qquad \overline{Y} = \frac{Y}{n}$$

$$= \frac{147877}{5} \qquad = \frac{28753}{5}$$

$$= 29575.40 \qquad = 5750.60$$

Calculation of correlation co-efficient (r)

$$r = \frac{xy}{\sqrt{x^2}\sqrt{y^2}}$$

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$$r\ \text{X}\ \frac{-412{,}084.20}{\sqrt{63{,}616{,}965.20}\ \sqrt{6{,}273{,}387.20}}$$

$$r\ \text{X}\ \frac{-412{,}084.20}{19{,}977{,}333.54}$$

= -0.02

Therefore, the co-efficient of determination (r^2) is 0

Calculation of probable error (PE)

$$=0.6745\ \frac{1-r^2}{\sqrt{n}} \qquad\qquad =0.6745\ \frac{1-0}{\sqrt{5}}$$

$$=0.6745\ \text{x}\ \frac{1}{2.24} \qquad\qquad = 0.29\ \text{ or }\ 29\%$$

Calculation of correlation of Coefficient between Total Deposit and Investment in Govt. Securities of NABIL

FY	Deposit(X)	Inv. In Govt. Securities(Y)	x= $X - \overline{X}$	y= $Y - \overline{Y}$	x^2	y^2	xy
2061/62	14,587.00	2,414.00	(10,720.80)	(1,161.20)	114,935,552.64	1,348,385.44	12,448,992.
2062/63	19,347.00	2,301.00	(5,960.80)	(1,274.20)	35,531,136.64	1,623,585.64	7,595,251.
2063/64	23,342.00	4,808.00	(1,965.80)	1,232.80	3,864,369.64	1,519,795.84	(2,423,438.2
2064/65	31,915.00	4,647.00	6,607.20	1,071.80	43,655,091.84	1,148,755.24	7,081,596.
2065/66	37,348.00	3,706.00	12,040.20	130.80	144,966,416.04	17,108.64	1,574,858.
Total	126,539.00	17,876.00	-	-	342,952,566.80	5,657,630.80	26,277,261

Calculation of arithmetic mean

$$\overline{X} = \frac{\sum X}{n} \qquad \overline{Y} = \frac{\sum Y}{n}$$

$$= \frac{126539}{5} \qquad = \frac{17876}{5}$$

=25307.80   =17602

Calculation of correlation co-efficient(r)

$$r = \frac{\sum xy}{\sqrt{\sum x^2}\sqrt{\sum y^2}} \qquad r = \frac{26,277,261.20}{\sqrt{342,952,566.80}\sqrt{5,657,630.80}}$$

$$r = \frac{26,277,261.20}{44,048,825.24}$$

=0.60

Therefore, the co-efficient of determination (r^2) is 0.36

Calculation of probable error(PE)

$$=0.6745\frac{\left[1-r^2\right]}{\sqrt{n}} \qquad\qquad =0.6745\frac{\left[1-0.36\right]}{\sqrt{5}}$$

$$=0.6745 \times \frac{0.64}{2.24} \qquad\qquad =0.19 \text{ or } 19\%$$

To find out the are all banks maintaining liquidity?, factor affecting liquidity, maintaining CRR, NRB monitoring, problems in liquidity management, technique to manage Liquidity and etc. For this purpose, research questions are made and asked to the respondents. During the research I went to some commercial Banks and I asked following questions to the top level officers:

1. What are the factors affecting liquidity?
2. How is the liquidity position of your bank?
3. How the liquidity position of Commercial Banks is changing?
4. Is the CRR Ratio maintained by Banks is sufficient for Liquidity management? And should it be increased or decreased?
5. Is NRB effectively monitoring the liquidity management?
6. What is/are the main problem/s about the liquidity management?
7. How can liquidity be managed effectively?